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FINAL
WASTE MANAGEMENT
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT
for
Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste

Volume V of V

Response to Public Comments

U.S. Department of Energy
Office of Environmental Management
1000 Independence Ave.
Washington, DC 20585

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RESPONSIBLE FEDERAL AGENCY: U.S. Department of Energy

TITLE: Final Waste Management Programmatic Environmental Impact Statement

CONTACT: For further information about this Environmental Impact Statement, contact:

David Hoel
Office of Waste Management, EM-35
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585
(202) 586-3977

For general information on the U.S. Department of Energy National Environmental Policy Act process, call 1-800-472-2756 to leave a message or contact:

Carol Borgstrom, Director
Office of NEPA Policy and Assistance (EH-42)
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585
(202) 586-4600

ABSTRACT: The Final Waste Management Programmatic Environmental Impact Statement (WM PEIS) examines the potential environmental and cost impacts of strategic management alternatives for managing five types of radioactive and hazardous wastes that have resulted and will continue to result from nuclear energy research and the development, production, and testing of nuclear weapons at a variety of sites around the United States. The five waste types are low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste. The WM PEIS provides information on the impacts of various siting alternatives, which the Department of Energy (DOE) will use to decide at which sites to locate additional treatment, storage, and disposal capacity for each waste type. This information includes the cumulative impacts of combining future siting configurations for the five waste types and the collective impacts of other past, present, and reasonably foreseeable future activities.

The selected waste management facilities being considered for these different waste types are treatment and disposal facilities for low-level mixed waste; treatment and disposal facilities for low-level waste; treatment and storage facilities for transuranic waste in the event that treatment is required before disposal; storage facilities for created (vitrified) high-level waste canisters; and treatment of nonwastewater hazardous waste by DOE and commercial vendors. In addition to the No Action Alternative, which includes only existing of approved waste management facilities, the alternatives for each of the waste-type configurations include Decentralized, Regionalized, and Centralized Alternatives for using existing and operating new waste management facilities. However, the siting, construction, and operations of any new facility at a selected site will not be decided until completion of a sitewide or project-specific environmental impact review.

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Introduction

This volume of the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) summarizes the comments on the Draft PEIS that the U.S. Department of Energy (DOE) received during the public comment period, and provides DOE responses to those comments.

The Draft WM PEIS was issued for public review and comment on September 22, 1995. In response to requests from the public, DOE extended the original 90-day comment period (September 22 to December 21, 1995) to February 19, 1996 (a total of 150 days).

During the 150-day public comment period, which included 13 public hearings in 18 cities across the United States, DOE received over 5,000 comments from more than 1,200 individuals, agencies, and organizations. Approximately 4,000 individuals cosigned letters or signed petitions.

How DOE Considered Public Comments in the NEPA Process

In compliance with the provisions of the National Environmental Policy Act (NEPA) (42 USC 4321 *et seq.*) and regulations of the President's Council on Environmental Quality (CEQ) (40 CFR 1500-1508), DOE assessed and considered public comments on the Draft WM PEIS, both individually and collectively. Some comments led to PEIS modifications; others resulted in a response to explain or communicate DOE policy, to clarify the scope of the WM PEIS, to explain the relationship of this PEIS to other related NEPA documentation, to refer commentors to information in the PEIS, to answer technical questions, to further explain technical issues, or to correct readers' misinterpretations.

Public input contributed to the development of decision factors and criteria, defined as desirable attributes or characteristics that measure the relative acceptability of alternatives, which were used to identify candidate preferred alternatives These factors and criteria include, but are not limited to, human health risk, environmental impacts, regulatory compliance, DOE and site waste management missions, technology development, transportation, cost, and mitigation. Volume I, Section 1.7.3, describes the factors and criteria DOE used to select preferred alternatives, which are identified or described in Volume I, Section 3.7, of the Final WM PEIS.

Public comments also provided valuable suggestions for improving the WM PEIS. A brief summary of public comments and resulting changes to the PEIS is provided in Volume I, Section 1.7.2. Responses to public comments given in this volume (Volume V) identify specific WM PEIS changes made as a result of the comments.

How to Find Individual Comments and Responses

The table at the back of this volume provides the guide to locating comments provided by individuals and organizations, as well as summaries of comments provided at public hearings. Individuals are listed first, alphabetically; organizations are listed second, alphabetically; and public hearings are listed last, alphabetically, by the city in which the hearing was held. To find each comment and DOE's response, locate the commentor's name (individual or organization) in the guide and turn to the index locations listed. The numbers in parentheses following the index numbers identify comments/responses. These are tracking numbers used in the WM PEIS comment/response computer database. In this comment/response volume, these numbers are in numerical order within each section, which permits commentors to locate their comments. The guide includes the entries "Anonymous" and "Illegible." Anonymous entries include comments provided in documents that did not identify the commentor or an organization. Illegible indicates names that were unreadable.

Comments that were the same or very similar to others were grouped and summarized and a single DOE response is provided. Thus, commentors might not read their exact words, but the essence of each comment is captured in the grouping. If an individual or organization is listed more than once in the guide, this indicates that DOE received more than one letter from the commentor, each containing different comments.

Public hearing participants who asked to have their comments specifically attributed to them are included in the list of individuals. Petitions are attributed to the first person who signed the petition or to the person who mailed the petition, if identified. The remaining petitioners are not listed individually. Be assured, however, that all petitions, written comments, and public hearing comments are accounted for and responded to in this volume. DOE also received a number of letters that did not contain comments (requests for copies of the PEIS, change of address notifications, etc.). These persons are not listed in the guide to comments and responses.

A "reverse index" to public comments is available in the DOE WM PEIS public reading rooms. The reverse index can be used by readers to identify the individual(s) attributed to each of the comments.

Supporting Documents and Technical References

Many of the responses to public comments in this volume refer to supporting technical reports, databases, DOE Orders, Federal laws and regulations, and other DOE EISs. DOE has not included these on the list of references provided at the back of this volume because they are listed and described in Volume I, Sections 1.4 and 1.8 cited as appropriate in Volumes I, II, III, and IV, and listed as references at the back of chapters and appendices. The Volume V list of references includes only references unique to Volume V.

List of Acronyms and Abbreviations

AED	Aerodynamic Equivalent Diameter
Ames	Ames Laboratory
ALARA	As Low as Reasonably Achievable
ANL-E	Argonne National Laboratory - East
AQCR	Air Quality Control Region
AQRV	Air Quality Related Values
ARAM	Automated Remedial Action Methodology
BACT	Best Available Control Technology
BEIR	Biological Effects of Ionizing Radiation
BEMR	Baseline Environmental Management Report
Bettis	Bettis Atomic Power Laboratory
BNL	Brookhaven National Laboratory
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH	Contact-handled
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CY	Calendar Year
D&D	Decontamination and Decommissioning
DARHT	Dual-Access Radiographic Hydrodynamic Test
DCF	Dose Conversion Factors
DNAPL	Dense, Nonaqueous-Phase Liquids
DNFSB	Defense Nuclear Facility Safety Board
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DUST	Disposal Unit Source Term
DWPF	Defense Waste Processing Facility
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ETEC	Energy Technology Engineering Center
FEMP	Fernald Environmental Management Project
Fermi	Fermi National Accelerator Laboratory
FFCAct	Federal Facility Compliance Act
FR	Federal Register
FTE	Full-time Equivalent
FY	Fiscal Year
GTCC	Greater-Than-Class C
Hanford	Hanford Site

List of Acronyms and Abbreviations

INEL	Idaho National Engineering Laboratory
IRIS	Integrated Risk Information System
K-25	Oak Ridge K-25 Site
LANL	Los Alamos National Laboratory
LBL	Lawrence Berkeley Laboratory
LLMW	Low-Level Mixed Waste
LLNL	Lawrence Livermore National Laboratory
LLW	Low-Level Waste
MEI	Maximally Exposed Individual
MEPAS	Multimedia Environmental Pollutant Assessment System
Mound	Mound Plant
MWMF	Mixed Waste Management Facility
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
Norfolk	Norfolk Naval Shipyard
NRC	U.S. Nuclear Regulatory Commission
NTS	Nevada Test Site
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
PAEC	Potentially Adverse Effects Concentrations
Pantex	Pantex Plant
PEIS	Programmatic Environmental Impact Statement
PGDP	Paducah Gaseous Diffusion Plant
Pinellas	Pinellas Plant
PLC	Potentially Life-Threatening Concentration
PM_{10}	Particulate matter of aerodynamic diameter less than 10 micrometers
SEIS-I	WIPP Supplement Environmental Impact Statement
SEIS-II	WIPP Disposal Phase Supplemental Environmental Impact Statement
SNF	Spent Nuclear Fuel
SNL-CA	Sandia National Laboratories (California)
SNL-NM	Sandia National Laboratories (New Mexico)
SRS	Savannah River Site
STP	Site Treatment Plan
TLV	Threshold Limit Values
TRUW	Transuranic Waste
TSCA	Toxic Substances Control Act

List of Acronyms and Abbreviations

VOC	Volatile Organic Compound
WIPP	Waste Isolation Pilot Plant
WM PEIS	Waste Management Programmatic Environmental Impact Statement
WVDP	West Valley Demonstration Project
Y-12	Oak Ridge Y-12 Plant

1. Purpose and Need for Action

Comment (3036)
Protection of the environment should be an element of the WM PEIS purpose and need and should be reflected throughout the PEIS.

Response
Protecting the environment is an important goal of DOE's waste management activities. DOE revised Volume I, Section 2.2, of the WM PEIS to include enhanced protection of the environment, as well as protection of public health and safety, as part of the WM PEIS purpose and need statement. This goal is also reflected throughout the PEIS. For example, Volume I, Section 1.1, states that the PEIS will help DOE continue to protect workers, public health and safety, and the environment.

Each waste-type chapter in the PEIS (Chapters 6 through 10 in Volume I) discusses the health risks and environmental impacts specific to one of the five waste types considered in the WM PEIS. Chapter 12 identifies ways DOE could mitigate potential adverse impacts.

Comment (3331)
DOE intends to use this WM PEIS as a *tool* to help select sites for waste management activities, but the PEIS does not select any specific location. Isn't this the U.S. Department of Energy? Isn't this the agency responsible for managing 54 U.S. sites? Isn't this the agency that is supposed to be sure all sites are meeting the criteria today? Doesn't this document address the treatment, storage, and disposal of radioactive and hazardous waste? Isn't this the agency the American people empowered by Congressional Act? Then why was this document written?

Response
The WM PEIS evaluates the potential environmental consequences of alternative configurations of a nationwide program for managing radioactive and hazardous waste, as discussed in Volume I, Section 1.1. Based on the factors and criteria identified in Section 1.7.3 DOE has identified preferred alternatives and a configuration of sites for each of the five waste types considered in the document. The results of the WM PEIS will provide input on environmental topics which, combined with other considerations (e.g., budget constraints, national priorities, site agreements with States), will contribute to the final decision on a national waste management configuration to be identified in Records of Decision. The WM PEIS will also provide a general point of reference for site-specific NEPA documents prepared to support decisions and locating waste management facilities on particular sites (see Volume I, Section 1.8).

2. Proposed Action

Comment (3352)
The Draft WM PEIS states that DOE needs to improve the management of its current and anticipated volumes of low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste in order to comply with all laws and to protect public health and safety. Implicit in this statement is that the current management system does not protect human health and the environment as well as it could and is possibly not in compliance with applicable laws. Yet, by DOE's own admission, the facilities that are going to *improve* this situation are not going to be in operation for at least 10 years, and probably longer. That means that the current situation of unacceptable release levels will continue a decade or more. Therefore, the situation for the next 10 to 20 years could have a significant impact on the environment. Yet this impact is not analyzed in the PEIS.

Response
DOE revised the text cited in the comment (Section 2.2) to clarify that DOE will manage its current and anticipated waste volumes in order to comply with all applicable Federal and State laws, to protect public health and safety, and to enhance protection of the environment.

DOE is committed to operating its hazardous and radioactive waste management activities in compliance with applicable regulations and in a way that protects human health and the environment. For purposes of the programmatic analysis the WM PEIS provides, DOE made the generalizing assumption that all waste management facilities necessary to implement a given alternative would be constructed in an initial 10-year period, followed by a 10-year operations period. Exceptions to this assumption would include a full 20-year operations phase (i.e., construction phase not applicable) for the No Action Alternative, and the site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS. The WM PEIS analysis is highly conceptual and DOE recognizes that construction of actual facilities could occur within a much shorter time period and that waste will begin to be processed at some facilities before construction at all facilities is completed. Nevertheless, DOE believes that the WM PEIS provides a reasonable and conservative estimate of environmental impacts sufficient to support programmatic decisionmaking.

As required by NEPA, the WM PEIS includes an analysis of the impacts of a No Action Alternative. In this PEIS, "no action" is defined as a continuation of current programs. As a part of current programs, some facility upgrades would be necessary to continue to comply with applicable regulations in an efficient, cost-effective manner. Continuing current programs would not result in chronic unacceptable releases because existing DOE waste management facilities routinely meet all regulatory requirements for releases to the environment and would continue to do so. Thus, DOE does not expect significant adverse impacts to the environment from ongoing activities during the period before new waste management facilities begin to operate.

Comment (3539)
The issues addressed in EISs should not be limited to potential problems for which there are practical near-term solutions. EISs "should not be used as tools to sell the development of a piece of property."

Response
The WM PEIS is a national study that examines the environmental impacts of managing DOE's radioactive and hazardous wastes. This strategy is expanding waste management horizons by developing new waste management options and analytical approaches to ensure safe and efficient

2. Proposed Action

management of DOE's radioactive and hazardous wastes, to comply with all applicable Federal and State laws, to protect public health and safety, and to protect the environment.

The PEIS expands existing options and looks into the future to find long-term management solutions for the waste types considered in the document, especially in light of the long-term hazards posed by certain waste materials. The PEIS analyzes candidate DOE sites for the management of its radioactive and hazardous wastes, but is not intended to be used as tools to "sell the development of a piece of property."

3. Waste Management Alternatives

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(No comments were received for this section)

3.1 General Comments, Not Waste-Type Specific

Comment (13)
What will actually be done with DOE wastes?

Response
DOE will manage its wastes by some combination of treatment, storage, and disposal, depending on the waste type. DOE has made no final decisions about how and where to treat, store, and dispose of low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste. Rather, DOE is developing a Department-wide strategy for managing these wastes. This WM PEIS evaluates the environmental impacts and costs of management at alternative DOE sites, for the five types of waste. It will be part of the basis for decisions about how and where to manage the waste. Decisions will be announced in Records of Decision (RODs) to be published in the *Federal Register* following publication of the Final PEIS.

Comment (36)
Why would DOE build more storage facilities under the No Action Alternative?

Response
The No Action Alternative represents the status quo of DOE waste management operations, and includes existing or planned waste management facilities. For low-level mixed waste and transuranic waste, current practice is to store waste until treatment and disposal capability is available. The PEIS continues this practice, adding storage capacity at each site to accommodate the additional waste generated during the next 20 years. Impacts for construction and operation of the additional storage are evaluated. For low-level waste, waste is shipped for disposal at one of six currently operating disposal sites. Thus, there is no requirement for additional storage. For high-level waste, additional storage is approved for SRS and Hanford; this was evaluated as planned facilities under the No Action Alternative. No additional storage was assumed for hazardous waste.

Comment (197)
Allow DOE sites to manage and monitor all the Nation's wastes and to be continually scrutinized by the public and government agencies.

Response
DOE is responsible for managing its wastes in accordance with all applicable laws and regulations. The management of non-DOE wastes (e.g., from commercial reactors) is outside the scope of the WM PEIS.

DOE strongly believes that its programs benefit from open exchange and coordination with the public, and with other government agencies. DOE welcomes public input to further improve its waste management activities.

Comment (220)
DOE should factor into the WM PEIS analysis the possibility that it will have an additional waste burden from failed commercial facilities. The analysis should factor in any change in "economy of scale" from DOE-generated waste processing to waste generated elsewhere.

3.1 General Comments, Not Waste-Type Specific

Response
DOE is not responsible for radioactive waste from commercial facilities. Therefore, such waste is beyond the scope of the WM PEIS. The U.S. Nuclear Regulatory Commission (NRC) or a State delegated by NRC to manage radioactive waste (NRC Agreement State) is responsible for regulating commercial facilities.

Comment (391)
DOE needs to examine waste management issues across the complex to gain a national "big picture."

Response
DOE believes that the WM PEIS provides the national "big picture" that will help with long-term planning efforts and be part of the basis for future decisions concerning the configuration of DOE's waste treatment, storage, and disposal complex.

Comment (487)
If a waste program is not safe it should not be in anyone's backyard.

Response
The purpose of this WM PEIS is to enhance, on a national level, the management of DOE's current and anticipated volumes of low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste in order to ensure safe and efficient management of these wastes, to comply with applicable laws and regulations, and to protect public health and safety and the environment. This study provides information on the impacts to alternative DOE sites. DOE will use this information in deciding where to locate additional treatment, storage, and disposal facilities for each waste type.

The WM PEIS analyzes impacts to human health and the environment for the proposed waste management alternatives. It also considers the cumulative impacts when the waste management actions are added to other past, present, and reasonably foreseeable future actions. If a particular site is chosen for a new waste management operation as a result of the PEIS analysis, additional sitewide or project-level NEPA documentation would be prepared.

Comment (542)
The project [Department-wide waste management as described in the WM PEIS] is consistent with the goals and objectives of the State of South Carolina, Grant Services Unit.

Response
Thank you for your comment.

Comment (1147)
We prefer alternatives that minimize transportation of these waste products as much as practicable.

Response
WM PEIS decision criteria and factors, which DOE used to select preferred alternatives, include favoring selection of alternatives and sites to minimize adverse environmental impacts and balancing the number of shipments with potential environmental risks, safety consequences, public concerns, mission needs, and costs. These criteria and factors are described in Volume I, Section 1.7.3.

3.1 General Comments, Not Waste-Type Specific

The PEIS includes a detailed assessment of risks associated with accidents from both rail and truck transportation, including low probability/high consequence and high probability/low consequence accidents. DOE found that risks from transportation accidents would be low under all alternatives. The Decentralized Alternative, however, would minimize transportation, while the Regionalized and Centralized Alternatives involve increased transportation.

Section 3.7 in Volume I of the WM PEIS provides DOE's preferred alternatives and the reasons they are preferred.

Comment (1288)
The impact of importing wastes to Livermore is an issue within the community.

Response
Lawrence Livermore National Laboratory (LLNL) is included in some of the proposed waste management alternatives evaluated in the WM PEIS for low-level mixed, low-level, and transuranic wastes, as described in Sections 6.3, 7.3, and 8.3 in Volume I, respectively. DOE analyzed the potential human health risks and environmental impacts associated with management activities at LLNL for each of these waste types and found that under all the alternatives risks and impacts would be small.

Comment (1570)
The WM PEIS only addresses the alternative of waste storage in perpetuity; it should address the alternative of storage predicated on total elimination of the wastes.

Response
The WM PEIS evaluates storage, treatment, and disposal of low-level mixed waste and low-level waste; treatment and storage of transuranic waste; and treatment of hazardous waste. However, because of DOE's large waste inventories and the wastes generated by ongoing operations, complete elimination of radioactive and hazardous waste does not appear feasible, even under the most effective pollution prevention plans. Volume IV, Appendix G, of the WM PEIS describes DOE's Pollution Prevention Program, DOE's waste reduction goals, and how waste management activities could be affected by pollution prevention efforts.

Comment (1638)
DOE's waste management system should reflect that the environmental management mission is dynamic and changing with time; hybrid and/or evolving configurations of management systems might be required.

Response
DOE is not constrained to select the specific configurations analyzed in the alternatives in the WM PEIS. It can select hybrid configurations as long as the impacts of alternatives analyzed in the WM PEIS include the impacts of the hybrid alternative. DOE has revised the text in Volume I, Section 3.4, of the WM PEIS to clarify how a hybrid alternative approach might be used. DOE's preferred waste management alternatives, and the reasons they are preferred, are identified in Section 3.7 in Volume I of the Final PEIS.

3.1 General Comments, Not Waste-Type Specific

Comment (1762)
All waste types and waste volumes should be on the table for the public to strategize about. Transuranic waste and low-level mixed waste are pulled out of the decisionmaking process because of WIPP and the Federal Facility Compliance Act.

Response
The PEIS addresses the management of five waste types: low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste. For transuranic waste, the PEIS analyzes potential locations for treatment and storage. DOE is analyzing the level of treatment for disposal and whether to dispose of transuranic waste at WIPP in the WIPP SEIS-II. For low-level mixed waste, the PEIS analyzes treatment and disposal decisions, but not storage because DOE assumes that it will store low-level mixed waste on the sites where it is generated until treatment and disposal. The low-level mixed waste alternatives were developed in parallel with the Federal Facility Compliance Act Site Treatment Plans. DOE's preferred alternatives for managing the five waste types and the reasons they are preferred are discussed in Section 3.7 in Volume I.

Comment (1937)
Clarify if ANL-E waste would be shipped to Idaho National Engineering Laboratory (INEL).

Response
None of the 36 alternatives analyzed in the WM PEIS include wastes generated at ANL-E being shipped to INEL. Chapters 6 through 10 in Volume I of the PEIS provide more detail on the alternatives analyzed.

Comment (2113)
None of the proposed alternatives are acceptable; rather, a moral change in DOE is required.

Response
Thank you for your comment.

Comment (2148)
Store the waste in an aboveground, monitorable facility.

Response
DOE assessed waste storage under the WM PEIS No Action Alternative. Most of this waste is stored in aboveground monitored facilities. As a matter of policy, DOE views waste storage as a temporary solution that would only defer a decision on disposal.

Comment (2306)
Assume that there will be onsite treatment. That is part of minimizing transportation.

Response
As identified in Volume I, Section 2.1, of the Final WM PEIS, DOE's proposal includes improving treatment of low-level mixed waste, low-level waste, transuranic waste preparatory to geologic disposal, and nonwastewater hazardous waste.

3.1 General Comments, Not Waste-Type Specific

Alternatives evaluated in the WM PEIS generally incorporate some type of onsite treatment. This treatment varies from the minimum treatment required to transport the waste, to treatment to meet Resource Conservation and Recovery Act (RCRA) land disposal restrictions for low-level mixed waste, for example. In general, transportation of waste offsite for treatment would be least under the Decentralized Alternatives. Note, however, that some types of treatment (e.g., solidification) actually increase the volume of waste that would need to be transported. This is because a solidifying agent such as cement might be added to the waste. U.S. Department of Transportation regulations require that some types of waste be solidified before they are transported.

DOE will consider transportation requirements in its WM PEIS evaluations (see Volume I, Sections 6.4.2, 7.4.2, 8.4.2, 9.4.2, and 10.4.2, and Volume IV, Appendix E). DOE will need to balance the number of shipments with potential environmental risks, safety consequences, public concerns, mission needs, and costs.

Comment (2317)
DOE should store nuclear waste as safely as possible near where it is generated and stop creating nuclear wastes.

Response
One of the four broad categories of alternatives analyzed in the WM PEIS is the Decentralized Alternative. Under this alternative, wastes would be managed as close to their point of origin as possible.

Radioactive and hazardous wastes were and are generated by DOE during national security and energy research facility, decontamination and decommissioning, and environmental restoration. However, DOE is strongly committed to pollution prevention. Appendix G (Volume IV) of the WM PEIS describes DOE's Pollution Prevention Program, waste reduction goals, and the implications of these activities for DOE's waste management strategy.

Comment (2416)
The various waste management alternatives for the different waste types do not, in some cases, cover a reasonable range of alternatives. A review of the list of choices, the preferred alternatives, and the tables showing treatment, storage, and disposal locations suggest that the real range of alternatives that makes sense is much narrower than the total range of alternatives analyzed.

Response
As discussed in Volume I, Section 3.2, the CEQ regulations implementing NEPA require Federal agencies to include a discussion of reasonable alternatives and provide sufficient information for each alternative so that reviewers can evaluate the comparative merits of those alternatives. Sections 1.7.3 and 3.5 in Volume I discuss the methodology for identifying alternatives. The WM PEIS analyzes four broad categories of alternatives that represent reasonable alternatives where DOE can manage its waste. These are No Action, Decentralized, Regionalized, and Centralized. CEQ regulations require that the No Action Alternative be analyzed. The sites identified in alternative configurations were chosen for evaluation based on the volume of waste they currently have in inventory, the amount of waste they expect to generate over the next 20 years, the waste's origin and treatment requirements, the waste treatment facilities at each site, and the requirements for transportation. DOE believes that application of this methodology produced a set of reasonable alternatives of the broadest range.

3.1 General Comments, Not Waste-Type Specific

Comment (2655)
Has the possibility of returning the majority of the waste back to the original mining sites been evaluated, since they are already radioactive?

Response
The CEQ regulations implementing NEPA require an EIS to evaluate all reasonable alternative actions or, where there are potentially a very large number of alternatives, a reasonable number of examples covering the full spectrum of alternatives. In general, mining sites are not necessarily located where existing geologic factors would help to contain wastes onsite. Furthermore, the characteristics of wastes are vastly different from those of the original materials that were extracted from the mines and might often be mixed with hazardous substances. Placing low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste in mining sites is not a reasonable alternative for these reasons.

Comment (3268)
The WM PEIS should not base alternatives on the viability of facilities that might or might not ever be available, and for which the future safety and effectiveness are questionable. Rather, DOE should base alternatives on long-term, monitored, and retrievable storage options. Such storage options should allow for upgrades or replacements. Disposal cannot realistically be considered as an alternative when adequate technology for disposal does not exist.

Response
DOE does not agree that the alternatives analyzed in the WM PEIS should be limited to long-term, monitored and retrievable storage options. Waste storage is considered to be a temporary solution and DOE believes decisions on disposal need to be made. The WM PEIS analysis considered the impacts of four categories of alternatives. With the exception of the No Action alternatives, the analysis considered the risk, impacts, and cost associated with the construction of treatment, storage, and disposal facilities suitable to meet the capacity requirements at each proposed site. These facilities would be constructed to meet EPA and DOE requirements, assuming best available technologies. Data for these technologies are generally based on actual operating experience; thus, adequate technology is considered to be available. Technologies and treatment processes are discussed for each waste type, other than high-level wastes, in Sections 6.2.2, 7.2.2, 8.2.2, and 10.2.2. The high-level waste analysis only considers storage of high-level waste that has already been treated. Under the No Action alternatives, minimal construction was assumed necessary. This allows for comparison of the other alternatives to the No Action, which helps to serve as a baseline.

Comment (3332)
None of the alternatives presented in the WM PEIS are good enough. Recycling is the only good alternative. DOE, you will not reprocess and reclaim plutonium. It wastes our tax dollars and creates huge quantities of "ominous" wastewater.

Response
The DOE Pollution Prevention Program encompasses those activities that involve source reduction and recycling of all waste and pollutants. Volume IV, Appendix G, of the WM PEIS provides a description of DOE's Pollution Prevention Program and a discussion of how DOE's pollution prevention efforts and practices could affect the waste volume that waste management facilities receive and, consequently, the need for such facilities.

3.1 General Comments, Not Waste-Type Specific

The processing or reclamation of plutonium is not part of the scope of this PEIS. DOE will make decisions on plutonium based on other EISs including the Fissile Materials PEIS, the Stockpile Stewardship and Management PEIS, the Pantex Sitewide EIS, the Plutonium Vault EIS, and the Plutonium Residues EIS.

Comment (3338)
While one alternative seems in the abstract to show benefits in one area (e.g., the economy), it shows increased risk in another (e.g., transportation risks or potential impacts to groundwater). For example, the Decentralized Alternatives put more groundwater at risk, while lessening transportation risks. Clean, healthy water is essential to survival on the planet, and since this is all the water we have, keeping it safe is paramount.

Response
As pointed out by the commentor, the selection of different alternatives would result in different impacts. For example, the magnitude of the transportation-related activities varies with each alternative, ranging from minimized transportation of waste for Decentralized Alternatives to significant transportation of waste for some Centralized Alternatives.

To the extent possible, the WM PEIS analyzes groundwater resources impacts as well as transportation risks. DOE considered these and other impacts in its identification of preferred alternatives for each waste type. Actual programmatic decisions will be documented in Records of Decision published in the *Federal Register*. When selecting locations for waste management facilities on selected sites, DOE will consider the results of existing relevant and required new sitewide or project-level NEPA reviews.

Comment (3349)
NEPA requires an EIS to present the impacts of the proposal, alternatives to the proposal, and preferred alternatives. DOE did not identify a preferred alternative for low-level waste treatment or disposal, transuranic waste treatment, or low-level mixed waste disposal. It is impossible to accurately comment on the proposals if we do not know exactly what is being proposed.

Response
The CEQ regulations that implement NEPA require that preferred alternatives be identified in Final EISs. Preferred alternatives need only be identified in draft EISs if the agency has a preference at the time the draft is prepared.

DOE's proposed action is the improved management of five types of waste. In the Draft WM PEIS, DOE outlined four broad categories of alternatives for managing these waste types, and identified preferred alternatives for low-level mixed waste, high-level waste, and hazardous waste. DOE sought public comments on the alternatives and also invited members of the public to identify their preferences for waste management alternatives and provide input on decision criteria to assist DOE in selecting preferred alternatives. DOE's preferred alternatives for all waste types and the reasons they are preferred are identified in Section 3.7 in Volume I of the Final WM PEIS.

3.1 General Comments, Not Waste-Type Specific

Comment (3350)
Commentors are concerned that DOE will present "hybrid" alternatives in the Final WM PEIS that were not proposed in the draft. This would violate NEPA and would deprive commentors of the opportunity to be fully informed concerning the proposals.

Response
NEPA requires DOE to analyze reasonable alternatives. The WM PEIS alternatives were developed and defined to incorporate all possible actions of DOE concerning waste management. As described in Volume I, Section 3.4, of the WM PEIS, the waste management configuration that DOE ultimately selects for a particular waste type is not necessarily limited to one of the alternatives presented. A hybrid alternative could be developed that would incorporate components from one or more of the alternatives analyzed. For example, DOE may choose to treat a particular waste type on a regionalized basis and dispose of it at a centralized location. Another example would be to select a disposal site analyzed under a centralized alternative and additionally select a second disposal site analyzed under a regionalized alternative.

The preferred alternatives are identified in Volume I, Section 3.7, of the Final WM PEIS. The waste-type chapters provide the impacts for the preferred alternatives. (See Volume I, Sections 6.16, 7.16, 8.16, 9.16, and 10.16, of the Final WM PEIS.)

Comment (3351)
All of the WM PEIS alternatives are limited to treating, storing, or disposing of waste. This organization of the PEIS is questionable. All alternatives basically propose to do the same thing, but in different places. The PEIS should present the environmental impacts of the proposal and the alternatives in comparative form, and sharply define the issues and provide a clear basis for choosing among options. By lumping all of the potential activities under three broad terms, DOE robs the public of information about the sharp differences in all of the reasonable alternatives of what can be done with the waste. For example, what about the alternative of detoxification? Is this a reasonable alternative? If detoxification is not a reasonable alternative, then DOE should explain why.

Response
DOE designed the WM PEIS to assist in the formulation of a broad national waste management strategy, including the future configuration of the DOE waste management complex. Although the configuration is analyzed on the basis of impacts related to treatment, storage, and disposal operations using generic technologies, the study does not focus on specific technologies or technology selection (e.g., detoxification). Appendix H in Volume IV of the WM PEIS describes several technologies that might be used to properly manage these wastes once the sites and configuration are selected. Hazardous waste and low-level mixed waste could contain toxic constituents. These types of waste are treated and disposed of in accordance with RCRA requirements.

Comment (3552)
The WM PEIS analyzes too many alternatives. The decision to develop multiple options unique to each waste type results in an unmanageable number of alternatives. It is not clear how the different alternatives represent a range of environmental, cultural, human health, and socioeconomic impacts.

3.1 General Comments, Not Waste-Type Specific

Response

The four broad categories of alternatives considered in the WM PEIS are the No Action, Decentralized, Regionalized, and Centralized Alternatives. However, the number of possible alternatives under these broad categories is vast, because five waste types, three management activities (treatment, storage, and disposal), and 17 major sites are evaluated. Thus, there are many possible combinations for the numbers and locations of DOE sites for treatment, storage, and disposal facilities. To narrow these combinations to a level that would permit meaningful analysis, DOE selected representative alternatives for analysis under each category.

DOE developed and defined the alternatives based on waste origin, and character; current and projected volumes and locations within the DOE complex; existing facilities and capabilities; and specialized treatment and disposal requirements. Evaluation of each alternative included impacts from the alternatives, such as human health risks; environmental, cultural, transportation and socioeconomic impacts; and costs associated with the range of waste treatment, storage, and disposal activities available to DOE.

Comment (4053)

The weapons and nuclear fuel complexes continue to produce tons of liquid and solid radioactive wastes that require temporary storage at the sites where they are generated. After a few years, these sites will inevitably evolve into permanent waste storage facilities that will be used to take in wastes from other facilities or civilian generators, whether local communities accept this outcome or not. The WM PEIS does not offer the public genuine alternatives to the continued environmental destruction of this country by further weapons research, development, and testing.

Response

This WM PEIS is a nationwide examination of the potential environmental impacts of managing five types of radioactive and hazardous wastes that result primarily from nuclear defense activities--the development, production, and testing of nuclear weapons at a variety of sites located around the United States. DOE needs to enhance its capability for managing its current and anticipated volumes of low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste in order to ensure continued safe and efficient management of these wastes, to comply with all applicable Federal and State laws, and to protect public health and safety and the environment. For each waste type, facilities are needed to treat, store, and dispose of the waste. For the first time, DOE has attempted not only to examine in an integrated fashion the impacts of Department-wide waste management decisions for each waste type, but also the cumulative impacts for all the waste facilities at a given site.

Comment (4442)

The WM PEIS Summary document should explain why Regionalized and Centralized Alternatives involving sites that do not have the largest volumes of waste were eliminated. This could involve quantitative sensitivity analyses of the tradeoffs between transportation risks (assuming maximum use of trains for waste transportation) and any differences in the risk to the maximally exposed individual (and to the population for the general public versus workers), if a given amount of waste is treated at one site versus another. The Draft WM PEIS did not provide definitive analysis showing that siting alternatives involving sites with the largest volumes of waste correspond to those that minimize impacts on the general public and the environment. This issue should be evaluated.

Response
Section 3.5 in Volume I of the WM PEIS states that in order to determine reasonable proposed sites for waste management facilities, DOE determined where the largest waste volumes are located and where transportation requirements would be minimized. However, waste volume was not the sole criterion used to identify sites for analysis. The character of the waste, specialized treatment requirements, and existing facilities were also taken into account. For example, some wastes that require special treatment, such as remote-handled low-level mixed waste (LLMW), alpha-contaminated low-level waste, and remote-handled transuranic waste, were analyzed separately, and treatment sites were chosen for analysis based on the volumes requiring special treatment, rather than on total volumes. In some cases, treatment facilities could be used for more than one waste type. Therefore, some sites were evaluated as candidate sites even where the volume of a particular waste type was not among the largest.

An advantage of regionalizing or centralizing waste management at the sites with the largest waste volumes is that these are generally larger sites with large buffer zones between the waste management facilities and the site boundaries. However, the Final PEIS now includes the results of a collective offsite population impacts analysis based on hydrology and site size/population density factors (Section 5.4.1.2.3 in Volume 1). This analysis indicates that sites like Hanford, NTS, INEL, LANL, and Pantex might be better suited for disposal than other sites.

3.2 General Comments, Waste-Type Specific

Comment (2870)
Why is there no preferred alternative for transuranic waste, since most of the transuranic waste is mixed waste and subject to the Site Treatment Plans, as is the low-level mixed waste? Note also, low-level mixed waste and transuranic waste alternatives should reflect the recent court decision, and DOE commitment to build a mixed waste processing facility at INEL.

Response
Approximately 60% of transuranic waste is mixed waste. However, for purposes of the WM PEIS analysis, all transuranic waste was considered to be mixed waste. The uncertainties associated with the treatment of transuranic waste and the WIPP facility at the time the Draft WM PEIS was developed did not allow for selection of a transuranic waste preferred alternative. While the Draft WM PEIS did not provide a preferred alternative for transuranic waste, the Final WM PEIS, consistent with the requirements of NEPA, identifies the preferred alternative for transuranic waste treatment and storage in Volume I, Section 3.7.

NEPA requires DOE to analyze all reasonable alternatives, even those that may not necessarily reflect" court decisions. Low-level mixed waste treatment at INEL was considered in the alternatives analyzed. DOE assumes the court decision referred to in the comment is the Consent Order based on the settlement agreement of October 1995 that resolved litigation between the State of Idaho and DOE and the Department of the Navy. DOE issued an amended Record of Decision for the SNF/INEL EIS to reflect the provisions of this Consent Order, which includes the requirements for DOE to commence building and operating a mixed waste treatment facility at INEL.

3.2.1 Low-Level Mixed Waste

Comment (2436)
There is essentially no range of alternatives for the treatment and disposal of remote-handled low-level mixed waste. In all alternatives, this waste is treated and disposed of at Hanford, INEL, ORR, and SRS.

Response
Remote-handled wastes often require specific technologies for safe treatment and disposal that are not routinely available at all sites. Because of concern for public health and safety and because transporting remote-handled waste is very costly, DOE is also committed to reducing the amount of remote-handled wastes transported between facilities. The WM PEIS analyzed remote-handled low-level mixed waste at the four sites where the waste currently exists--Hanford, INEL, ORR, and SRS. Because such wastes often require specific technologies for safe treatment and disposal, it would be unreasonable to consider transporting remote-handled wastes to other sites that have little, if any, experience with these wastes.

Comment (3017)
DOE should evaluate the low-level mixed waste alternative that replicates the Federal Facility Compliance Act (FFCAct) activities that the sites and states have committed to in consent agreements.

Response
To ensure that any possible configurations in the Site Treatment Plans are included in the WM PEIS analysis, DOE evaluated seven broad alternatives for management of low-level mixed waste (see Volume I, Chapter 6). Volume I, Section 3.7, of the Final WM PEIS provides the preferred alternative for low-level mixed waste management, along with the supporting rationale.

3.2.2 Low-Level Waste

Comment (1672)
For the Hanford Site and NTS, costs are similar for the centralized disposal of all low-level waste without treatment when rail or truck transportation is used. The next most cost-competitive option is $2 billion more expensive. The most cost-effective Regionalized Alternative would probably be disposal facilities at NTS and Hanford, but this alternative was not included.

Response
To the extent possible, the Regionalized Alternatives were selected to include sites that were centrally located in the regions analyzed. Therefore, the two-site Regionalized Alternatives incorporated an eastern site and a western site. This logic is supported by the waste volumes. According to Volume I, Figure 7.1-1, 981,300 cubic meters of low-level waste are located in the east and 345,100 cubic meters are located in the west.

As described in Section 7.14, the total costs of low-level waste Regionalized Alternative 7 (disposal at SRS and NTS) would be $13.9 billion--$2.8 billion more than the $11.1 billion Centralized Alternative 2 (disposal at NTS). Truck transport costs for Regionalized Alternative 7 would be $0.67 billion; for Centralized Alternative 2 they would be $2.25 billion. Assuming that approximately 60% of the $1.56 billion difference in truck transportation costs is due to shipping the eastern sites' wastes to a western site (NTS), similar shipping charges would result, regardless of whether wastes were shipped to NTS or Hanford. Therefore, an alternative that regionalizes disposal at NTS and Hanford is likely to cost more than an alternative that allows regionalized disposal at SRS and NTS or Hanford. Of course, if the geographic distribution of waste volumes changed substantially, these relationships could also change.

Comment (2048)
A commentor at the Brookhaven National Laboratory (BNL) public hearing stated that the Low-Level Radioactive Waste Siting Commission has prohibited the siting of disposal sites for radioactive wastes over a sole-source aquifer.

Response
DOE will comply with all applicable Federal and State regulations when siting waste management facilities. The WM PEIS identifies the lower aquifer system (Magothy and Raritan Formations) and the Pleistocene Upper Glacial Aquifer as sole-source aquifers and as part of the affected environment for BNL. The existence of these sole-source aquifers is, therefore, considered in the WM PEIS analysis.

Comment (2867)
In Volume I, Chapter 7, the alternatives listed do not analyze the impacts of the importation, treatment, and disposal of an intermediate amount of low-level waste to INEL. In the footnotes for all low-level waste alternatives except No Action, alpha low-level waste would be treated and disposed of at the closest of five sites. The alpha low-level waste stored at INEL is considered to be low-level mixed waste and will be treated along with the transuranic waste stored there, and both disposed of in the WIPP facility. In addition, the low-level waste waste acceptance criteria for the current disposal facility prohibits the disposal of low-level waste containing more than 10 nanocuries per gram of transuranic radionuclides.

Response

DOE used standard definitions for each of the waste types addressed in the WM PEIS that do not reflect the subtleties of site-specific definitions or waste characteristics. Additionally, the programmatic nature of the WM PEIS did not allow for the inclusion of site-specific waste acceptance criteria.

3.2.3 Transuranic Waste

Comment (39)
It does not seem reasonable to ship transuranic waste (TRUW) from INEL to the Hanford Site or to the Oak Ridge Reservation (ORR) for treatment and then to ship it back to New Mexico for storage, when INEL is one of the four sites with the largest volume of transuranic waste.

Response
Under the Decentralized Alternative and all Regionalized Alternatives, INEL would treat its own contact-handled TRUW and then transport the treated waste to WIPP for disposal. INEL has more contact-handled TRUW than any other DOE site. However, the Hanford Site is estimated to have approximately 10 times more remote-handled TRUW than INEL; thus, the Regionalized Alternatives assume that INEL would transport its remote-handled TRUW to the Hanford Site for treatment prior to disposal at WIPP. Different facilities are used for treatment of remote-handled TRUW and contact-handled TRUW, and the consolidation of treatment of remote-handled TRUW at the site with the greatest quantity of that waste type (Hanford) is a reasonable alternative. Under none of the TRUW alternatives described in Volume I, Section 8.3, does INEL ship TRUW to ORR for treatment.

Comment (190)
DOE should modify the transuranic waste No Action Alternative to (1) include storing plutonium-238 onsite until radioactive decay decreases the high exposure potential during treatment and handling and (2) include transporting plutonium-239 directly to WIPP, the designated repository for transuranic waste, thereby reducing treatment and handling costs.

Response
The WM PEIS alternatives include a No Action Alternative under which transuranic waste would be stored onsite under the assumption that WIPP will not be available during the 20-year period of analysis. Shipment of plutonium-contaminated transuranic waste would not be consistent with the definition of the No Action Alternative. Storage of plutonium-contaminated transuranic waste is consistent and was evaluated under the No Action Alternative for the 20-year period of analysis. The impacts of storage beyond 20 years are analyzed as part of the No Action Alternatives in the WIPP SEIS-II. Other alternatives consider the impacts of treating transuranic waste to various treatment levels and at various sites prior to shipment to WIPP for final disposal. Finally, under the Centralized Alternative, DOE evaluated the impacts of shipping all of the contact-handled transuranic waste to WIPP for both treatment and disposal. Some level of treatment was assumed at each site for all alternatives involving transportation, to ensure safe shipment of the transuranic waste and to meet regulatory requirements for transportation, as well as to meet acceptance criteria at WIPP. Therefore, for example, some treatment of plutonium-238 is assumed in every alternative with transportation. DOE did not single out individual radionuclides for separate management at each site; this level of complexity was beyond scope of this analysis for purposes of the programmatic decisions being considered. However, such management decisions would be appropriate for each site, and the WM PEIS notes that plutonium-238 would require special mitigation measures beyond those considered in the WM PEIS.

Comment (915)
DOE's preference for transuranic waste treatment and storage sites is not clear.

Response
The Draft WM PEIS did not identify a preferred alternative for transuranic waste. NEPA and CEQ regulations only require the agency to identify a preferred alternative in a draft EIS if the agency has a preference at the time the draft is released for a public review. However, the agency must identify a preferred alternative in its final EIS. DOE identifies its preferred alternative for transuranic waste treatment and storage and the reasons it was designated the preferred alternative can be found in Volume I, Section 3.7, of the Final PEIS.

Comment (1564)
A commentor is concerned that the Centralized Alternative for transuranic waste treatment at WIPP was not previously evaluated.

Response
The PEIS includes a Centralized Alternative for transuranic waste, under which contact-handled transuranic waste would be treated at the location of final disposition. DOE assumed this would be WIPP. DOE identifies its preferred alternative for transuranic waste treatment and the reasons it was designated the preferred alternative can be found in Volume I, Section 3.7, of the Final PEIS. Selection of the Centralized Alternative for transuranic waste would necessitate a project-level NEPA review for the treatment facility.

Comment (2385)
DOE should analyze more fully the treatment options considered [e.g., as presented for the transuranic waste (TRUW) Centralized Alternative]. The WM PEIS fails to address the feasibility of safe shipments of untreated plutonium-238 combustible wastes from the Savannah River Site (SRS) and Los Alamos National Laboratory (LANL) to an offsite facility.

Response
Volume I, Section 8.3.4, describes the TRUW Centralized Alternative. Under this alternative, SRS would ship all of its TRUW to WIPP for treatment to meet land disposal restrictions and for disposal. No onsite treatment of TRUW is assumed at SRS under this alternative. LANL would ship its contact-handled TRUW to WIPP for treatment to meet land disposal restrictions and for disposal. LANL would ship its remote-handled TRUW to Hanford for treatment and then to WIPP for disposal. Treatment to meet land disposal restrictions would include thermal treatment of combustibles.

As described in Volume I, Section 8.2.3, DOE assumed that facilities would be made available at sites requiring retrieval, characterization, treatment, repackaging, and shipment of TRUW to meet U.S. Department of Transportation or RCRA transportation regulations, and to meet State shipping and receiving requirements. Therefore, DOE assumed that plutonium-238 combustible wastes would be treated, if necessary, and, therefore, would meet all shipping requirements and be safe to ship.

Comment (2405)
Section 6.2 of the WM PEIS Summary document states that SRS would receive transuranic waste from other sites under some alternatives. Please describe what SRS will be asked to take and from where.

Response
Volume I, Section 8.3, of the WM PEIS presents details of the transuranic waste alternatives evaluated, including the Regionalized Alternatives that involve shipment of waste from other sites to SRS for

3.2.3 Transuranic Waste

treatment. Under the Regionalized Alternatives, SRS would treat contact-handled transuranic waste from six other sites: ANL-E, the Mound Plant, ORR, Paducah Gaseous Diffusion Plant (PGDP), the University of Missouri, and West Valley Demonstration Project (WVDP). The contact-handled transuranic waste from these sites would comprise about 17% of the transuranic waste to be treated at SRS under these alternatives. Under the No Action, Decentralized, and Centralized Alternatives, no transuranic waste would be shipped to SRS.

Comment (3146)
The WM PEIS does not provide an adequate basis for proceeding with WIPP, nor does it consider the range of reasonable alternatives to WIPP. Although the number of fatalities and costs suggest implementing the No Action Alternative for transuranic waste (TRUW), DOE is still committed to begin emplacement of wastes at WIPP, reasoning that extended storage under the No Action Alternative is not in compliance with RCRA. The WM PEIS must analyze alternatives for storage that would comply with RCRA.

Response
DOE believes that the WM PEIS includes reasonable alternatives sufficient to support programmatic decisions on TRUW treatment and storage. The No Action Alternative does evaluate, for the period of analysis (20 years), the impacts if there is a delay in the receipt of TRUW at WIPP and waste continues to be stored at the generating sites. As described in Volume I, Section 1.1, the WM PEIS analyzes alternatives for treating and storing TRUW preparatory to proposed disposal at WIPP. The WM PEIS does not study the repository itself, nor will it be used to support decisions on TRUW disposal at WIPP.

The decision of whether to store TRUW or treat TRUW for disposal is contingent on the DOE disposal decision for WIPP, not on whether continued TRUW storage would comply with RCRA. The disposal impacts from operating WIPP as a TRUW repository are addressed in the WIPP SEIS-II, which analyzes the potential environmental impacts associated with the operation of WIPP and the minimum level of TRUW treatment needed. The WIPP SEIS-II No Action Alternatives, in part, evaluate the continued management of TRUW at the generator and/or treatment sites, and decommissioning of the WIPP facility, if TRUW were not disposed of at WIPP. A discussion of the relationship between the WM PEIS and the WIPP SEIS-II is provided in Volume I, Section 1.8.1.

Comment (3148)
The WM PEIS contains no discussion of storage and disposal alternatives for the volumes of retrievably stored transuranic wastes that do not meet the WIPP waste acceptance criteria or for other reasons could not be sent to WIPP.

Response
For purposes of analysis, the WM PEIS assumes that all transuranic waste shipped to WIPP for disposal will meet the WIPP waste acceptance criteria. Once the waste acceptance criteria are finalized, this could mean that certain transuranic waste would have to be treated to meet these criteria. Only the wastes that meet final WIPP waste acceptance criteria will be accepted for disposal at WIPP, if WIPP becomes operational as a transuranic waste repository.

3.2.3 Transuranic Waste

Comment (3150)
The WM PEIS does not include a reasonable Centralized Alternative for transuranic waste, because the Centralized Alternative considered assumes that TRUW would be treated at WIPP, even though the WIPP Land Withdrawal Act does not authorize such an activity.

Response
Under the Centralized Alternative, DOE would not ship all transuranic waste to WIPP for treatment. DOE would ship all contact-handled transuranic waste to WIPP for treatment to meet land disposal restrictions and for disposal and remote-handled transuranic waste would be shipped to the Hanford Site and ORR for treatment to meet land disposal restrictions prior to disposal at WIPP. Consolidation of remote-handled transuranic waste at one site for treatment was not considered because a large number of trips would be required, and most remote-handled transuranic waste requires extensive treatment (but not necessarily to meet land disposal restrictions) before it can be shipped.

Agencies are required under NEPA to analyze reasonable alternatives, even if the alternatives are not within the agency's jurisdiction (e.g., in conflict with current law). While the WIPP Land Withdrawal Act does not make provision for treatment activities at WIPP, for purposes of analysis and compliance with NEPA, DOE considered WIPP to be a reasonable WM PEIS siting alternative. Consideration as a siting alternative in the WM PEIS does not mean a site will be selected to perform waste management activities.

Comment (3212)
The WM PEIS does not analyze options to WIPP as the national repository for transuranic waste. WIPP might not open, and even if it does, it will not hold all of the transuranic waste in the DOE complex (this includes transuranic waste that is currently buried, plus waste that will be generated from remediation efforts). DOE should analyze all options for transuranic waste, including other disposal sites, extended monitored retrievable storage at the point of generation, regionalized and centralized storage, and the adequacy of current treatment standards (WIPP waste acceptance criteria) for such storage. The impacts of transporting waste to WIPP, and other options, should be analyzed in the WM PEIS.

Response
DOE believes that the WM PEIS includes reasonable alternatives to support programmatic decisions on national transuranic waste treatment and storage configurations. The WM PEIS does not however, analyze the environmental impacts of disposal at WIPP or alternative locations for a geologic repository. For purposes of analysis, DOE assumed that WIPP will become operational. Although the WM PEIS does not evaluate WIPP or its suitability for disposal, the No Action Alternative does evaluate for the period of analysis (20 years) the impacts if there is a delay in the receipt of transuranic waste at WIPP and waste continues to be stored at the generating sites.

DOE is analyzing impacts of disposal and continued storage of transuranic waste in the WIPP SEIS-II and will make both disposal and transuranic waste treatment decisions based on the WIPP SEIS-II analysis. The WIPP SEIS-II No Action Alternatives evaluate the continued management of transuranic waste at the generator and/or treatment sites, and decommissioning of the WIPP facility. These alternatives analyze environmental impacts if transuranic waste were not disposed of at WIPP. The WM PEIS will provide a basis for decisions on where any transuranic waste treatment and storage facilities would be sited.

3.2.3 Transuranic Waste

It is true that during the 35-year planned operational life of WIPP, the amount of transuranic waste projected to be available for disposal could exceed the statutory capacity of WIPP. DOE is in the early planning stages of evaluating options for disposal of this excess transuranic waste.

Comment (3609)
Legally, can WIPP be used as the central treatment location? Can liquids go to WIPP? Even if they are grouted? Can soils go to WIPP? Even if they are grouted or organically solidified?

Response
Agencies are required under NEPA to analyze reasonable alternatives, even if the alternatives are not within the agency's jurisdiction (e.g., in conflict with current law). While the WIPP Land Withdrawal Act does not provide for treatment activities at WIPP, for purposes of analysis and compliance with NEPA, DOE considered WIPP to be a reasonable WM PEIS siting alternative. Consideration as a siting alternative in the WM PEIS does not mean a site will be selected to perform waste management activities.

Current planning basis WIPP waste acceptance criteria would limit liquid waste forms at WIPP to less than 1% per container. Grouted or organically solidified transuranic waste forms would be acceptable at WIPP if they met the other requirements of the waste acceptance criteria. The WIPP SEIS-II evaluates what types of transuranic waste, if any, would be disposed of at WIPP and what type of treatment would be required for disposal of waste at WIPP.

Comment (3620)
If the repackaging of transuranic waste has or will commence under the No Action Alternative, then we find the characterization of the No Action Alternative unsatisfactory as well as an abuse and violation of NEPA requirements. Repackaging is in itself a major action that could significantly effect the environment. Also, if repackaging of transuranic waste has or will commence under the No Action Alternative, then the only difference between the No Action Alternative and the other alternatives is simply transportation of the wastes.

Response
As described in Section 8.3.1, the No Action Alternative evaluates treatment to WIPP-WAC only for future transuranic waste and does not assess the impacts of removing transuranic waste from retrievable storage. However, as stated in WM PEIS Section 8.14, under the No Action Alternative, DOE would only treat waste that required urgent repackaging to prevent leakage at the site. The packaging would not be sufficient to allow transportation to other sites.

Comment (3633)
In Section 8.3.5, why not calculate the cross-country trips for remote-handled transuranic waste shipments for extensive treatment to be able to compare with the other alternatives. This is another example of DOE's selective calculations to show only what outcome DOE wants.

Response
DOE did not calculate cross-country trips for remote-handled transuranic waste shipments because a single-site Centralized Alternative for remote-handled transuranic waste treatment was not considered to be a reasonable alternative for detailed analysis in the WM PEIS. Because so much remote-handled transuranic waste would have to be shipped across the country under such an alternative, an

unreasonable amount of pretreatment cost would have to be incurred to ensure acceptable transportation risks. Much lower costs and limited transportation risks were expected to accrue in the consolidation alternative that is analyzed, under which DOE would treat remote-handled transuranic waste at the two sites - the Hanford Site and ORR - where approximately 90% of current and projected inventory is located.

3.2.4 High-Level Waste

Comment (2256)
I do not believe that this is a document that can lead to waste management decisions, particularly in the case of the high-level radioactive waste. It is based on privatization plans that might be able to get underway, that might be able to build a facility, that might be able to vitrify. It is premature to include in this PEIS information about how the vitrified waste will be stored.

Response
DOE believes that the WM PEIS will be a useful tool in the waste management decisionmaking process. Treatment of high-level waste is not analyzed in the WM PEIS, but is analyzed in other sitewide or project-level NEPA documents. Disposal of high-level waste will be analyzed in the Geologic Repository EIS. The WM PEIS, thus, looks only at the impacts of storing vitrified high-level waste.

The PEIS has been modified (see Volume I, Section 1.7.4) to acknowledge the potential use of privatized facilities for the management of the five waste types considered, including high-level waste. The WM PEIS does not preclude the use of waste management facilities constructed and operated by private entities on DOE sites at DOE's direction. Proposals to use commercial or privatized facilities for waste management decisions would be analyzed in sitewide or project-specific NEPA documents.

Both the Defense Waste Processing Facility at SRS and the West Valley Demonstration Project began vitrifying high-level waste in 1996. Vitrification at these facilities is supported by existing site-specific NEPA documentation. DOE will store the canisters containing the vitrified waste until a geologic repository is ready to accept them for final disposal.

Comment (2407)
The scheduled date of 2015 for availability of the high-level waste geologic repository seems early. Include a few sentences on selection of this date for the WM PEIS and what contingency planning is available if a later date is needed and what contingency planning exists for the lack of a repository. The WM PEIS should include analysis of the impacts of a delayed date for the repository (for example, 2035 or 2050) due to the uncertainties associated with the opening date.

Response
As stated in Volume I, Section 9.2.2, of the WM PEIS, although a geologic repository for the permanent disposal of high-level waste is scheduled to begin accepting DOE-managed high-level waste in 2015, for purposes of the WM PEIS analysis, DOE also analyzed high-level waste canister storage requirements should the opening of the repository occur after 2015. For example, Table 9.4-4 presents risk results for the scenario of an opening after 2015 as incremental annual storage risks.

3.2.5 Hazardous Waste

Comment (41)
Referencing the Draft PEIS Summary document, Section 8.2.2, the commentor asked, "Why start incineration of hazardous wastes at LANL, ORR, and SRS and stop at INEL? LANL currently does no onsite treatment. The discussion states a preference for expansion of current treatment sites versus building new ones. Also, the PEIS generally states that it is cheaper to transport wastes than to build new facilities.

Response
For the Decentralized Alternative, DOE assumed thermal treatment at three sites with existing or planned incinerators--LANL, ORR, and SRS. To account for the decision to retire the Controlled Air Incinerator at LANL and the decision to continue operation of the Waste Experimental Reduction Facility at INEL, DOE has revised the WM PEIS (see Section 8.2.2 of the Summary document and Section 10.3.2 in Volume I) to replace LANL with INEL as a candidate for onsite treatment of hazardous waste under the Decentralized Alternative.

Comment (2034)
The WM PEIS hazardous waste analysis is based on the estimate that 90% of the total hazardous waste in a given year is generated by 11 or fewer DOE sites (Volume I, Section 10.1.2). However, the WM PEIS also states that the 11 sites are not always the same every year. Because of the variability, is the selection of the 11 sites from one particular year appropriate for the analysis of impacts, rather than the sites that have contributed 90% of the waste for the entire time period of data accumulation?

Response
The objective of the WM PEIS hazardous waste evaluation was to determine impacts for a policy of greater onsite treatment versus continued reliance on commercial vendors. This evaluation used representative sites and treatment technologies. Based on a review of RCRA uniform hazardous waste shipping manifests, facility reports, and hazardous waste generation and disposal information dating back to 1984, 11 sites typically account for 90% of DOE hazardous waste, but the sites differ from year to year. Thus, DOE selected the 11 sites for the WM PEIS analysis based on 1991 and 1992 data, which were the most current data when the PEIS analysis began. DOE believes that recent waste generation rates are more likely to reflect future trends than rates from the 1980s. Thus, DOE believes that its selection of 11 hazardous waste sites based on the 1991 and 1992 waste generation rates is adequate for the programmatic decisions it must make.

Comment (2036)
Under the No Action Alternative, 3% of the hazardous waste would be treated at two DOE sites and the remainder would be treated at commercial facilities. Under the Decentralized Alternative, 11% would be treated at three DOE sites, and the remainder sent offsite. The differences in the two options are so small that they were discussed together. We do not believe there is enough difference in the two alternatives to justify calling the Decentralized Alternative a meaningful option.

Response
The WM PEIS hazardous waste analysis is designed to evaluate the impacts from onsite treatment of waste, with emphasis on organic wastes requiring thermal destruction. The alternatives were selected to provide representative results for the range of onsite options. For the Final PEIS analysis, the alternatives evaluate treatment onsite of 3%, 9%, 50%, and 90%, respectively, of the DOE RCRA waste (excluding wastewater). The Decentralized Alternative uses three sites that have exciting or

3.2.5 Hazardous Waste

planned thermal treatment facilities. DOE recognizes that the differences in hazardous waste volumes between the No Action and Decentralized Alternatives are small. However, evaluating both alternatives is consistent with the overall framework of the four broad categories of alternatives. DOE added text to Volume I, Section 10.3, to better explain the alternatives.

Comment (2039)
Under Regionalized Alternative 1, clarify how DOE determined the assumption that two-thirds of the hazardous waste would be sent to the regional hubs and the other one-third sent to commercial incinerators.

Response
Section 10.3.3 in Volume I describes Regionalized Alternative 1 for hazardous waste treatment. Under this alternative, hazardous waste (other than wastewater) generated by 11 major DOE sites that could be treated through organic removal/recovery technologies (such as incineration) would be sent to five regional centers--Hanford, INEL, LANL, ORR, and SRS--for treatment.

The regional centers would treat two-thirds of the received hazardous waste and send the other one-third to a commercial facility. The two-thirds/one-third split in waste treatment discussed above is an analytic assumption used to mathematically achieve the 50% onsite treatment for Regionalized Alternative 1. Approximately 75% of the waste being treated (excluding wastewater) is incinerable; thus, to achieve a 50% onsite treatment rate for both incinerable and non-incinerable waste, two-thirds of the incinerable waste must be treated onsite.

Comment (2040)
A centralized alternative was not explored because the current policy is the use of decentralized or regionalized commercial facilities. The decision was, therefore, not to use an alternative that could not be compared to current practice. Considering that Regionalized Alternative 2 uses only two DOE facilities to treat 90% of the hazardous waste, going to one centralized site does not appear to be a major difference. DOE's current practice should not preclude it from exploring a centralized option.

Response
Section 10.3.4 in Volume I of the WM PEIS states that a Centralized Alternative for hazardous waste management was not considered because for hazardous waste the decision of concern is whether DOE should continue to use commercial treatment facilities or construct its own. Since the hazardous waste analysis is designed to evaluate the level of onsite DOE versus offsite commercial treatment, only alternatives representative of various onsite treatment capacities were needed. DOE selected four representative alternatives to account for both the effects of site consolidation and a range of waste volumes (3%, 9%, 50%, and 90%, respectively, of non-wastewater treated onsite). These representative alternatives were considered adequate to evaluate the policy option of increased onsite treatment. DOE has added text to Volume I, Section 10.3.4, to better explain why the Centralized Alternative was not evaluated.

Comment (2860)
Volume I, footnote b to Tables 4-1 and 4-2, states that other sites also manage hazardous waste but were not analyzed in the WM PEIS. On what arbitrary basis can other hazardous waste generators be excluded? If any site manages any quantity of hazardous waste it should be included and noted in the WM PEIS. Furthermore, the WM PEIS must state the preferred alternative for handling hazardous

wastes from those sites currently excluded from the analysis, particularly BNL. In addition, the WM PEIS should state that any quantity of hazardous waste generated by BNL shall be transported offsite.

Response
DOE estimates that more than 90% of the total hazardous waste in a given year is generated by 11 sites. DOE focused its hazardous waste analysis on the 11 largest DOE generator sites, which are listed in Table 10.1-1 in Volume I of the WM PEIS. The 90% cutoff is appropriate to support programmatic decisions on hazardous waste, which would apply to BNL as well as the other generator sites. Because BNL is not one of those 11 largest generator sites, the PEIS does not specifically analyze hazardous waste at BNL, but the PEIS analysis is representative of DOE sites in general. DOE's preferred alternative for managing nonwastewater hazardous waste and the reason it is preferred is identified in Volume I, Section 3.7 of the WM PEIS.

3.3 Public Preferences for or Opposition to Management Alternatives

Comment (141)
A very small percentage (less than 4%) of the WM PEIS public comments expressed a preference for or opposition to a specific waste management alternative. Of those, about one-third were preferences for the Decentralized Alternative and about one-fifth were preferences for the No Action Alternative. The remaining expressions of preference or opposition were spread among the alternatives or combinations of alternatives.

Most of these commentors gave reasons for their support or opposition, some did not. Some commentors viewed and commented on the alternatives in a programmatic sense, without reference to a specific site. Most often, however, commentors expressed support for or opposition to an alternative from a site-specific perspective. That is, commentors were most expressive about alternatives in terms of what the alternatives would mean for their site, and not for the Nation as a whole. A few commentors identified preferences for alternatives to manage specific waste types; most did not. Public preferences for or opposition to specific waste management alternatives are summarized below. Note that public comments opposing the siting of new waste management facilities and activities at specific sites are addressed in Sections 3.5.1 through 3.5.17 in this volume.

<u>No Action Alternative</u>

Commentors who expressed a preference for the No Action Alternative, in general or for their site, gave one or more of the following reasons: It would "keep things the way they are;" waste would not be added to sites by bringing it from other sites; therefore sites and the general public would not be subjected to the potential for additional risks associated with transporting and receiving additional wastes. It would cost less than other alternatives. Additional wastes would not be brought to sites in seismically active areas, or areas subject to severe weather or flooding. Under other alternatives, leaks could impact drinking water, agriculture, and other resources. Moving wastes away from some sites might cause people to lose their jobs. The waste is "OK" where it is. "Nothing has happened yet"; if DOE tries to change the way it is currently managing waste, it "might mess up." "More bad than good" would come out of doing anything else. Sites already have enough wastes and communities do not want them to have more. Incineration is dangerous. There is not enough information in the PEIS to proceed with any other alternative.

Some commentors prefer the No Action Alternative specifically for management of high-level, transuranic, and hazardous waste types. Some commentors prefer the No Action Alternative for BNL because the site would continue treatment of wastewater and ship other wastes offsite.

Of the few commentors who oppose the No Action Alternative, some stated that they want change or they are concerned that waste will continue to accumulate, making the problem harder to solve.

<u>Decentralize Alternative</u>

Commentors who expressed a preference for the Decentralized Alternative, in general or for their site, gave one or more of the following reasons: It would reduce the risks and costs of large-scale transportation of wastes. It would be safer than other alternatives. It would present fewer risks to the environment. It would not involve any additional lands. Wastes would be managed where they are generated and additional wastes would not be taken away from or brought to sites. It would avoid increased risks that would result from bringing additional wastes to some sites. It would create jobs at

3.3 Public Preferences for or Opposition to Management Alternatives

some sites, improve local economies, and bring additional revenues to local governments. Additional wastes would not be brought to sites in areas that are subject to earthquakes, severe weather (e.g., tornadoes), or other dangerous events (e.g., floods). Waste would not "pile up" in one place. It might cause sites to be more careful about what wastes they generate and concentrate on minimizing or eliminating the generation of waste. It would cause fewer negative impacts to local communities.

Many of the commentors who prefer the Decentralized Alternative stated that they do not want PGDP to be a decentralized site. One commentor prefers Decentralized or Regionalized Alternatives for treatment of low-level mixed waste and low-level waste at PGDP because it would increase benefits with minimal or no additional risks, and the experienced workforce at PGDP would be available to support treatment of these wastes.

A few commentors prefer the Decentralized Alternative specifically for the management of transuranic waste. One commentor prefers either the Decentralized or Regionalized Alternative for low-level waste because they appear to be the best compromise between cost and environmental protection.

Some commentors oppose the Decentralized Alternative for PGDP because it would cost too much and incineration would cause air pollution and health impacts. Some commentors oppose the Decentralized Alternative for ANL-E because it would cost too much; it would increase the risk of more accidents and leakage; more than 2,000 residents around ANL-E have signed a petition opposing this alternative, and this item should be put to a voter referendum in November. Some commentors oppose Decentralized Alternatives specifically for management of low-level mixed waste and low-level waste at BNL because of ongoing restoration efforts to remediate groundwater resources contaminated from past disposal of radioactive wastes.

Regionalized Alternatives

Several commentors prefer the Regionalized Alternatives, but not for PGDP. Reasons given for the preference were that regionalization “only hurts a few spots in the country;” PGDP already has enough nuclear waste; and waste should be removed from PGDP because of the potential impacts of an earthquake. One commentor suggested regionalizing the waste and distributing it evenly among the 37 locations, with a few exceptions (e.g., PGDP and LLNL) because of the potential for earthquakes. Conversely, some commentors prefer a Regionalized Alternative for PGDP because it would create jobs, put money into the local economy, and the site should be responsible for the waste it generates.

Some commentors prefer a Regionalized Alternative for ANL-E because it makes more sense from a cost perspective and a safety issue. Some commentors prefer a Regionalized Alternative because it would manage wastes at sites that have the largest volumes. Some commentors prefer Regionalized Alternatives specifically for management of low-level mixed waste and/or low-level waste (some specified because it would result in low fatalities and low estimated life-cycle costs). Some commentors prefer Regionalized Alternatives specifically for management of transuranic waste. Some commentors prefer the Regionalized and Centralized Alternatives for BNL because radioactive wastes should be stored in areas remote from biological habitats, highly populated areas, or a sole-source aquifer. One commentor prefers Regionalized or Centralized Alternatives at BNL specifically for management of low-level mixed waste, low-level waste, and hazardous waste.

3.3 Public Preferences for or Opposition to Management Alternatives

Commentors who expressed opposition to the Regionalized Alternatives, in general or for their site, gave one or more of the following reasons: There would greater danger from emissions from a leak. There would be risks from earthquakes at some sites; there are too many people living, working, going to school, etc., around some of the sites. Transportation risks are too great. Sites already have enough waste. People at some sites would lose their jobs. Regionalizing waste management would harm more places. If there are already impacts at a site, a Regionalized Alternative would add more impacts.

Centralized Alternatives

Some commentors prefer the Centralized Alternative. Most commentors who preferred the Centralized Alternative specified that they do not want waste to be centralized at their site or that they want waste removed from their site. One commentor supports centralization, but not at locations around water sources or near active fault lines. Another recommended that under the Centralized Alternative, separate sites be designated for management of low-level and high-level wastes. Those who prefer the Centralized Alternative gave one or more of the following reasons for the preference: There would be security advantages. Centralizing at one or two sites reduces the number of populated areas that could be affected by a spill. It would reduce the number of people exposed to radiation. It would be easier to monitor and control the waste if it is centralized. It would be easier to control a spill if waste is centralized. It would reduce the risk of an accident. Existing risks (human health risks, environmental contamination, etc.) associated with waste located at multiple sites would be eliminated. Some sites are in seismically active areas; removing wastes from these sites would eliminate the concern over radioactive releases that could be caused by earthquakes. Much of the waste is already concentrated at a few sites. It is worth the risk of a transportation accident to get the waste moved from multiple sites to one or two sites.

Commentors who expressed opposition to the Centralized Alternative, in general or for their site, gave one or more of the following reasons: transportation of wastes would present substantial risks to workers, the public, and the environment; a centralized site might become "overstocked" with wastes; and there could be impacts to those living near sites where waste is centralized.

One commentor stated that the Centralized Alternative is the least likely to work because attempts over the last 20 years to centralize wastes have failed. One commentor opposed the Centralized Alternative specifically for management of transuranic waste.

Response
DOE appreciates the public's response to its request for comments on the WM PEIS alternatives. Although DOE does not respond specifically to each point offered in these comments, DOE did consider these comments, and many other factors, in its selection of preferred alternatives to manage the five types of waste considered in the WM PEIS. The decision criteria and factors used in the selection of preferred alternatives are described in Volume I, Section 1.7.3 of the WM PEIS. DOE's preferred alternatives and the reasons they are preferred are described in Volume I, Section 3.7, and in the Summary document.

DOE's final decisions will be based on this PEIS and other considerations such as regulatory compliance, budget constraints, schedules, compliance with site agreements with States, national priorities, and other DOE studies. Decisions will be announced in Records of Decision to be published in the *Federal Register*. If DOE selects a site for a waste management operation that prompts the need for new or expanded facilities, DOE would consider the results of relevant existing or required new sitewide or project-level NEPA reviews which examine potential environmental impacts in more detail.

Comment (530)
One commentor pointed out that many of the alternatives considered in the WM PEIS proposed shipment of offsite wastes to INEL. Such waste movement must be consistent with State of Idaho offsite waste principles as established in the Federal Facility Compliance Act (FFCAct) Site Treatment Plan (STP) Consent Order and with requirements mutually agreed upon in the Spent Nuclear Fuel Court Order of October 1995. Another commentor stated that the management of low-level mixed waste at INEL is effectively ruled out by those documents. Another commentor stated that DOE should know that the proposals within the WM PEIS and the Agreement with the State of Idaho are good, and that it is appropriate to handle spent nuclear fuel separately from other wastes at INEL.

Response
NEPA requires DOE to analyze reasonable alternatives. The mixed waste treatment alternatives described in the Draft WM PEIS are broad enough to envelop the potential environmental impacts of the configuration that results from the FFCAct process. The WM PEIS and the FFCAct STPs were developed in parallel, ensuring consistency and integration. The PEIS, which broadly analyzes DOE's waste management activities, provides the analysis of potential environmental impacts of the STPs developed for site-level mixed waste treatment decisions.

DOE revised Section 1.4 in Volume I of the WM PEIS to clarify that its compliance with applicable laws and regulations would necessarily include compliance with applicable site-specific plans, agreements and consent orders.

DOE considered these comments, along with many other comments and decision criteria and factors, in its selection of preferred alternatives to manage the five WM PEIS waste types. Section 3.7 in Volume I identifies DOE's preferred alternatives and the reasons they are preferred. However, these are not final decisions. Final decisions will be based on this PEIS and other considerations such as budgets, schedules, national priorities, and other DOE studies. Decisions will be documented in Records of Decision published in the *Federal Register*.

Comment (1760)
Until DOE develops a comprehensive national strategy, all wastes should be stored at the point of generation.

Response
Although the WM PEIS does not make actual programmatic waste management decisions, it analyzes and identifies preferred programmatic alternatives to manage wastes across the DOE complex, including the storage of wastes at the point of generation. Current DOE waste management activities are not confined to storage activities. DOE is pursuing other activities such as treatment and disposal.

DOE considered this and other public comments in its selection of WM PEIS preferred alternatives (see Volume I, Section 3.7).

3.3 Public Preferences for or Opposition to Management Alternatives

Comment (1899)
Onsite disposal may be cheapest in the long run because most sites are already large enough and meet government standards.

Response
The selection of the Decentralized Alternative, as advocated in this comment, would result in DOE management of waste where it is or where it will be generated, treated, or disposed of in the future. For low-level mixed waste and low-level waste disposal, the Decentralized Alternative is evaluated for the siting, construction, and operation of disposal facilities at 16 sites, including 10 sites that do not currently have low-level mixed waste or low-level waste disposal. The evaluation results indicate that costs are greatest for this alternative and decrease as the number of disposal sites decreases through the efficiencies realized from economies of scale. The Decentralized Alternative would require less transportation of wastes than the other alternatives, however, facility costs are greater than transportation costs. Low-level mixed waste costs are presented in Section 6.14 and low-level waste costs are presented in Section 7.14 in Volume I of the WM PEIS. An approach such as Decentralization might offer other particular economic benefits, such as jobs and income at many sites, but DOE must base its final decision on diverse environmental, economic, and regulatory issues.

Comment (2258)
We must not accept no action. Nuclear waste must be dealt with. DOE should have a comprehensive strategic plan that identifies all EISs and the decisions that will result. There has to be a cooperative approach.

Response
NEPA requires an EIS to include a discussion of a No Action Alternative. While such a "status quo" alternative could result in non-compliance with applicable laws and regulations, analysis of the No Action Alternative provides an environmental baseline against which the impacts of other alternatives can be compared. As evidenced by this PEIS, DOE is placing a high priority on "dealing" with its radioactive and hazardous wastes through a Department-wide strategy for safe and efficient management of these wastes.

The WM PEIS preferred alternatives and the reasons they are preferred are identified in Section 3.7 in Volume I of the Final PEIS. Actual programmatic waste management decisions will be announced in Records of Decision published in the *Federal Register*.

The decisions to be made subsequent to the Final WM PEIS will result in a comprehensive strategic plan for the management of the five waste types analyzed. DOE has coordinated the preparation of the WM PEIS with other EISs being prepared on similar proposals for strategic management of nuclear materials within DOE Section 1.8.1, Waste Management PEIS Relationship to Other Actions and Programs, has been updated to reflect the relationship and status of these other studies. To the extent the information was available for incorporation, Chapter 11 in Volume I of the PEIS addresses cumulative impacts resulting from other programs.

Comment (2328)
Incineration of low-level mixed waste at ORR under a Regionalized alternative, if properly carried out, is not an objectionable method. The destruction of nonradioactive organic contaminants is particularly

attractive, in contrast to burying them in landfills from which they might eventually leak into the environment.

Response
DOE agrees. Properly designed and operated incinerators are as or more effective than other treatment technologies, and DOE does not preclude their use at any site. EPA's combustion strategy states, "If properly designed and operated in compliance with regulatory standards, combustion is a technology that provides sound management of hazardous waste." Fact sheets on radioactive and mixed waste incineration published jointly by EPA and DOE (EPA 402-F-95-004 through 007, January 1996) recognize the effectiveness of incineration as part of the DOE Waste Management Program.

Comment (2345)
I prefer the No Action Alternative for hazardous waste rather than have DOE incinerate hazardous waste because of the vapors and secondary chemicals produced in the process. Has DOE considered their effects?

Response
Thank you for expressing this preference. NEPA requires DOE to analyze reasonable alternatives. DOE identifies its preferred waste management alternatives in Volume I, Section 3.7, of the WM PEIS.

DOE did evaluate the effects of the incineration emissions from treatment of hazardous waste, including combustion products. See Volume I, Chapter 10.

Comment (3201)
Please explain why the WM PEIS does not select a preferred alternative for the low-level waste. In selecting the preferred alternative from the alternatives proposed in the WM PEIS, DOE should select the alternative that minimizes the number of fatalities, including transportation fatalities.

Response
DOE did not have a preferred alternative for treatment and disposal of low-level waste when the Draft WM PEIS was issued in September 1995. NEPA does not require the identification of a preferred alternative in a draft environmental impact statement if such an alternative is not known at that point in time. In accordance with the requirements of NEPA, after consideration of the analyses presented in the WM PEIS, the decision criteria in Volume I, Section 1.7.3, and all public comments in the Draft WM PEIS, DOE has identified preferred alternatives for each waste type, including low-level waste, in Volume I, Section 3.7, of the Final WM PEIS. As described in Volume I, Section 1.7.3, DOE favors alternatives which reduce human health risk, including the number of vehicle accidents expected to occur during transportation of waste.

Comment (3556)
One commentor prefers the Decentralized Alternative for low-level mixed waste because LANL and Sandia National Laboratories-New Mexico (SNL-NM) would treat and dispose of their own low-level mixed waste and none would be brought to New Mexico from other sites. If SNL-NM is unable to site a protective disposal unit, the commentor's second choice for low-level mixed waste is Regionalized Alternative 1 because LANL would receive waste only from SNL-NM. If LANL is unable to site additional protective disposal units, the commentor's third choice is Regionalized Alternative 3, under which all low-level mixed waste and low-level waste would be disposed of at NTS.

3.3 Public Preferences for or Opposition to Management Alternatives

Response
DOE considered this, and many other comments and factors, in its selection of preferred alternatives to manage the five types of waste considered in the WM PEIS. The decision criteria and factors used in the selection of preferred alternatives are described in Volume I, Section 1.7.3, of the WM PEIS. DOE's preferred alternatives and the reasons they are preferred are described in Volume I, Section 3.7, and in the Summary document.

The preferred alternatives are not final decisions. Final decisions will be based on this PEIS and other considerations such as regulatory compliance, budget constraints, schedules, compliance with site agreements with States, national priorities, and other DOE studies. Decisions will be announced in Records of Decision published in the *Federal Register*. If DOE selects a site for a waste management operation that prompts the need for new or expanded facilities, DOE will consider the results of relevant existing or required new sitewide or project-level NEPA reviews which examine potential environmental impacts in more detail.

Comment (3557)
A commentor prefers the Decentralized Alternative for treatment and disposal of low-level waste because LANL and SNL-NM would treat and dispose of their own low-level waste, and none would be brought to New Mexico from other sites. If SNL-NM is unable to site a protective disposal unit, the commentor prefers as a second choice Regionalized Alternative 2 because LANL would dispose of low-level waste only from SNL-NM. This commentor believes that the preferred alternative should be the same for low-level mixed waste and low-level waste because both wastes could be disposed of together once the hazardous component of low-level mixed waste is treated. The commentor does not understand why the No Action and Decentralized Alternatives for low-level mixed waste differ from those for low-level waste.

Response
The alternatives differ for low-level mixed waste and low-level waste because RCRA land disposal restrictions still apply to low-level mixed waste even after its hazardous components have been treated. Treated low-level mixed waste must be disposed of in a RCRA-permitted disposal facility. Since these restrictions do not apply to low-level waste, other or different alternatives are reasonable to be analyzed in the EIS.

DOE considered this, and many other comments and factors in its selection of preferred alternatives to manage the five types of waste considered in the WM PEIS. The decision criteria and factors used in the selection of preferred alternatives are described in Volume I, Section 1.7.3 of the WM PEIS. DOE's preferred alternatives and the reasons they are preferred are described in Volume I, Section 3.7, and in the Summary document.

The preferred alternatives are not final decisions. Final decisions will be based on this PEIS and other considerations such as regulatory compliance, budget constraints, schedules, compliance with site agreements with States, national priorities, and other DOE studies. Decisions will be announced in Records of Decision published in the *Federal Register*. If DOE selects a site for a waste management operation that prompts the need for new or expanded facilities, DOE will consider the results of relevant existing or required new sitewide or project-level NEPA reviews which examine potential environmental impacts in more detail.

3.3 Public Preferences for or Opposition to Management Alternatives

Comment (3559)
For transuranic waste, a commentor prefers a modified Decentralized Alternative, under which SNL-NM would treat and store contact-handled transuranic waste and LANL would treat and store contact-handled and remote-handled transuranic waste; thus, SNL-NM would be added as an additional storage site.

Response
As shown in WM PEIS Volume I, Tables 8.3-1 and 8.3-2, SNL-NM is considered as a transuranic waste storage site under the No Action Alternative and a transuranic waste treatment site under the Decentralized Alternative.

DOE considered this, and many other comments and factors, in its selection of preferred alternatives to manage the five types of waste considered in the WM PEIS. The decision criteria and factors used in the selection of preferred alternatives are described in Volume I, Section 1.7.3, of the WM PEIS. DOE's preferred alternatives and the reasons they are preferred are described in Volume I, Section 3.7, and in the Summary document.

Final decisions will be based on this PEIS and other considerations such as regulatory compliance, budge constraints, schedules, compliance with site agreements with States, national priorities, and other DOE studies. Decisions will be announced in Records of Decision published in the *Federal Register*. If DOE selects a site for a waste management operation that prompts the need for new or expanded facilities, DOE will consider the results of relevant existing or required new sitewide or project-level NEPA reviews that examine potential environmental impacts in more detail.

Comment (3958)
A commentor prefers the No Action Alternative for treatment, storage, and disposal of hazardous waste. Although not mentioned in the Draft WM PEIS, both LANL and SNL-NM are permitted under RCRA to treat hazardous waste.

Response
DOE considered this, and many other comments and factors, in its selection of preferred alternatives to manage the five types of waste considered in the WM PEIS. DOE's preferred alternatives and the reasons they are preferred are described in Volume I, Section 3.7, and in the Summary document. The decision criteria and factors used in the selection of preferred alternatives are described in Volume I, Section 1.7.3, of the WM PEIS. As identified by the commentor, LANL and SNL-NM are permitted for hazardous waste treatment. However, neither is currently incinerating hazardous waste, the generic treatment technology used in the WM PEIS.

3.4 Waste Management Sites

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(No comments were received for this section)

3.4.1 General Comments

Comment (30)
DOE's draft preferred alternatives will not have adverse environmental impacts for the Hampton Roads region.

Response
Thank you for your comment. DOE has identified preferred alternatives, and the reasons they are preferred, for all waste types in Volume I, Section 3.7, of the Final WM PEIS.

Comment (31)
Do not store, treat, or dispose of wastes in metropolitan areas, such as the Hampton Roads region, or in environmentally sensitive areas.

Response
None of the 17 "major" sites evaluated for waste management activities are located in the Hampton Roads region, although the Decentralized Alternative for management of low-level mixed waste would result in treatment and storage at Norfolk Naval Shipyard.

DOE appreciates the public's response to its request for comments on the WM PEIS alternatives. DOE considered this, and many other comments and factors, in its selection of preferred alternatives to manage the five types of waste considered in the WM PEIS. The decision criteria and factors used in the selection of preferred alternatives are described in Volume I, Section 1.7.3, of the WM PEIS. DOE's preferred alternatives and the reasons they are preferred are described in Volume I, Section 3.7, and in the Summary document.

Comment (71)
Commentors suggested that DOE locate waste treatment, storage, and disposal activities in sparsely populated or unpopulated areas, or in areas that are remote and isolated. Many suggested desert areas; others suggested ocean or space disposal.

Response
DOE prefers to avoid introduction of radioactive waste at DOE and other Federal sites where none exists. In turn, the proximity of a waste management site to populated areas is only one factor in evaluating alternatives. DOE must consider and balance other factors to achieve its objective of safe and efficient treatment, safe and secure storage, and ultimate disposal of each waste type. For example, DOE must consider waste transportation requirements. Although selecting sites for waste management activities in less-densely populated or remote areas could reduce the potential for some impacts, the risks of transporting wastes over longer distances to reach remote sites would increase the potential for other impacts. Section 1.7.3 in Volume I lists and describes examples of the factors DOE will consider in the decisionmaking process.

NEPA requires DOE to analyze reasonable alternatives. Neither ocean nor deep space disposal are considered feasible. Because of ongoing concerns over polluting the marine environment, and in accordance with U.S. law and international agreements (the London Dumping Convention of 1975, as amended), EPA no longer issues permits for ocean dumping or disposal of radioactive materials. As for launching the material into space, the costs and accident risks associated with such an approach would likely be significantly higher than those associated with the alternatives evaluated in the WM PEIS.

3.4.1 General Comments

Comment (528)
The public needs to be aware that INEL operations are generally safe; DOE should get on with making its decisions with the use of care and good science.

Response
DOE intends to proceed, as it has done to date, using care and good science in making waste management decisions across the Department and on a site-specific or project-level basis. The WM PEIS, which is a national decisionmaking tool, has been prepared to help DOE enhance the management of its current and anticipated volumes of radioactive and hazardous wastes in order to ensure safe and efficient management of these wastes, to comply with all applicable Federal and State laws, and to protect public health and safety and the environment.

Comment (917)
A commentor supports the DOE preference to store high-level waste at INEL, the Hanford Site, and SRS until disposal in a geologic repository becomes a reality.

Response
Thank you for your comment.

Comment (1650)
DOE has not done too bad a job at NTS, despite mistakes, and deserves full support.

Response
Thank you for your comment.

Comment (1826)
It is possible that the inflated waste generation data are part of a misdirected, yet intentional effort to maintain Argonne National Laboratory (ANL-E) on a national list of potential disposal sites. The PEIS does not sufficiently reflect reasonable present and future conditions to allow one to draw conclusions about the impacts of the proposed actions at ANL-E.

Response
The waste volumes identified in the Draft WM PEIS were based on the best data available at the time the analysis was performed. The Draft WM PEIS presented a "snapshot in time" of the waste volumes and projections. Since the Draft PEIS was published, DOE has updated information on several types of waste. Appendix I of the Final WM EIS addresses how newly available data on low-level waste, low-level mixed waste, and transuranic waste might affect the analyses of alternatives in the PEIS.

Section 1.6.1 in Volume I of the WM PEIS explains how DOE identified sites for analysis. Identification as a "major site" does not mean the site will be selected for waste management activities. The concept of the major site is intended to facilitate the WM PEIS analysis in terms of alternatives considered and to allow for meaningful comparison of programmatic waste management options.

As described in Section 4.4.1 in Volume I of the WM PEIS, the information on current conditions in terms of the affected environment at ANL-E was obtained largely from reports prepared in 1990 through 1994. More detail is provided in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final PEIS.

3.4.1 General Comments

The characterization of the affected environment establishes the baseline conditions from which the impacts of the various WM PEIS alternatives can be assessed.

Comment (1869)
DOE should investigate the feasibility of using other agencies' sites (e.g., the U.S. Department of Agriculture research facility in Clay Center, Nebraska) for disposal.

Response
Volume I, Section 3.10, of the WM PEIS explains that DOE does not consider the use of other Federal agencies' sites for waste management activities to be reasonable. However, the WM PEIS does consider, at a conceptual level, the use of commercial and privatized waste management facilities, including those at sites that might be purchased or leased from other Federal agencies. Although DOE committed during the scoping process to avoid introduction of radioactive waste at DOE and other Federal sites where none exists, this does not preclude the use of privatized or non-DOE-owned facilities for management of DOE waste, as discussed in Section 1.7.4.

Comment (1926)
There are not enough safeguards to give communities a sense of security. The potential impacts of a waste disposal facility at ANL-E were not shown to the surrounding communities.

Response
Only the Decentralized Alternatives for low-level waste and low-level mixed waste would involve *disposal* actions at ANL-E. The potential impacts of such disposal actions (as well as from possible waste treatment and storage) are provided in Chapters 6 and 7 in Volume I. To supplement the quantitative estimates of individual disposal risks presented in Sections 6.4.1.6 and 7.4.1.7 of the WM PEIS, DOE also performed semi-quantitative analyses of the *potential* for offsite population risk. ANL-E was determined to be intermediate among the 16 proposed disposal sites in its potential vulnerability to offsite population risks from disposal. Additional detail on potential impacts at ANL-E is provided in Section 2 in Volume II of the WM PEIS. Furthermore, Site Summaries for each of the 17 major sites analyzed in the WM PEIS (including ANL-E) have been added to the back of the PEIS Summary document.

Comment (1986)
The WM PEIS states that low-level mixed waste will be stored on the sites where it is generated until treatment and disposal. This does not take into consideration the Naval Nuclear Propulsion program sites that were required to complete Mixed Waste Site Treatment Plans in accordance with the Federal Facility Compliance Act of 1992. Mixed waste from Naval Nuclear Propulsion Program sites undergoing base closure will be stored at projected treatment sites. This should be reflected in the Final WM PEIS.

Response
Because this is a programmatic analysis, DOE made broad assumptions applicable to all sites, including the assumption that low-level mixed waste would be stored where it is generated until treatment and disposal. This assumption was not meant to restrict site-specific operations and exceptions where they would not prejudice programmatic analysis or decisions. DOE added this clarification to Volume I, Section 1.6.

3.4.1 General Comments

All of the Naval Nuclear Propulsion Program sites listed in Volume I, Table 6.1-1, have relatively small inventories and projected generation of low-level mixed waste. None of the sites are evaluated in detail. The Final WM PEIS considers updated waste inventory data, including low-level mixed waste inventories at Naval Nuclear Propulsion Program sites undergoing base closure in Volume IV, Section I.2. DOE concluded that pretreatment storage at different sites would not significantly affect decisions stemming from the WM PEIS.

Comment (2105)
BNL is a good neighbor and should continue to do world-class research. BNL's mission has always been primarily research oriented and has not included waste disposal. Identifying waste disposal sites across the country will erode DOE's credibility and impact funding for BNL and DOE.

Response
Potential waste management activities would not alter BNL's mission as an important research facility within DOE's configuration of sites.

NEPA requires DOE to consider and evaluate reasonable alternatives to a proposed action; in this case, the potential for siting some waste management activities at BNL is a reasonable programmatic waste management alternative. BNL is one of 17 reasonable candidate sites ("major sites") for programmatic waste management activities. Note that BNL would manage only its own low-level mixed waste and low-level waste and could take advantage of private-sector waste management resources. BNL would dispose of low-level mixed waste and low-level waste only under the Decentralized Alternative. BNL would not dispose of any offsite wastes. The newest low-level mixed waste and low-level waste volumes for BNL are provided for in Volume IV, Appendix I, of the WM PEIS.

Comment (2193)
The commentor stated that he was quoting from page 34 of the final Site Treatment Plan. "...Battelle has decided to withdraw its application for the Part B permit, as a recommendation under a corporate cost reduction program." In order to save $250,000 for a private entity you have decided to rip up all the advisory board's advice, and the multi-site principles, and ship it to Hanford for disposal. Well, our values are not being factored in here and we are not going to let you do that.

Response
DOE assumes that the commentor was referring to the Battelle Columbus Site Treatment Plan. The commentor infers that Hanford has agreed to disposal of Battelle waste to save Battelle Columbus the expense of obtaining a RCRA Part B permit. This inference is not true on several counts. Battelle Columbus is not a "private entity," but a DOE-funded facility and the waste is DOE waste. The waste codes which result from decontamination and decommissioning activities at Battelle Columbus were never included in the permit application to begin with; nor was onsite treatment ever part of the permit request. Hanford was chosen as a primary site for treatment and storage of Battelle's radioactive waste based on historical ties. The impacts of using Hanford were assessed in an Environmental Assessment, which was shared with the State of Washington.

Battelle Columbus withdrew its RCRA Part B permit after meeting with EPA, the State of Ohio, and local stakeholders. Battelle made a decision to act as a 90-day waste generator, which means that waste can only be stored onsite for a maximum of 90 days. The decision to withdraw the RCRA Part B permit application did save money and also allows Battelle to meet all regulatory requirements.

3.4.1 General Comments

The Battelle Site is sending low-level mixed waste to the Hanford Site for treatment only. After treatment at the Hanford Site, the low-level mixed waste will be shipped offsite for disposal. The agreement to treat one of Battelle's waste streams at Hanford was negotiated between Battelle Columbus, the Ohio EPA, the State of Washington Department of Ecology, DOE-Headquarters, and the Richland Office, in accordance with the Federal Facility Compliance Act.

Comment (2417)
The WM PEIS portrays waste management taking place at "greenfields," but does not recognize that most of the proposed locations have significant problems with environmental contamination. Because of the severity of some of these problems, it is not necessarily appropriate to correlate inventory with preferability for a particular alternative.

Response
DOE is committed to managing its wastes in an environmentally acceptable manner. New treatment and disposal facilities would be subject to project-level NEPA reviews that would address potential environmental impacts from those projects. DOE's preferred alternative for a project would not necessarily correlate with the inventory location of the waste to be managed, although inventory location would clearly be an important factor in the facility location decision.

DOE recognizes that other activities on DOE sites have environmental impacts and that these other activities should be accounted for. Volume I, Chapter 11, of the WM PEIS discusses the combined impacts of waste management alternatives for the five types of waste analyzed in the WM PEIS for each of the 17 major sites. Chapter 11 then presents these combined impacts, added to the impacts of other past, present, and reasonably foreseeable future actions external to the WM PEIS in (cumulative impacts). CEQ and DOE regulations require consideration of cumulative impacts.

Comment (2847)
Volume I, Section 6.3.5, states that Knolls Atomic Power Laboratory was eliminated because it is a Navy site. Yet a similar site, Bettis, was eliminated because of terrain and geology. According to Section 4.5, both sites have the same mission and ownership and are jointly managed by DOE and the Navy. It is not clear why the Navy site status should eliminate one or the other. Descriptions of these sites in Section 4.5 should be clarified to explain who has direct responsibility and authority (ownership) for these sites.

Response
DOE revised Section 6.3.5 to state that Bettis was eliminated because of sloping terrain and unstable geology, and because it is a Navy site. In addition, DOE revised Chapter 4 in Volume I to clearly indicate the affiliations of the sites.

Comment (2949)
ORR is considered for treatment and disposal of low-level mixed waste. Where on the site would DOE dispose of these wastes?

Response
ORR is considered as a candidate site for treatment and disposal of low-level mixed waste under several alternatives in the WM PEIS, which DOE has prepared as part of its effort to develop an overall national strategy on which to base waste management decisions. However, the WM PEIS does

3.4.1 General Comments

not propose locations within site boundaries for facilities. Facility locations will be determined after DOE announces WM PEIS decisions and considers the results of existing or new sitewide or project-level NEPA reviews.

Comment (3782)
The public needs to understand the specific reasons why populated areas are being considered for waste management facilities, rather than the desert southwest and plains where it is least likely to harm people.

Response
To identify reasonable proposed sites for waste management facilities, DOE determined where the largest volumes of waste are and where transportation requirements would be minimized. Other site-selection criteria included the characteristics of the waste, specialized treatment requirements, and existing facilities.

Sites that are less densely populated were considered for waste treatment, storage, and disposal. Although storage and disposal in less populated regions may lessen some impacts, the risks from transporting waste to these remote areas would increase. These trade-offs are described in the WM PEIS and are important factors that will be considered in the decision process. The remoteness and low population density of a location for a waste management site constitutes only one factor in evaluating alternatives. Other criteria include the construction or modification of facilities and increased transportation requirements.

Comment (4394)
A commentor suggested that DOE consider the Savanna Army Depot, located approximately 130 miles west of ANL-E in the northwest corner of Illinois for the following reasons as the site for a government waste storage facility: (1) the government already owns the property and it has already been used as a storage site for similarly hazardous materials, (2) it is located within only a few hours of not only Argonne, but also Fermi National Accelerator Laboratory and Ames Laboratories, (3) it is a rural site with very little nearby population, (4) the citizens of the communities around the depot would be receptive to the idea of having this facility nearby because of the positive effect it would have on the local economy, and (5) it is in the same State as two of the three proposed waste generators and so would avoid any potential problems with transporting waste across State lines. Another commentor stated that there are large tracts of Federal lands, Federal facilities, commercial facilities, and possibly Indian Reservations where DOE could store, treat, and/or dispose of its waste.

Response
As stated in the WM PEIS, Volume I, Section 1.6, DOE limited its scope to the 54 sites for which DOE has some management responsibility. Of those 54, 40 contained one or more of the waste types considered in the PEIS, and only 17 contain the bulk of those wastes. DOE limited the scope of the WM PEIS to these 54 sites, focusing most specifically on the major 17 sites identified in Table 1.6-2. However, Section 1.7.4 in Volume I discusses the concept of using commercial facilities.

3.4.2 Identification of 17 Major Sites

Comment (520)
The WM PEIS discusses 17 "major" sites associated with transuranic and other wastes. Other public documentation lists 27 sites. The PEIS should discuss the other 10 sites and explain why they were not included in the analysis. Taxpayers are concerned about the total picture.

Response
For purposes of the programmatic level of analysis in the WM PEIS, DOE identified 17 "major" sites because they contain the bulk of the five waste types, have the capability for the future disposal of low-level mixed waste and low-level waste, or have existing or planned major waste management facilities. These 17 sites are the focus of this PEIS because they are candidates to either receive wastes generated at other sites, to host disposal facilities, to manage high-level waste, or were included to be consistent with the Federal Facility Compliance Act process. DOE revised Section 1.6.1 in Volume I to expand the explanation of how these 17 sites were identified as candidates for waste management activities.

The 10 additional sites referred to in the comment have waste volumes compared to the volumes at the 17 major sites. DOE did not expect those small waste volumes to measurably affect the programmatic alternatives evaluated in the WM PEIS. Therefore, the sites were not included in the impacts analysis. The additional sites would principally package and ship wastes, rather than support major waste treatment or disposal facilities; therefore, waste management impacts at these sites are expected to be small.

Comment (1665)
Screening criteria used for selection of disposal sites are "woefully inadequate." DOE should expand its screening criteria to consider (1) the exclusion of sites that are located in large region of influence population areas, and (2) transportation impacts, as well as issues of distance to where most of the wastes to be disposed of are currently located.

Response
As described in Volume I, Section 6.3.5, 16 candidate low-level mixed waste disposal sites were selected for evaluation in the WM PEIS based on screening performed by DOE in coordination with the States under the Federal Facility Compliance Act (FFCAct). For consistency, the same 16 sites were also evaluated for low-level waste disposal. The screening process determined which DOE sites could be eliminated from consideration for disposal without further evaluation.

In the WM PEIS risk analyses, DOE did not attempt to predict risks to current or future offsite populations from the disposal of low-level waste and low-level mixed waste. Estimating these risks requires knowing the exact location of disposal facilities on a site with respect to existing aquifers and the populations that might use them. Since the PEIS does not attempt to make decisions about locations of disposal facilities on sites, quantitative estimates of collective dose and risk are not attempted.

However, to supplement the quantitative estimates of maximally exposed individual disposal risks presented in Sections 6.4.1.8 and 7.4.1.7 in Volume I, DOE performed semi-quantitative analyses of the potential for offsite population risk in Section 5.4.1.2.3 of the Final PEIS. These analyses produced estimates of relative population vulnerability of the sites, rather than quantitative estimates of person-rem doses and cancer fatalities. For these analyses, DOE used simple statistical methods and information about site characteristics known or expected to be associated with the potential for offsite population disposal risk to develop "risk vulnerability" groupings of the sites. ROI population was one

3.4.2 Identification of 17 Major Sites

of the factors used in the analysis. The sites within each of the three vulnerability groups developed in this analysis have similar potential for offsite population health risk from disposal.

DOE used minimization of waste transportation as a criterion in developing alternatives. The WM PEIS analyzes transportation impacts. Detailed analyses are presented in the waste type and cumulative impacts chapters of Volume I of the WM PEIS. In addition, Appendix E in Volume IV of the WM PEIS is dedicated to transportation.

Comment (1744)
Provide a list of the 16 sites selected as disposal sites and explain how and why the WM PEIS differs from the *Performance Evaluation of the Capabilities of DOE Sites for Disposal of Mixed Low Level Waste*.

Response
Section 6.3.5 in Volume I of the WM PEIS lists and describes how DOE identified the 16 sites evaluated for potential disposal of low-level waste and low-level mixed waste (i.e., ANL-E, BNL, FEMP, Hanford, INEL, LANL, LLNL, NTS, ORR, PGDP, Pantex, Portsmouth, RFETS, SNL-NM, SRS, and WVDP) were identified. In addition, Section 1.8.2 discusses the relationship of the WM PEIS with the efforts of the DOE Disposal Workgroup.

Although the Federal Facility Compliance Act does not specifically address disposal of treated mixed wastes, both DOE and the States have recognized that disposal issues are an integral part of treatment discussions. A process was established by the DOE Disposal Workgroup in conjunction with State representatives and the National Governors Association to evaluate and discuss the issues related to the potential disposal of the residuals from the treatment of DOE low-level mixed waste at the sites subject to the Federal Facility Compliance Act. The results of this analysis are presented in the report entitled *Performance Evaluation of the Capabilities of DOE Sites for Disposal of Mixed Low Level Waste*.

The focus of this process has been to identify sites that are suitable for further evaluation of their potential as disposal sites from among the sites that currently store or are expected to generate mixed waste. The evaluation is intended to increase understanding of the strengths and weaknesses of a site's potential for disposal, but is not a site-selection process. Ultimately, the identification of sites that might receive low-level mixed waste for disposal will follow State and Federal regulations for siting and permitting, and will include appropriate public involvement.

The sites identified through the Disposal Workgroup process reflect the same set analyzed for low-level mixed waste disposal in the WM PEIS, except that the WM PEIS analysis includes BNL, which has been categorized by the DOE Disposal Workgroup as low in priority for a mixed waste disposal mission.

Comment (2240)
The WM PEIS alternatives are not adequate because they have been preselected and look at the West as a dumping ground.

Response
All alternatives except the Centralized Alternatives consider disposal facilities in the East as well as in the West. Volume I, Section 3.5, describes how DOE selected the alternatives. To identify reasonable

proposed sites for waste management facilities, DOE determined where the largest waste volumes are located and where transportation requirements would be minimized. Treatment, storage, or disposal facilities were analyzed at those sites.

However, total volumes of waste were not the sole criterion used to select sites. The character of the waste, specialized treatment requirements, and existing facilities were also taken into account. For example, some wastes that require special treatment were analyzed separately, and treatment sites were selected for analysis based on the volumes requiring special treatment rather than on total volumes. In some cases, treatment facilities could be used for more than one waste type. Therefore, some sites were evaluated as candidate sites even if the volume of a particular waste type at that site was not among the largest.

This process was not biased toward the West. In fact, 8 of the 16 sites considered for disposal of low-level mixed waste and low-level waste are east of the Mississippi River. For transuranic waste and high-level waste, the candidate repository sites at Carlsbad, New Mexico (WIPP), and NTS (Yucca Mountain) were used for transportation calculations; however, they were not evaluated for disposal, which is beyond the scope of the WM PEIS.

Comment (3243)
DOE's criteria for selecting candidate waste treatment and disposal sites should be reevaluated so as to question or dismiss sites with: (1) large region of influence (ROI) population densities, (2) high seismic risk, (3) transport routes connecting to waste generating sites that have the highest percentage of travel in urban areas (high population densities, traffic congestion and delays), and (4) sites where offsite contamination is already posing substantial environmental and health risks to the surrounding communities.

Response
The points specified by the commentor are addressed in the WM PEIS environmental impacts analysis in the waste-type and cumulative impacts chapters. The 17 "major" waste management sites contain the bulk of the five waste types, have the capability for future disposal of low-level mixed waste and low-level waste, or have existing or planned major waste management facilities. These 17 sites are the focus of this PEIS because they are candidates to receive wastes generated elsewhere, to host disposal facilities, to manage high-level waste, or were included to be consistent with the Federal Facility Compliance Act process. The PEIS refers to these sites as major sites, and considers in detail environmental impacts that could arise from treating, storing, and disposing of wastes at these sites.

Comment (3921)
DOE needs to explain why 37 of 54 sites were removed from the list. DOE is too limited in its site selections. For example, let's send the waste to Washington, D.C. Let the Government have it.

Response
Section 3.5 in Volume I of the WM PEIS describes how DOE selected the alternatives. Section 3.10 describes alternatives not evaluated in detail in the WM PEIS. Of the 54 DOE sites that generate or have in inventory identifiable quantities of radioactive or hazardous waste, 17 were considered "major" sites because they contain the bulk of the waste and are candidates to receive waste from other sites for treatment, storage, or disposal. The other 37 sites have relatively small amounts of waste and DOE

3.4.2 Identification of 17 Major Sites

eliminated them as candidate sites for receiving waste from other sites. Under various alternatives, these 37 sites are candidates for managing the wastes that are generated onsite.

3.5 Public Preferences for or Opposition to Siting Waste Management Activities/Facilities

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(No comments were received for this section)

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Comment (209)
Of those commentors opposing the siting of programmatic waste management activities at ANL-E, some gave no reason for their opposition and others expressed one or more of the reasons listed below:

- The overall risks to public health and safety, worker health and safety, and the quality of the environment from normal operations, operations accidents, and truck and rail transportation accidents;

- Specific Risks: Risks to surrounding residential communities and farmland; risks to sensitive habitat (such as Waterfall Glen Forest Preserve); risks due to possible earthquakes, tornadoes, and flooding; potential air, groundwater and drinking water contamination; potential negative impacts on the local economy, including decreased real estate values, business opportunities, and tax revenues; potential negative impacts to the overall quality of life in the area; safety risks in the event of a terrorist attack;

- Factors: The population density, including many children, around the site; the "higher-than-average" cancer rates in surrounding communities, especially among children, and potential dangers to future generations; existing contamination at the site; the longevity of the waste and the lack of long-term accountability and guarantees of safety in the future; the site's proximity to major highways; construction costs, and potential clean-up costs in the event of a release of radioactivity; potential evacuation problems in case of an accident; the potential for lawsuits and waste of tax dollars;

- Opinions: That there are more viable and cost-effective storage and disposal alternatives than ANL-E, which should only be used for research and development; that proposed waste management activities at ANL-E conflict with existing treatment plans and Federal Facility Compliance Act agreements; that construction and processing operations would contribute non-hazardous wastes to an already overburdened system; that wastes could be shipped to less-densely populated, remote or desert areas, and the cost would be minimal compared to the risk of contamination; that there is a lack of communication and adequate public input to waste management decisions; that there is a lack of confidence in DOE's ability to properly manage past, existing or future wastes, as well as its ability to prevent environmental damage; that DOE is proposing to use unproven thermal treatment technologies; and that ANL-E does not have adequate facilities and equipment to become a permanent waste facility.

Response
NEPA requires DOE to consider and evaluate reasonable alternatives to a proposed action; in this case, the potential for siting some waste management activities at ANL-E was analyzed as a reasonable option under some of the WM PEIS waste management alternatives. ANL-E is one of 17 "major" sites analyzed in the WM PEIS, which is a nationwide study to help DOE make programmatic, Department-wide decisions about how it will manage the five waste types considered in the PEIS. Major sites are those candidate locations that might either receive wastes generated offsite, manage high-level waste, host disposal facilities, or were included to be consistent with the Federal Facility Compliance Act process. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites. However, designation as a major site does not mean the site will be selected for a programmatic waste management role. Under 3 of the 36 alternatives evaluated (Decentralized Alternatives for low-level mixed waste, low-level waste, and transuranic waste), DOE would construct new facilities to manage wastes at ANL-E. These facilities would manage wastes generated at ANL-E, a small quantity of low-level mixed waste generated at Ames Laboratory, and low-level waste generated at Ames and Fermi Laboratories. No transuranic wastes from off the site would be managed

at ANL-E. Under the Regionalized and Centralized Alternatives, all ANL-E waste would be treated and disposed of at other DOE sites.

The WM PEIS analyzes for each candidate site the potential for environmental impacts resulting from programmatic waste management activities. See Volume I, Chapters 6 through 10 for results; see Chapter 5 and Volume III, Appendix C, for analysis methods. The analysis considered potential impacts, including most of the impacts that concern commentors, from normal operations, operations accidents, incident-free transportation, and transportation accidents. In addition, the PEIS estimates cumulative impacts from past, present, and reasonably foreseeable future actions (see Volume I, Chapter 11). In general, the environmental impacts associated with waste management activities under all alternatives at all sites considered in the PEIS would be minimal. For those impacts that would not be minimal, DOE would incorporate mitigation measures to reduce or eliminate the impacts and, where applicable, comply with regulatory requirements.

Volume I, Section 3.7, identifies DOE's preferred alternatives and the reasons they are preferred. These are not final decisions. The subsequent Records of Decision will announce DOE's decisions and the reasons for the decisions if they differ from those provided in the Final PEIS. The WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets, schedules, and national priorities, as well as other DOE studies, will be considered in developing Records of Decision.

DOE used data from the 1990 U.S. Census to estimate that about 7,940,000 people live within 50 miles from the center of ANL-E. This population could possibly be exposed to emissions released to the atmosphere from waste treatment facilities. Human health risks (e.g., cancer) constitute a site-specific impact parameter analyzed in the PEIS (Volume I, Sections 6.4, 7.4, and 8.4). Offsite population human health risks and offsite maximally exposed individual health risks are also cumulative impact parameters addressed by the PEIS (see Volume I, Section 11.3). The health risk analyses suggest that adverse health effects to both adults and children from the operation of waste treatment facilities located at ANL-E would be negligible.

In response to requests from the residents of Lemont, Illinois, the Illinois Department of Public Health initiated a study of the cancer incidence among children in the Township. The Division of Epidemiologic Studies prepared a study based on hospital reports found in the Illinois State Cancer Registry for the years 1986 through 1993 (Illinois Department of Health, 1995). Seventeen cases of childhood cancer were observed in the study area, four cases more than the 13 that would be statistically expected. The most frequently reported childhood cancer type was leukemia, with six cases observed and three cases statistically expected. The report finds that those differences are not statistically significant. More details on the survey can be obtained from the study.

The WM PEIS evaluates the potential impacts of several types of accidents at treatment and storage facilities (e.g., fires, explosions, earthquakes, aircraft crashes). The PEIS also includes a detailed assessment of the risks of a complete range of credible transportation accidents for both rail and truck transportation. The analyses were designed to address the potential impacts of acts of terrorism or sabotage. DOE provides for Radiological Assistance Program teams consisting of trained experts equipped and prepared to quickly respond to an accident and assist local emergency response personnel, if requested by local agencies. Because health and safety consequences could possibly result from an accident involving radioactive or other hazardous material, DOE has allocated resources and

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has established emergency response training under the overall Federal Emergency Response Program to investigate the effects of such an accident.

DOE is concerned with health and safety and the need for emergency preparedness in and around its sites. Emergency response plans are required on sites and in the surrounding communities by Federal, State, and local authorities that deal with emergency situations such as earthquakes, floods, tornadoes, and other natural or man-made disasters. These plans are regularly updated and their review coordinated with DOE, the U.S. Department of Transportation, the Federal Emergency Management Agency, and State and local authorities.

Properly designed and operated thermal treatment technologies (incinerators), have been shown to be as or more effective than other proven treatment technologies and DOE will not preclude their use at any site. DOE compared impacts from incineration with non-thermal treatment technologies and identified little or no difference in treatment risks to human health; DOE documented these findings in a technical report. (M/B SR-03, September, 1995). DOE has an aggressive technology development program exploring alternatives to incineration. Alternatives would be tested and deployed depending on their potential to safely and effectively treat wastes.

As to the other specific risks cited by the commentors, refer to the following sections of the PEIS: air quality (Sections 6.5, 7.5, and 8.5); water resources (Sections 6.6, 7.6, and 8.6); and ecological resources (Sections 6.7, 7.7, and 8.7). Risks to local agriculture are not considered in the PEIS as a specific impact parameter; however, as environmental risks would be small, there is no reason to believe that there would be any negative impact to local agriculture. Further, site facilities are outside the probable 500-year maximum floodplain, and seismic analyses indicate there is little or no risk from earthquakes.

While implementing programmatic waste management decisions could entail construction of new and/or modification of existing facilities, the WM PEIS does not propose locations on sites for actual waste management facilities. If ANL-E is selected for a waste management role, DOE would consider site-specific conditions analyzed in existing or new sitewide or project-level NEPA reviews. DOE is aware of the sensitive ecological resources associated with ANL-E and would locate any new waste management facilities to minimize or avoid impacts to nearby wetlands and other sensitive habitats.

A major focus of the WM PEIS is to help DOE establish a Department-wide program to safely and efficiently manage radioactive and hazardous wastes. However, issues regarding existing pollution, a site's waste management record, and actual site cleanup efforts are more appropriately evaluated in sitewide or project-level studies. Impacts of existing actions and other missions related to radiological and hazardous waste are included in the cumulative impacts chapter of the WM PEIS, Volume I, Chapter 11.

The WM PEIS and the Federal Facility Compliance Act Site Treatment Plans were developed in parallel, ensuring consistency and integration. The PEIS provides the analysis of environmental impacts to support the Site Treatment Plans developed for site-level mixed waste treatment decisions. Pre-existing site-specific plans and agreements will be considered by decisionmakers to the extent possible; however, it is possible that some site-specific NEPA decisions might need to be revisited as a result of decisions made based on the WM PEIS.

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DOE recognizes that the siting of waste management activities may be perceived negatively by some persons. DOE is committed to protecting human health and the environment. DOE takes its responsibility and accountability for waste management decisions seriously and intends to select a configuration for its waste management complex that provides human health and safety assurance to the public. The WM PEIS will help DOE make sound waste management decisions.

The proximity of a waste management site to populated areas is only one of many factors in evaluating alternatives. DOE must consider and balance other factors to achieve its objective of safe and efficient treatment, safe and secure storage, and ultimate disposal of each waste type. For example, DOE must consider waste transportation requirements, and the PEIS presents alternatives that would minimize waste transportation (Decentralized Alternatives) or that would maximize waste transportation (Centralized Alternatives). Although siting waste management activities in less-densely populated or remote areas could reduce the potential for some impacts, the risks of transporting wastes over longer distances to reach remote sites would increase the potential for other impacts. Actual decisionmaking will consider a range of decision criteria and factors, including viability and cost-effectiveness. Section 1.7.3 in Volume I lists and describes examples of the factors and criteria DOE will consider in the decisionmaking process.

DOE must comply with all applicable laws and regulations. DOE believes that the WM PEIS meets the requirements of NEPA and CEQ regulations. The Final WM PEIS incorporates corrections to errors that affected the final analysis, which were identified in the Draft WM PEIS by public commentors, DOE, and its contractors. DOE believes the Final WM PEIS is technically sufficient to make programmatic waste management decisions. By carefully studying and planning long-term waste management strategies at the national and site levels, DOE hopes to correct past waste management practices to ensure protection of the public, workers, and the environment in the future.

DOE welcomes the level of interest in its waste management decisions, and has considered all comments offered during the public comment period. A well-informed and involved citizenry can provide valuable insight into what the public feels DOE should consider in its decisionmaking. However, DOE must, by law, actually make decisions, and is held accountable by the public and its regulators for safely implementing those decisions.

Comment (458)
The State of Illinois prefers a combination of alternatives not listed in the WM PEIS charts and considers a Regionalized Alternative that designates ANL-E as a treatment site for low-level waste but not a disposal site as the most preferable scenario. Since such an alternative is not presented in the WM PEIS, the State requests that DOE reevaluate the alternatives under consideration, and rewrite the WM PEIS and associated alternatives to incorporate this input.

Response
DOE assumes that the State of Illinois is referring to low-level mixed waste and not low-level waste due to the low-level mixed waste Site Treatment Plan for ANL-E that proposes to treat low-level mixed waste onsite, but dispose of residues offsite.

The WM PEIS analyzes 36 alternatives under four broad categories. In accordance with NEPA and CEQ regulations, these alternatives include the impacts that might be envisioned. Under the WM PEIS

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analysis, low-level mixed waste treatment and disposal at ANL-E is considered only under the Decentralized Alternative.

Section 3.7 in Volume I of the WM PEIS identifies the preferred configuration alternative for low-level mixed waste treatment and disposal and the reason it is preferred. The preferred treatment and disposal site(s) will be identified at a later date with appropriate public notification before a decision is made. The preferred alternatives identified in the WM PEIS will provide input into the Records of Decision process, which will culminate in programmatic waste management decisions. In this context, NEPA allows combining specific configurations analyzed in the WM PEIS, as suggested in the comment, when selecting a "DOE preferred alternative." Further, NEPA allows DOE, in making its decisions, to consider partial alternatives or combinations of alternatives, as long as they fall within the bounds of the alternatives considered in the EIS. (See Volume I, Section 3.4.) An alternative encompassing treatment at ANL-E without disposal could be selected without further analysis. DOE will explain in the Records of Decision how and why it made its decisions, and how the decisions relate to the alternatives analyzed in the Final EIS.

Comment (465)
Decisions for the siting, construction, and operation of a waste disposal facility at ANL-E should not be made until site-specific characteristics and potential impacts are evaluated. Also, DOE should outline how it will handle waste at the proposed disposal facility for ANL-E once that facility is filled; whether ANL-E will continue to receive waste; whether the disposal facility will be expanded; and whether another facility will be sited and started at ANL-E.

Response
The environmental impacts from construction and operation of generic waste disposal facilities are identified in the WM PEIS to provide relative comparisons to aid in decisionmaking. However, the WM PEIS did consider many site-specific characteristics at ANL-E, including population, weather, and geology and water resources. Even more detailed site characteristics would be considered in sitewide or project-level NEPA reviews.

DOE believes that it would be speculative to consider the disposition of wastes beyond the 30-year projected life of the new waste management facilities being considered in the PEIS. Therefore, these activities are outside the scope of the WM PEIS, but could be considered in future NEPA documentation.

Comment (471)
DOE should clarify whether ANL-E will be designated a regional site.

Response
DOE does not consider ANL-E a candidate site for a regional disposal facility for any of the five waste types addressed in the WM PEIS. DOE will announce the site's role in the final waste management configuration in Records of Decision published in the *Federal Register* following the publication of the Final WM PEIS.

Comment (1066)
ANL should not be considered as a future waste disposal site for radioactive materials because the community has already suffered enough. When DOE dropped the research on shortening the

radioactive life and reuse of radioactive materials, it lead to major employment cutbacks. The best place to store this material is in Washington, D.C.

Response

DOE evaluated 36 alternatives in the WM PEIS. DOE did not consider Washington, D.C., as a management site because it does not meet the criteria for a major site given in Section 1.6.1 in Volume I. Only under three alternatives (Decentralized Alternatives for low-level mixed waste, low-level waste, and transuranic waste) would new facilities be constructed to manage wastes at ANL-E. These facilities would manage wastes generated at ANL-E and a small quantity of low-level mixed waste generated at Ames Laboratory and low-level waste generated at Ames and Fermi Laboratories. Under the Regionalized and Centralized Alternatives, all ANL-E wastes would be managed at other DOE sites. DOE recognizes that some commentors disagree with the reasonable alternatives being considered in this PEIS for management of radioactive waste. The WM PEIS human health risk assessment and ecological risk assessment examined potential Waste Management Program effects on humans and the environment near ANL-E. DOE found that impacts to public health and the environment would be small at ANL-E under all waste management alternatives.

DOE is committed to research and will defend its programs. However, budget levels for DOE, as well as implementation guidance, are established by Congress. Thus, some DOE programs are experiencing cutbacks, which does impact employment in some areas.

Comment (1295)

The communities do not want any more waste of any kind brought to Argonne because of (1) the high residential population; (2) the already existing cleanup problems; (3) the legacy of Site A and Plot M; (4) already contaminated French drains; (5) incidents with uranium working its way up to the top of the ground; (6) past closures of drinking wells due to ANL-E ground contamination; and (7) already enough bad experiences.

Response

DOE evaluated 36 alternatives in the WM PEIS. Only under three alternatives (Decentralized Alternatives for low-level mixed waste, low-level waste, and transuranic waste) would new facilities be constructed to manage wastes at ANL-E. These facilities would manage wastes generated at ANL-E and a small quantity of low-level mixed waste generated at Ames Laboratory and low-level waste generated at Ames and Fermi Laboratories. Under the Regionalized and Centralized Alternatives, all ANL-E wastes would be managed at other DOE sites.

The WM PEIS human health risk assessment and ecological risk assessment examined potential Waste Management Program effects on humans and the environment near ANL-E. DOE found that impacts to public health and the environment would be small at ANL-E under all waste management alternatives.

Site A (which was decommissioned in 1956) and Plot M are not located on the ANL-E site. Moreover the drinking wells, also located offsite, were closed due to contamination at Site A. However, ANL-E continues a groundwater monitoring program at the site. The WM PEIS considered existing contamination at ANL-E and the region of influence surrounding the ANL-E Site as the baseline condition as discussed in Section 4.4.1 in Volume I and in the WM PEIS Affected Environment Technical Report. The need for additional remedial action at Site A and Plot M (a small parcel of land

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used for radioactive waste disposal) will be determined when the characterization activity has been completed. All such remedial action is part of the Environmental Restoration Program and therefore is beyond the scope of the WM PEIS analysis.

DOE's environmental restoration activities are governed, to a large extent, by the Comprehensive Environmental Response, Compensation, and Liability Act, and the Resource Conservation and Recovery Act. The objective of these laws is to provide for response to and remediation of past environmental contamination. DOE encourages the citizens to be proactive and report issues of environmental contamination to Federal, State, and local authorities.

Comment (1831)
There are important combinations of alternatives that were not evaluated in the WM PEIS. Specifically, DOE did not evaluate ANL-E for a treatment site under the low-level mixed waste Regionalized Alternatives.

Response
DOE analyzed 36 alternatives in four broad categories in the WM PEIS. These alternatives encompass the reasonable combinations of options that might be envisioned. In designing these alternatives, DOE used the principle of minimizing waste transportation to select the sites to host treatment and disposal facilities. Accordingly, in going from decentralized treatment to centralized treatment, the sites with the smallest amount of waste were the first to be eliminated as treatment centers. Of all the sites that would treat waste under the Decentralized Alternative, ANL-E was among the first six sites to be eliminated because it was among the six sites with the smallest volume of low-level mixed waste inventory plus 20 years of projected generation.

Under all alternatives, sites were assumed to treat their own wastewaters. Furthermore, sites not treating their waste to its final form would need to treat their wastes sufficiently to meet transportation requirements.

Comment (1833)
ANL-E is clearly not a major site. By WM PEIS definition, a major site is a candidate to receive wastes generated offsite, to host disposal facilities, or to manage high-level radioactive wastes. There is no technical basis for including ANL-E in this study. We are also not aware that ANL is scheduled to play a significant role in the management of DOE's high-level radioactive waste. If there are additional reasons for ANL-E being classified as a major site, such as projected waste volumes, make them clear in the PEIS.

Response
Volume I, Section 1.6.1, describes DOE's basis for selecting candidate sites for waste management activities and explains the designation "major site." Major sites are candidates to receive wastes generated at other sites, to host disposal facilities, or to manage high-level waste, or they are sites that were included in the study to be consistent with the Federal Facility Compliance Act process.

Within the alternatives evaluated in the WM PEIS, ANL-E is not considered for management of high-level waste. It is a candidate to receive wastes generated at other sites and to host low-level waste or low-level mixed waste disposal facilities.

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Comment (1835)
If DOE is seriously considering ANL-E as a prospective site for disposal of low-level mixed waste, it should discontinue that approach for lack of an adequate technical basis. Factors such as demographics, local geology, groundwater resources, and ANL-E's waste volume, if properly considered, will prevent DOE from concluding that ANL-E is a suitable disposal location site.

Response
DOE's preferred alternative for low-level mixed waste treatment is a combination of parts of the Decentralized and several Regionalized Alternatives (see Volume I, Section 3.7, for the rationale for this selection). DOE decisions about waste disposal will be based on all available information, including the WM PEIS analysis and current technical information (including up-to-date waste volume information). Section 1.7.3 identifies environmental impacts as a criterion DOE used to screen, evaluate, and narrow the number of alternatives and sites and to select preferred alternatives.

Comment (1838)
Consideration of ANL-E for disposal of waste is a proposed action that we will continue to oppose. Its significance could easily influence the finalization of the agreement between the State of Illinois and DOE under the Federal Facility Compliance Act.

Response
The fact that ANL-E is analyzed as a major site in the WM PEIS does not automatically entail selection of that site for a given waste management role. Rather, it means that potential impacts from conceptual waste management activities were analyzed. DOE evaluated 36 alternatives in the WM PEIS. Only under two alternatives (Decentralized Alternatives for low-level mixed waste and low-level waste) would facilities be constructed to dispose of wastes at ANL-E. These facilities would dispose of wastes generated at ANL-E and small quantities of low-level mixed waste generated at Ames and low-level waste generated at Ames and Fermi. Under the Regionalized and Centralized Alternatives, all ANL-E wastes would be managed at other DOE sites.

Section 1.8.3 in Volume I of the WM PEIS discusses the relationship of the document with other programs. The Federal Facility Compliance Act directs DOE to address the treatment of mixed waste that DOE generates or stores by requiring the development of mixed waste Site Treatment Plans. These plans identify how DOE will provide the necessary mixed waste treatment capacity, including schedules for bringing new treatment facilities into operation. The WM PEIS and the Site Treatment Plans were developed in parallel, ensuring consistency and integration. The mixed waste treatment alternatives described in the WM PEIS are broad enough to envelope the potential environmental impacts of the configuration that results from the Federal Facility Compliance Act process.

Although the Act does not specifically address disposal of treated mixed wastes, both DOE and the States have recognized that disposal issues are an integral part of treatment discussions. A process was established by the DOE Disposal Workgroup in conjunction with State representatives and the National Governor's Association to evaluate and discuss the issues related to the potential disposal of the residuals from the treatment of DOE low-level mixed waste at the sites subject to the Act. The focus of this process has been to identify sites that are suitable for further evaluation of their potential as disposal sites from among the sites that currently store or are expected to generate mixed waste. The evaluation is intended to increase understanding of the strengths and weaknesses of a site's potential for disposal, but is not a site-selection process. Ultimately the identification of sites that might receive

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mixed waste for disposal will follow State and Federal regulations for siting and permitting, and will include appropriate public involvement.

Information obtained through the Disposal Workgroup will be considered with information contained in the WM PEIS during the development of Records of Decision. Following the publication of WM PEIS decisions, DOE may (1) initiate site-specific NEPA reviews for new proposed disposal facilities; (2) initiate performance assessment analyses for compliance with DOE Order 5820.2A; and (3) initiate processes for permitting disposal facilities. Coordination with the States and stakeholders will continue to ensure stakeholder input and to resolve concerns at the earliest possible stage.

Comment (1885)
Commentors strongly oppose the selection of ANL-E as a potential site for storage of radioactive waste, because it takes more than 15 years to clean up a contaminated site and the cost to do so is substantial, with no guarantee that the funds will be available when needed.

Response
The WM PEIS is intended to provide environmental information to help DOE determine at which sites it should modify existing waste management facilities or construct new facilities. DOE evaluated 36 alternatives in the PEIS. Only under three alternatives (Decentralized Alternatives for low-level mixed waste, low-level waste, and transuranic waste) would new facilities be constructed to manage wastes at ANL-E. These facilities would manage wastes generated at ANL-E and a small quantity of low-level mixed waste and low-level waste generated at Ames.

The Environmental Restoration Program has been established to clean up environmental contamination at the sites where research, development, test, and production of nuclear weapons took place. Environmental cleanup is not within the scope of the WM PEIS, DOE's programmatic waste management study, because of the site-specific nature of environmental restoration decisions.

DOE receives funds through Congressional appropriations. Thus, environmental restoration, as well as waste management and other programs, are subject to prevailing budget policies.

Comment (1934)
A commentor opposes "another nuclear waste dump" at ANL-E and suggested cleaning up "the mess at Red Gate Woods" before planning a new facility.

Response
No uncontrolled dumping is permitted by current waste disposal regulations. If ANL-E were selected to host a disposal facility, the facility would be designed, constructed, operated, and maintained in compliance with all applicable regulations. This facility would be an engineered waste disposal facility with comprehensive waste acceptance criteria to ensure that performance objectives would be attained.

Site A and Red Gate Woods are environmental restoration sites that are being addressed by site-specific remedial actions and, therefore, are outside the scope of the WM PEIS. Stakeholder meetings are being planned for later this year to update constituents about the decisions on future environmental restoration actions for Site A and Red Gate Woods. DOE has searched the National Archives extensively looking for records detailing the wastes buried at Plot M, which is in the forest preserves outside the ANL-E boundaries. To date, DOE has been unable to find any records on what was put into Plot M between May 1944 and its closure in July 1949. DOE is continuing to look for any records on what was disposed of in this area. The comment has been forwarded to the Argonne Group Office.

Comment (2650)
The region is already at risk from ANL-E experiments and potential problems at nuclear generating stations of Commonwealth Edison.

Response
Section 11.3 in Volume I of the WM PEIS identifies cumulative impacts for ANL-E and the existing baseline risk. These impacts and risks are generally minor. However, risks associated with activities outside of DOE's control, such as those from commercial nuclear generating stations, are not within the scope of the WM PEIS.

The WM PEIS decision process will not result in the selection of specific locations for waste management facilities on DOE sites. Before DOE selects locations for facilities on sites, it will consider the results of relevant existing or required new NEPA analyses, which would include detailed site-specific cumulative impacts.

Comment (2654)
Shipping methods must consider the safety of the community. Waste should not be transported by any means to ANL-E.

Response
The WM PEIS provides an analysis that allows for relative comparison of the possible risks due to waste transportation, which could be mitigated through careful planning and safety measures. DOE has always maintained that the risks of transporting its waste are very low, but no form of transportation is without some risk. The WM PEIS analysis is based on overall traffic statistics, which do account for the special measures DOE takes when transporting waste.

Because health and safety consequences could possibly result from an accident involving radioactive or other hazardous material, DOE has allocated resources and has established training on emergency response under the overall Federal Emergency Response Program to investigate the effects of such an accident. The mitigating measures that DOE takes include careful choice of the route used, the packaging and transportation methods used, and other considerations.

No one has ever been killed or seriously injured in an accident involving radioactive materials because of the nature of the cargo. In a 23-year observation period, 307 highway and 20 rail accidents occurred. Radioactive materials that could have serious consequences if released are packaged to withstand hypothetical accident conditions during shipping. Accidents involving these packages have resulted in no release of radioactive materials.

Shipping radiological and other hazardous material to interstate highways or rail terminals is described for each site in the WM PEIS Affected Environment Technical Report, which is referenced in the WM PEIS and is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the WM PEIS. In addition, transportation-related impacts are presented in Sections 6.4.2, 7.4.2, 8.4.2, 9.4.2, and 10.4.2 in Volume I, and Appendix E in Volume IV.

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In the transportation technical reports supporting the WM PEIS, which are available in the DOE public reading rooms listed in Section 1.9 in Volume I, estimates of shipments by truck and rail are given. It is estimated that Ames would send two truck shipments or one rail shipment of low-level waste; Fermilab would send 43 truck shipments or one rail shipment of low-level waste; and Ames would send one rail and one truck shipment of low-level mixed waste. Truck shipments would use Interstate 55 to minimize risks to the community. Thus, there would be less than one shipment a week for alternatives calling for shipments of waste to ANL-E.

Comment (2760)
Keep the neighborhood around ANL-E safe; remove the waste stored there illegally.

Response
DOE policy is to conduct its operations to protect the environment and ensure the safety and health of onsite workers and offsite residents. DOE will continue to comply with all applicable environmental and safety statutes and regulations with regard to its waste management activities at ANL-E and other DOE sites.

Comment (3752)
As a person living about one mile from the site, I drink the water from a well nearby. I am a cancer survivor and have greatly benefited by the diagnostic results of ANL. As an ANL employee, I have tried to maintain my objectivity about the WM PEIS, however, I oppose the permanent placement of the LLW and LLMW for a few reasons. (1) This is a densely populated (over 7 million people) area; thousands live just a few miles from the site. (2) As per President Clinton's speech [the commentor claims that President Clinton said in the State of the Union Address given on January 23, 1996, it was his objective to not store nuclear waste near densely populated areas with children], why are we considering it here? (3) I am concerned about drinking water. (4) I am concerned about accidental releases and radiation exposures.

Response
The proximity of a waste management site to populated areas is only one factor in evaluating alternatives. DOE must consider and balance other factors to achieve its objective of safe and efficient treatment, safe and secure storage, and ultimate disposal of each waste type. For example, DOE must consider waste transportation requirements. Although siting waste management activities in less-densely populated or remote areas could reduce the potential for some impacts, the risks of transporting wastes over longer distances to reach remote sites would increase the potential for other impacts. Section 1.7.3 in Volume I of the WM PEIS lists and describes a range of decision criteria and factors that DOE will consider in its programmatic waste management decisions. Minimization of risks to public health, and public preferences, will continue to play a crucial role in this process.

In his State of the Union Address of January 23, 1996, President Clinton identified the challenge "to leave our environment safe and clean for the next generation," given that "10 million children under 12 will live within four miles of a waste dump," a "third of us breathe air that endangers our health," and "in too many communities the water is not safe to drink." The WM PEIS represents DOE's national planning tool to enhance the management of its radioactive and hazardous waste in order to ensure safe and efficient management of these wastes, to comply with all applicable laws, and to protect public health and safety and the environment.

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The WM PEIS analysis estimates that risks from drinking water impacts and accident (treatment and storage facilities, transportation) would be small under all PEIS alternatives. More detail is provided in Sections 6.6.2, 7.6.2, 8.6.2, 9.6.2, and 10.6.2 in Volume I of the PEIS (water quality), and Appendices E and F (transportation, including accidents; facility accidents) in Volume IV.

Comment (3915)
Discount most of the public meeting participants and what they have said. ANL-E has not been involved in nuclear weapons production. Public safety and air quality are monitored. The people in this area should be concerned with the refinery and the chlorine tankers on the railroads. Property values are exploding, not declining.

Response
Thank you for your comment. It is DOE's policy to consider and respond to public comments and to factor public input into its decisions.

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Comment (330)
When deciding whether to store waste at BNL or ship it to a safer location, DOE should compare the difficulties, expenses, and safety concerns (especially drinking water at BNL) associated with those alternatives.

Response
BNL is considered for the management of low-level mixed waste and low-level waste. The site is not considered a potential candidate to receive wastes from other sites, and under all the Regionalized and Centralized Alternatives, BNL would ship its waste offsite for proper treatment and disposal. Under the No Action and Decentralized Alternatives the impacts of storing, treating, and disposing of low-level mixed waste and low-level waste onsite were analyzed and are reported. Chapters 6 and 7 in Volume I of the WM PEIS provide details of the full impact analysis for managing low-level mixed waste and low-level waste across the DOE complex.

The environmental impacts of managing low-level waste and low-level mixed wastes at BNL will be considered in making any treatment, storage, and disposal decisions concerning the BNL wastes. Other factors in the decisions will be impacts on DOE's mission and costs. In arriving at its decisions, DOE attempts to balance its waste management activities supporting site and Department-wide cleanup and ongoing site operations with the desires of the communities within which it operates.

Comment (400)
The Federal Facility Compliance Act Brookhaven Mixed Waste Matrix, which creates separate streams for each waste category and has a limited number of disposal facilities, is the most responsible option.

Response
DOE's low-level mixed waste is subject to the Site Treatment Plans required under the Federal Facility Compliance Act. The Final WM PEIS preferred alternative for low-level mixed waste is a combination of parts of the Decentralized and Regionalized Alternatives, and is intended to be consistent with the configuration established through the Federal Facility Compliance Act. The preferred alternatives, and the reasons they are preferred, are described in Section 3.7 in Volume I of the WM PEIS.

Comment (541)
Commentors oppose the siting of programmatic waste management activities at BNL. Some commentors gave no reason for their opposition; others expressed one or more of the reasons listed below.

- The overall risks to public health and safety and the quality of the environment from proposed waste management activities

- Specific Risks: Risks to endangered species; risks to sensitive habitat (such as the Long Island Pine Barrens and coastal ponds); potential groundwater and drinking water contamination

- Factors: The population density around the site; the "high rate" of breast cancer on Long Island; the site's location over a sole-source aquifer; existing water and air pollution

- Opinions: That DOE could find a better site; that the sum of legal impediments and environmental factors makes BNL extremely inappropriate for disposal of mixed and/or low-level wastes; that the land at BNL is unsuitable for disposal of wastes; that in light of BNL's successful waste source reduction program, DOE should continue to focus on cleaning up existing contamination rather than bringing in new wastes from other sites; and that there is no guarantee that onsite treatment of waste is less damaging to the environment than shipping the waste to another facility.

Response

BNL is one of 17 "major" sites analyzed in the WM PEIS. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites. However, designation as a major site does not mean the site will be selected for a programmatic waste management role. Under two of the 36 alternatives in the PEIS (Decentralized Alternatives for low-level mixed waste and low-level waste), DOE would construct new facilities for BNL to manage its own waste. BNL would not dispose of any offsite wastes. Under the remaining alternatives, BNL's low-level mixed waste and low-level waste would be disposed of at other DOE sites.

The WM PEIS analyzes for each candidate site the potential for environmental impacts resulting from programmatic waste management activities. See Volume I, Chapters 6 through 10 for results; see Volume III, Section C.4.1.2.3, for analysis methods. The analysis considered potential impacts, including most of the impacts that concern commentors, from normal operations, operations accidents, incident-free transportation, and transportation accidents. In addition, the PEIS estimates cumulative impacts from past, present, and reasonably foreseeable future actions (see Volume I, Chapter 11). In general, the environmental impacts associated with waste management activities under all alternatives at all sites considered in the PEIS would be small. For those impacts that would not be small, DOE would incorporate mitigation measures to reduce or eliminate the impacts, and where applicable, to comply with regulatory requirements. Therefore, there is no reason to believe that waste management activities at BNL would have a significant negative impact on public health and safety or the natural environment.

Volume I, Section 3.7, identifies DOE's preferred alternatives and the reasons they are preferred. These are not final decisions. Records of Decision published in the *Federal Register* will announce DOE's decisions and the reasons for the decisions if they differ from those provided in the Final PEIS. The WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets, schedules, and national priorities, as well as other DOE studies, will be considered in developing Records of Decisions.

The WM PEIS addresses water resources as site-specific impact parameters. Major surface-water features associated with BNL include the onsite Peconic River and its intermittent tributary. Onsite streams and the Peconic River receive treated wastewater. Discharge monitoring in 1991 showed that all concentrations were within applicable standards, except for trichloroethylene. The lower aquifer system (Magothy and Raritan Formations) and the Pleistocene Upper Glacial Aquifer, which are all considered sole-source aquifers, are the major groundwater units at BNL. Groundwater monitoring in 1991 showed that eight parameters exceeded New York State Drinking Water Standards. Some groundwater contamination has migrated offsite, and concentrations have been found to exceed drinking water standards. However, as described in Sections 6.6.2 and 7.6.2 in Volume I, the WM PEIS water quality analysis indicated that disposal of low-level mixed waste and low-level waste at BNL would not cause groundwater concentrations to exceed drinking water standards that were used as an indication of acceptable groundwater quality.

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BNL is located in the Central Pine Barrens and within the Peconic Estuary system. One Federally listed endangered species (the Peregrine Falcon) and several State-listed species have been observed on or near the site. DOE is aware of the sensitive ecological resources associated with BNL, and would locate new waste management facilities to avoid impacts to threatened and endangered species, nearby wetlands, and other sensitive habitats.

DOE used data from the 1990 U.S. Census to estimate that about 5,740,000 people live within 50 miles from the center of BNL. This population could possibly be exposed to emissions released to the atmosphere from waste treatment facilities. Human health risks (e.g., cancer) constitute a site-specific impact parameter analyzed in the PEIS (Volume I, Sections 6.4, 7.4, and 8.4). Offsite population human health risks and offsite maximally exposed individual health risks are also cumulative impact parameters addressed by the PEIS (see Volume I, Section 11.2). The health risk analyses suggest that adverse health effects from the operation of waste treatment facilities located at BNL would be small. Public health impacts from disposal would similarly be small after implementation of mitigation measures necessary to ensure that DOE would not exceed radionuclide- and/or chemical-specific limits. Further, waste management facilities are not expected to contribute to radiation exposure of the general public or result in radiation emissions to the environment.

A major focus of the WM PEIS is to help DOE establish a Department-wide program to safely and efficiently manage radioactive and hazardous wastes. However, issues regarding existing pollution, a site's waste management record, and actual site cleanup and pollution prevention efforts are more appropriately evaluated in sitewide or project-level studies.

While DOE understands and appreciates individual concerns, some alternative must be selected in light of the considerable amount of existing radioactive and hazardous wastes. Be assured that DOE is committed to managing its wastes to protect human health and the environment. DOE takes its responsibility and accountability for waste management decisions seriously and intends to select a configuration for its waste management complex that provides human health and safety assurance to the public. The WM PEIS will help DOE make sound waste management decisions.

The proximity of a waste management site to populated areas is only one of many factors in evaluating alternatives. DOE must consider and balance other factors to achieve its objective of safe and efficient treatment, safe and secure storage, and ultimate disposal of each waste type. For example, DOE must consider waste transportation requirements, and the PEIS presents alternatives that would minimize waste transportation (Decentralized Alternatives) and that would maximize waste transportation (Centralized Alternatives). Although siting waste management activities in less-densely populated or remote areas could reduce the potential for some impacts, the risks of transporting wastes over longer distances to reach remote sites would increase the potential for other impacts. Section 1.7.3 in Volume I lists and describes examples of the criteria and factors DOE will consider in the decisionmaking process.

DOE prepared the WM PEIS as a part of its effort to develop an overall national strategy on which to base waste management decisions. After DOE announces its decisions and before selecting specific locations for waste management facilities on sites, DOE will consider the results of existing relevant or required new NEPA reviews, which would include more detailed evaluations of the potential for environmental impacts based on site-specific conditions.

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Comment (2090)
BNL is located in the Long Island Nassau-Suffolk Aquifer System, and WVDP is located in the Cattaraugus Creek Aquifer System. These have been designated as sole-source aquifers pursuant to the Safe Drinking Water Act. The sensitivity and importance of these sole-source aquifers should be considered in the selection of the sites. Specifically, site-specific NEPA documentation should include a detailed assessment of the potential groundwater impacts. A copy of EPA's guidance for conducting groundwater analyses in sole-source aquifers is available upon request.

Response
Volume I, Chapter 4, and Volume III, Section C.4.3.5, of the WM PEIS identify DOE sites, including BNL and WVDP, that are located over EPA-designated sole-source aquifers. DOE decisionmakers will consider the locations of sites in relation to sole-source aquifers when determining future waste management configurations. The minimization of environmental impacts is a decision criterion. See Volume I, Section 1.7.3.

In addition, before selecting locations for facilities on sites, DOE will consider the results of existing relevant or required new NEPA reviews, which would include detailed assessments of potential groundwater impacts. DOE will follow applicable guidelines, including those from EPA, in conducting its groundwater analyses.

Comment (2109)
Siting multiple disposal sites around the country would be poor waste management strategy and would play into the hands of those who would close the lab [BNL] and DOE as the lab's major funder.

Response
NEPA and CEQ regulations require the action agency to include a discussion of reasonable alternatives to a proposed action in an EIS. The agency must provide sufficient information for each alternative so that reviewers can evaluate the comparative merits of those alternatives. Four broad categories of alternatives encompass the reasonable alternatives available to DOE for siting of facilities for the five waste types that are considered in the WM PEIS. The No Action Alternative, Decentralized Alternatives, Regionalized Alternatives, and Centralized Alternatives. However, under each category of alternatives, there are many possible combinations for the number and location of DOE waste management sites. To narrow these combinations to a level where meaningful analysis could occur, DOE selected representative alternatives for analysis under each category.

Implementation of the waste management programmatic strategy could entail consolidation, or downsizing, of waste management activities at some sites or upgrading in more regionalized or centralized approaches. The PEIS does not *make* those decisions; rather, it makes recommendations. Decisions will be based on this PEIS, regulatory compliance, budgets, schedules, compliance with site agreements with States, national priorities, and other DOE studies. Decisions will be announced in Records of Decision to be published in the *Federal Register*.

Comment (2813)
A commentor stated that BNL is inappropriate for hazardous wastewater treatment, and is concerned that DOE believes sewage or wastewater treatment processes are appropriate for liquid hazardous wastes at BNL. BNL received a permit from New York State in 1995 for a hazardous waste management facility. The permit was solely to allow BNL to store hazardous wastes onsite prior to

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shipment for appropriate disposal. However, [the commentor] "is shocked" to discover that DOE considers shipment of liquid hazardous wastes to be inappropriate and requested that DOE amend the WM PEIS concerning the generic treatment of hazardous wastes at DOE facilities to reflect a policy that is truly applicable complex-wide.

Response
The continued treatment of hazardous wastewater onsite at DOE facilities is one of the assumptions identified in Volume I, Section 10.2.3, of the WM PEIS. For purposes of analysis the WM PEIS considers hazardous waste at the 11 sites which collectively produce 90% of that waste type. Due to the programmatic nature of the document, the WM PEIS analysis is generic in character and based on assumptions to allow for meaningful comparison of programmatic management options. DOE believes conclusions would not change, programmatically, if all sites (including BNL) were specifically analyzed. All sites, however, will be subject to the decision made based on the WM PEIS.

Most DOE hazardous waste consists of wastewater that contains less than a 1% concentration of organic materials. DOE currently treats hazardous wastewater onsite and will continue to do so in the future because wastewater is not difficult to treat, but it is difficult and expensive to transport to an offsite treatment facility. DOE believes that hazardous wastewater can be treated onsite within regulatory limits. DOE complies with all applicable statutes and regulations in treating hazardous waste onsite at BNL. DOE does not treat nonwastewater liquid hazardous waste with its sewage.

The focus of the PEIS alternatives is on the RCRA-defined nonwastewater hazardous waste that is used for fuel burning onsite or shipped offsite for incineration. This nonwastewater hazardous waste, predominantly solvents and cleaning agents, is about 1% of the DOE hazardous waste.

DOE revised Section 1.5.6 in Volume I of the WM PEIS to explain that non-hazardous and nonradioactive sanitary waste, non-hazardous solid waste, and hazardous and low-level process wastewater are not included in the PEIS analysis. They raise site-specific issues and, therefore, not appropriately addressed in a programmatic EIS.

Comment (2815)
BNL has very little low-level mixed waste waste and no low-level waste. BNL should not receive any offsite wastes because it does not produce a significant quantity of its own.

Response
Table 6.1-1 in Volume I of the WM PEIS is based on the 1994 Mixed Waste Inventory Report, which indicates that BNL has 190 cubic meters of estimated inventory plus 20 years generation of low-level mixed waste. The 1992 Integrated Data Base, the source of LLW data for the Draft WM PEIS, did not provide LLW data for BNL. Thus, the evaluation in the Draft PEIS for BNL did not include impacts from management of LLW. However, Tables 1.6-2 and 7.1-1 in Volume I of the Final PEIS show that the inventory plus the 20-year projected LLW volume at BNL is 5,600 cubic meters. The updated data were obtained from the 1995 version of the Integrated Data Base. Consideration of updated LLW estimates for BNL are included in Appendix I in Volume IV of the Final PEIS. Appendix I addresses the issue of how updated waste projections affect PEIS conclusions.

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BNL would manage only its own low-level mixed waste and low-level waste, and would dispose of such wastes onsite only under the Decentralized Alternatives. BNL would not dispose of any offsite wastes.

Comment (2850)
BNL and its surrounding area are too environmentally sensitive for "indefinite storage." Materials should be shipped off this site even under the No Action Alternative.

Response
The No Action Alternative can be characterized as the status quo alternative. Wastes would continued to be treated, stored, and/or disposed of at each site using only existing or planned facilities. The No Action Alternative for BNL means the following: for low-level mixed waste, BNL would treat wastewater only and store BNL low-level mixed waste onsite; BNL would ship low-level waste to Hanford for disposal. Note that RCRA Subtitle C implementing regulations governing low-level mixed waste, prohibit "indefinite storage" of waste that requires treatment.

As to the environmental sensitivity of the BNL area, DOE found that the construction of waste management facilities would entail a limited loss of acreage. DOE should be able to locate new waste management facilities in a manner to minimize adverse impacts to sensitive ecological resources. Actual waste management facilities will be analyzed in future sitewide or project-level NEPA reviews.

Comment (2856)
The WM PEIS states that Regionalized Alternatives are preferred for low-level mixed waste. There are blank spaces in Table 3.4-1 for the Regionalized Alternatives under BNL. If this means that BNL would not become a regional treatment and disposal site for low-level mixed waste, that low-level mixed waste would be shipped from BNL off Long Island, and that no low-level mixed waste would be shipped from offsite locations to BNL, the commentor supports this preferred alternative.

Response
DOE's preferred alternative for treatment of low-level mixed waste is a combination of parts of the Decentralized and Regionalized Alternatives. At BNL, the preferred treatment alternative is regionalized treatment, under which DOE would ship its low-level mixed waste offsite for treatment; although, some low-level mixed waste could be treated onsite, consistent with the Site Treatment Plan. All BNL low-level mixed waste would be disposed of offsite under the preferred alternative. Note, however, that these are not final decisions. Decisions will be announced in Records of Decision published in the *Federal Register* following publication of the Final WM PEIS.

Comment (2869)
As BNL is not an appropriate site to consider for the disposal of hazardous and/or radioactive wastes, BNL should be deleted from all of the tables in Chapters 4, 6, and 7.

Response
NEPA requires DOE to consider and evaluate reasonable alternatives to a proposed action; in this case, BNL was analyzed as a reasonable potential waste management site for its own low-level mixed waste and low-level waste. For this reason, BNL is listed in the tables in Chapters 4, 6, and 7 in Volume I of the WM PEIS.

3.5.2 Brookhaven National Laboratory

Comment (2965)
The No Action Alternative for hazardous and/or radioactive waste is completely inappropriate for BNL. Because BNL is in a very environmentally sensitive area, there should be no treatment or storage of low-level mixed waste at this site.

Response
NEPA requires Federal agencies to include a discussion of reasonable alternatives in an environmental impact statement. DOE must provide sufficient information for each alternative so that reviewers may evaluate the comparative merits of those alternatives.

Under the WM PEIS alternatives, BNL would manage only its own low-level mixed waste and low-level waste. BNL would dispose of such wastes onsite only under the Decentralized Alternative. It would not dispose of any offsite wastes.

Although the Final WM PEIS does identify preferred alternatives for each waste type, actual programmatic decisions will be announced in Records of Decision. Moreover, the WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets, schedules and national priorities, as well as other DOE studies, will be considered in moving to Records of Decision. The minimization of environmental impacts, e.g., on ecological resources, is a decision criterion.

3.5.3 Fernald Environmental Management Project

Comment (1761)
The WM PEIS lists the Fernald Environmental Management Project (FEMP) as a possible disposal facility for other sites' waste. However, DOE, EPA, and the State of Ohio have already accepted the citizens' recommendation explicitly rejecting the idea that any offsite wastes come to FEMP for disposal.

Response
As described in Chapters 6 and 7 in Volume I of the Final WM PEIS, the alternatives for low-level mixed waste and low-level waste (the waste types considered for management at FEMP) do not include disposal at FEMP of waste generated offsite. Table 7.3-4 in Volume I of the Draft WM PEIS was misleading in identifying waste from sites other than FEMP (Ames, ANL-E, Fermi, Mound) being disposed of at FEMP. This table has been corrected in the Final WM PEIS.

Comment (2339)
Regionalized Alternative 2 is a good choice for low-level waste because it includes FEMP in the process. However, this choice could be precluded because of the preexisting agreements between FEMP and NTS.

Response
Historically, FEMP's low-level radioactive waste has been shipped to NTS for shallow land burial. FEMP ships this waste to NTS in accord with direction from DOE Headquarters and Nevada Defense Waste Acceptance Criteria NVD-325. There are no binding agreements between FEMP and NTS that would preclude the Regionalized 2 Alternative.

3.5.4 Hanford Site

Comment (1148)
We prefer that high-level waste from WVDP be stored at the Hanford Site rather than at SRS.

Response
Thank you for commenting. DOE's preferred alternative for managing high-level waste, and the reason it is preferred, is identified in Section 3.7 in Volume I of the WM PEIS. Programmatic decisions will be announced in Records of Decision published in the *Federal Register*. Budgets, schedules and national priorities, as well as other DOE studies will be factored into the decisionmaking process.

Comment (1952)
Of those commentors opposing the siting of programmatic waste management activities at the Hanford Site, some commentors gave no reason for their opposition and others expressed one or more of the reasons listed below:

- The overall risks to public health and safety (including Native Americans) and the quality of the environment from normal operations, facility accidents, and transportation accidents; including the potential contamination of water from buried waste;
- Contamination of critical sage-brush habitat in violation of the Endangered Species Act;
- That waste should be kept where it is, and DOE should not be allowed to import to Hanford and bury mixed radioactive and hazardous wastes from other nuclear weapons plants at Hanford;
- That Hanford facilities be used to treat mixed waste or low-level waste from other nuclear weapons plants only if there is no impact to Hanford cleanup schedules and if the wastes are not stored at Hanford before or after treatment for prolonged periods (a few commentors also expressed the opposite view);
- Seismic activity at Hanford was not considered with regard to long-term impacts of the treatment and storage of high-level waste; such site-specific analyses must be conducted at Hanford before any irreversible or irretrievable commitment of resources;
- That Hanford is not suitable for receiving additional wastes, as it is a Superfund site and existing wastes are not being properly stored or dealt with; Hanford cleanup needs to happen, not more dumping; modifications to the Hanford Site Tri-Party Agreement would be opposed; all waste should be kept in aboveground monitored storage; DOE should not create any more nuclear waste; and that DOE needs to determine the real total costs of these actions.

Response
NEPA and CEQ implementing regulations require DOE to consider and evaluate reasonable alternatives to a proposed action; in this case, the potential for siting some waste management activities at the Hanford Site was analyzed as a reasonable option under some WM PEIS waste management alternatives. Hanford is one of 17 "major" sites analyzed in the WM PEIS. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites.

3.5.4 Hanford Site

Radioactive and hazardous wastes are generated at DOE facilities from the development, production, testing, and disassembly of nuclear weapons; from basic and applied research; and from energy research activities. DOE will continue to perform these and other functions within its mission until directed otherwise by the President and Congress.

The Hanford Site is being analyzed in the PEIS as a candidate location for management of low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste.

For low-level mixed waste, DOE evaluated seven separate alternatives. Under five of these alternatives, Hanford would serve as a disposal site for its own low-level mixed waste. Under the Decentralized Alternative and Regionalized Alternative 1, Hanford would also receive low-level waste from two small sites amounting to less than 1% of the total volume disposed of at Hanford. For Regionalized Alternatives 2 and 4, Hanford would receive small volumes of wastes from six other sites amounting to 7% of the total onsite disposal at Hanford. For Regionalized Alternative 3, all Hanford low-level mixed waste would be shipped to other sites for disposal. Only under the Centralized Alternative would the Hanford Site be responsible for disposing of a substantial quantity of waste other than its own (86% of the total volume disposed of would be received from other sites).

For low-level waste, DOE evaluated 14 separate alternatives, 12 of which considered Hanford as a potential site for disposal. Under No Action, Hanford would continue to treat and dispose of low-level waste generated onsite, as well as offsite wastes that would amount to 68% of the total volume disposed of at Hanford. For the Decentralized Alternative and Regionalized Alternatives 1, 2, and 3, Hanford would only dispose of the wastes generated on the site. For Regionalized Alternatives 4 and 5 and Centralized Alternatives 3 and 4, Hanford would dispose of its own waste, as well as offsite wastes amounting to 8% of the total volume disposed of. Hanford would dispose of a greater amount of wastes generated off the site under Regionalized Alternative 6 (80%) and Centralized Alternatives 1 and 5 (both 94%), in addition to disposing of its own waste.

Under the transuranic waste management alternatives, Hanford would treat transuranic waste, and up to 10% of the total volume that it treats would come from other sites. However, no transuranic waste disposal would take place at Hanford.

Hanford currently stores high-level waste on the site. Under each of the alternatives for managing this waste type, all of the existing and planned high-level waste being stored at Hanford would eventually be transported off the site. Under Regionalized Alternative 2, Hanford would also receive and temporarily store high-level waste from WVDP prior to its shipment to a permanent storage location.

Under three of the four alternatives proposed for hazardous waste management, the Hanford Site would continue to ship all hazardous waste off the site for treatment either at a commercial facility or at another DOE "hub" site (INEL). For the remaining alternative (Regionalized Alternative 1), Hanford would serve as a hub site managing its own waste and hazardous waste received from LLNL. Under this alternative, Hanford would treat some of the hazardous wastes onsite, with any remaining waste being shipped off the site for treatment at a commercial facility.

The PEIS analyzes for each candidate site the potential for environmental impacts resulting from programmatic waste management activities. See Volume I, Chapters 6 through 10 for results; see Volume III, Appendix C, for analysis methods. The analysis considered potential impacts, including

3.5.4 Hanford Site

most of the impacts that concern commentors, from normal operations, operations accidents, incident-free transportation, and transportation accidents. In addition, the PEIS estimates cumulative impacts from past, present, and reasonably foreseeable future actions (see Volume I, Chapter 11). In general, the environmental impacts associated with waste management activities under all alternatives for all sites considered in the PEIS would be small. For those impacts that would not be small, DOE would incorporate mitigation measures to reduce or eliminate the impacts. Therefore, there is no reason to believe that waste management activities at Hanford would have a significant negative impact on the natural environment or public health and safety.

DOE used data from the 1990 U.S. Census to estimate that about 378,000 people live within a 50-mile radius of the existing 200-Areas waste management facilities at Hanford. This population could possibly be exposed to emissions released to the atmosphere from waste management activities. Human health risks (e.g., cancer) constitute a site-specific impact parameter analyzed in the PEIS (Volume I, Sections 6.4, 7.4, and 8.4). Offsite population human health risks and offsite maximally exposed individual health risks are also cumulative impact parameters addressed by the PEIS (see Volume I, Section 11.6). The health risk analyses indicate that there is a potential for increased adverse health effects from the operation of waste treatment or disposal facilities located at Hanford. However, if DOE decides to site a new waste management facility at Hanford, it would establish design and operational limitations to ensure that releases from the facility would be maintained below regulatory limits. Appendix D in Volume III describes in more detail waste management facility human health risk estimates.

The PEIS also includes a detailed assessment of risks associated with accidents from both rail and truck transportation, including low-probability/high-consequence and high-probability/low-consequence accidents. DOE found that risks from transportation accidents would be low under all alternatives. DOE provides for Radiological Assistance Program teams consisting of trained experts equipped and prepared to quickly respond to an accident and assist local emergency response personnel, if requested by local agencies.

Section 4.4.4 in Volume I of the WM PEIS states that the seismicity of the Columbia Plateau is relatively low, although shallow, low intensity earthquakes occur throughout the Hanford Site area, although quakes of greater magnitude have occurred in the plateau region. Section 2.2.1.1 of the WM PEIS Affected Environment Technical Report further discusses the existing known faults within the Hanford area and the seismic history of the Columbia Plateau. The technical report is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final WM PEIS.

Groundwater monitoring at Hanford in 1992 showed that 14 parameters exceeded comparison criteria. Preliminary investigations have identified four major groundwater contaminant plumes, which have been found to enter the Columbia River in at least three locations. However, any future waste management facilities at Hanford would be appropriately designed and constructed to minimize the potential for leaks affecting groundwater.

The PEIS ecological risk assessment found that environmental risks from treatment would be low at Hanford under all waste management alternatives, and environmental risk from disposal would be low after implementation of radionuclide- and/or chemical-specific limits.

3.5.4 Hanford Site

Sections 6.14, 7.14, 8.14, 9.14, and 10.14 of the WM PEIS compare potential costs by alternative for each waste type. In addition, Volume II of the PEIS contains data tables that include cost information for each site.

As evidenced by this PEIS, DOE does not intend to "dump" waste in the ground. DOE intends to properly manage the wastes to protect human health and the environment. The opinion that waste should be managed where it is generated most closely matches the No Action and Decentralized Alternatives (see Volume I, Chapter 3), which are carefully evaluated in this PEIS. Further, no wastes would be shipped to Hanford for treatment until suitable treatment facilities become available.

Other sites are being analyzed to take large quantities of Hanford transuranic waste and high-level waste for disposal. When decisions are made based on the WM PEIS, Hanford could be asked to take some or all of the low-level waste and low-level mixed waste in the DOE complex. Decisions will be based on impacts evaluated in the WM PEIS, as well as other criteria. Certainly, public input and equity will be considered in the final decisions.

DOE recognizes that the siting of waste management facilities may be perceived negatively by some people. DOE is committed to protecting human health and the environment. DOE takes its responsibility and accountability for waste management decisions seriously and intends to select a configuration for its waste management complex that provides human health and safety assurance to the public. The PEIS will help DOE make sound waste management decisions.

The WM PEIS uses generic treatment and disposal technologies and a number of conservative assumptions to develop its programmatic evaluations of the relative impacts of different waste management alternatives. The results of these impact analyses are screening-level estimates; prior to implementing any decisions and committing resources, DOE would develop more precise estimates of potential impacts. Issues regarding existing pollution, a site's waste management record, and actual site cleanup efforts will be evaluated at the site level.

DOE prepared the PEIS as part of its effort to develop an overall national strategy on which to base waste management decisions. This strategy includes compliance with all laws that govern protection of the environment, including the Endangered Species Act. Based on projected land requirements, DOE considered the potential for proposed waste management activities to affect sensitive habitats and species. Because the land required for the construction of waste management facilities would be a small fraction of available nonsensitive lands, DOE would be able to avoid direct impacts to sensitive lands. Further, DOE would have enough flexibility to avoid indirect impacts, such as those that could result from building access roads. If DOE selects Hanford for a specific waste management role, it would consider in greater detail potential impacts to endangered species and natural resources.

Preexisting site-specific plans and agreements, such as the Tri-Party Agreement, will be considered by decisionmakers. However, it is possible that some compliance agreements might need to be revisited as a result of decisions made based on the WM PEIS.

Volume I, Section 3.7, identifies DOE's preferred alternatives and the reasons they are preferred. These are not final decisions. Records of Decision will announce DOE's decisions and the reasons for the decisions if they differ from the preferred alternatives provided in the Final PEIS. The WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets,

3.5.4 Hanford Site

schedules, and national priorities, as well as other DOE studies will be considered in developing Records of Decision.

Comment (2181)
Washington State voters passed a law, by an 84% margin, stating that we are not going to be your high level nuclear dump, not for temporary storage, nor for an underground repository. The WM PEIS does not examine alternatives to Yucca Mountain. Since Yucca Mountain is not likely to open on time, or at all, or have enough room for DOE wastes, Hanford would become a permanent waste dump.

Response
While the WM PEIS analyzes impacts from the storage and transportation of canisters that contain vitrified high-level waste, high-level waste treatment and disposal are outside the scope of the PEIS. High-level waste treatment is addressed through sitewide or project-level NEPA reviews identified in Sections 9.1.2.1 through 9.1.2.4 in Volume I of the PEIS.

The Nuclear Waste Policy Act, as amended in 1987 (Public Law 100-23), designated that a repository for high-level waste and spent nuclear fuel be developed and that deep geologic disposal be at Yucca Mountain, the only option studied for the disposal of high-level waste. Although the law does not require that the repository be at Yucca Mountain in Nevada, it identifies only Yucca Mountain for the site characterization activities that would precede the selection of a repository location. Potential environmental consequences of constructing and operating a high-level waste repository at the site is being evaluated in the Yucca Mountain Repository EIS. If the high-level waste repository is not established at Yucca Mountain, DOE would have to reevaluate long-term plans for disposition of high-level waste.

As described in Section 9.3.5 in Volume I, the WM PEIS does examine the environmental impacts of long-term storage of high-level waste canisters at Hanford if the repository does not open on time. The impacts of long-term *storage* of vitrified high-level waste at Hanford would be small.

Comment (2238)
The WM PEIS should include Chapter 5 of the Hanford Remedial Action EIS, including the land-use-based and health-risk-based alternatives.

Response
The WM PEIS is a national and programmatic study to help DOE develop a strategy to manage the radioactive and hazardous wastes for which the Waste Management Program is responsible. The alternatives in the Hanford Remedial Action EIS deal primarily with environmental restoration, not waste management, activities at Hanford. Environmental restoration activities are not within the scope of the WM PEIS. However, the PEIS does evaluate how the comparison among waste management alternatives could be affected by estimated volumes of environmental restoration waste that could be transferred to Waste Management Program responsibility (see Volume III, Appendix B). In addition, Section 1.8 in Volume I describes the relationship of this PEIS to other actions and programs, including the Hanford Remedial Action EIS.

3.5.4 Hanford Site

Comment (2260)
The workforce at Hanford is demoralized by no action. We need to identify the opportunities that exist from the legacy of the past. We cannot tolerate delays. We will never have all the answers; we will have to make decisions on incomplete information.

Response
The WM PEIS does not qualitatively analyze environmental restoration wastes ("the legacy of the past"), nor does the scope of the WM PEIS include environmental restoration alternatives. Section 1.7.1 in Volume I of the PEIS explains the change in scope of the WM PEIS, which removed environmental restoration alternatives from the analysis, primarily because of the site-specific nature of environmental restoration activities and the uncertainty about the characteristics of environmental restoration waste at many DOE sites.

Section 1.8.1 in Volume I does include descriptions of other Hanford NEPA documents and their relationship to the WM PEIS. Among these documents is the Hanford Remedial Action Draft EIS, which analyzes the impacts of remediating past-practice waste sites that are DOE's responsibility. It will help establish future land-use objectives to assist DOE in developing a remediation strategy for the Columbia River, Central Plateau, and all other geographic areas of the Hanford Site.

Section 11.6.2 in Volume I of the WM PEIS notes that the impacts of actions addressed in the Hanford Remedial Action Draft EIS are included in the cumulative impacts analysis for Hanford.

Comment (3088)
Since the State of Nevada indicates it does not want the high-level waste, Hanford could become a permanent centralized storage site under the Centralized Alternative, which would affect and require a modification to the Tri-Party Agreement. All of WVDP's 300 canisters would be shipped to Hanford because WVDP would generate all of its canisters prior to 2015; if acceptance of the high-level waste at the geologic repository is delayed past 2015, all canisters from WVDP, SRS, and INEL could be shipped to Hanford for storage prior to shipping to Yucca Mountain. Nevada might never accept these canisters, leaving Hanford a permanent storage site.

Response
As described in Section 9.3.5 in Volume I, the WM PEIS examines the environmental impacts of long-term storage of high-level waste canisters at Hanford if the repository designated by the Nuclear Waste Policy Act, as amended in 1987 (Public Law 100-23), does not open on time. The impacts of long-term storage of vitrified high-level waste at Hanford would be small.

Comment (3166)
One commentor stated that the State of Washington and the U.S. EPA should not allow DOE or the U.S. Department of Defense to transfer to the Hanford Site any hazardous and radioactive waste unless the following criteria are met. Transport of offsite waste to Hanford for treatment will require careful planning of routes and consideration of weather emergencies to minimize the likelihood of an accident. Emergency preparedness for minimizing the impacts from an accident will require financial support from DOE to State, Tribal and local involvement, including adequate equipment and training. When materials are shipped, timely notification should be provided to transportation agencies.

3.5.4 Hanford Site

Response

Sections 4.3.10 in Volume I and E.9 in Volume IV of the WM PEIS describe the transportation planning and route selection processes used by DOE. Transportation planning includes considerations of emergency planning and shipment notification requirements.

DOE requirements for emergency response preparedness are contained in DOE Order 151.1, *Comprehensive Emergency Management Systems and Planning for Preparedness for Operational Emergencies*. Emergency preparedness for transport of radioactive wastes is a vital part of the transportation planning process.

As a shipper of radioactive materials, DOE is responsible for complying with the regulations applicable to the safety of its shipments. This includes assisting State, Tribal, and local emergency responders if an accident occurs. DOE's Transportation Emergency Preparedness Program includes initiatives on planning and training, exercises, and technical assistance to State, Tribal, and local governments. DOE further provides for Radiological Assistance Program teams consisting of trained experts equipped and prepared to quickly respond to an accident and assist local emergency response personnel, if requested. DOE's Radiological Assistance Program teams are administered by eight Regional Coordinating Officers.

Comment (3421)

DOE's low-level radioactive waste is not regulated. At Hanford, it is buried in unlined, unregulated trenches that do not meet commercial standards and lack appropriate monitoring. DOE now wants to bury in Hanford's unlined and unregulated low-level radioactive waste trenches waste that has been considered mixed toxic or carcinogenic dangerous waste under the Washington State Dangerous Waste Law. Quantities of these wastes and corresponding risks and impacts (e.g., health, water, wildlife, and air) of having these wastes in the same unlined, unregulated burial trenches as radioactive wastes are not disclosed in the WM PEIS.

Response

Assuming that the comment might refer to low-level mixed waste after treatment, it is important to note that the disposal facilities for treated low-level mixed waste would be designed to comply with the applicable Dangerous Waste Regulations of Washington State.

Quantities of low-level mixed wastes and hazardous waste, including those referred to by the commentor, and the corresponding impacts analyses are found in Chapters 6 and 10, respectively, in Volume I of the PEIS. Further information is provided in Appendix I in Volume IV of the PEIS, and in technical reports available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final PEIS.

Comment (3715)

Even without considering environmental restoration and decontamination wastes, the Centralized Alternative for low-level mixed waste and hazardous waste could cause adverse air quality impacts, pose health risks along transportation corridors, make Hanford a sacrifice zone, and impact air and water resources and transportation corridors by treating/incinerating mixed waste from other sites at privatized facilities now planned by Hanford. In addition, if DOE chooses the Centralized Alternative for disposal of all DOE low-level mixed waste at Hanford, Hanford would get 6.3 times more waste than it already has plans to dispose of.

3.5.4 Hanford Site

Site Treatment Plans for other weapons plants include plans to ship mixed waste to Hanford for long-term storage/disposal in violation of Hanford Advisory Board advice, Joint States' principles, and DOE's own promises. Why do we have to worry about DOE choosing the Centralized Alternative for disposing of all of the Nation's low-level mixed waste at Hanford? Because DOE's cost estimate for the Centralized Alternative is $5 billion less than for the Decentralized Alternative.

Response
DOE analyzed the Centralized Alternatives for low-level mixed and hazardous waste to compare reasonable alternatives, as required by the CEQ regulations for implementing NEPA. Potential impacts that were analyzed included air quality, health risks from transportation, ecological resources, and land requirements. Cost was only one item among many analyzed. As waste is consolidated at fewer sites, costs for waste management facilities decrease. DOE identifies its preferred waste management alternatives and the reasons they are preferred in Volume I, Section 3.7, of the Final PEIS.

The WM PEIS provides the NEPA basis for the Federal Facility Compliance Act low-level mixed waste treatment configuration. The initial Site Treatment Plans were based on discussions among States, EPA, Tribal Governments, and the public. The implementing Compliance Orders can be modified to reflect technical, schedule, and other additional inputs as the treatment configuration and needs evolve.

Comment (3743)
If DOE chooses the Centralized Alternative for disposal of all low-level waste at the Hanford Site, even without consideration of Hanford's own cleanup waste requirements, the site's total wastewater treatment capacity would be exceeded.

Response
As noted in Section 1.7.3 in Volume I, in accordance with NEPA, the Final WM PEIS identifies a preferred alternative for each waste type. As noted in Section 1.7.3 in Volume I, DOE selected these preferred alternatives based on factors and criteria that include public input; favoring strategies that further DOE mission objectives; ensuring alternatives are consistent with site capabilities and availability of technologies; etc. Preferred alternatives and the reasons they are preferred are discussed in Section 3.7 in Volume I. DOE will announce its decisions in Records of Decision to be published in the *Federal Register*. Before selecting locations for waste management facilities on sites, DOE will consider the results of existing relevant or required new NEPA reviews, which would address in more detail potential environmental impacts based on site- specific conditions, including wastewater treatment capacity. If an alternative selected by DOE would result in the Hanford Site's total wastewater treatment capacity being exceeded, expanded wastewater treatment capacity would be among the new facilities required by that alternative.

3.5.5 Idaho National Engineering Laboratory

Comment (537)
DOE needs to understand that the disposal of low-level waste over an aquifer will not be a preferred alternative for Idaho; this would be a non-preferred alternative.

Response
Low-level waste would be disposed of at INEL under the No Action, Decentralized, and Regionalized 1 through 5 Alternatives. The WM PEIS analysis of the impacts to water quality from disposal showed that low-level waste disposal at INEL would not cause groundwater concentrations to exceed or even approach relevant drinking water standards under any of the low-level waste alternatives. More detail on water quality impacts from low-level waste management is provided in Section 7.6.2 in Volume I of the WM PEIS. DOE would conduct disposal unit performance assessments before siting disposal facilities at INEL or any site. Siting of disposal facilities will not occur before DOE has considered the results of sitewide or project-level NEPA reviews.

Comment (2583)
The WM PEIS states that INEL was eliminated from consideration as a Regionalized Alternative site for high-level waste because it has no existing or approved storage facilities. In that case, why is INEL appropriate for other alternatives?

Response
Four DOE sites either store or manage high-level waste: the Hanford Site, INEL, SRS, and WVDP. The WM PEIS analyzes the impacts of stored vitrified high-level waste. However, high-level waste at INEL is not vitrified; rather, it is in liquid or calcined forms pending future processing to a final waste form, and no high-level waste canister storage facility exists or is approved for INEL.

Because the site is not authorized to treat high-level waste to a final waste form acceptable for disposal in the candidate repository, the No Action Alternative assumes no canister production at INEL. INEL is also assumed to have no canister storage facilities under the No Action Alternative.

For all alternatives other than No Action, an average annual production rate of 48 canisters per year is assumed for INEL. Under the Decentralized Alternative, storage capacity would be constructed at the site equal to the anticipated total production of high-level waste canisters at INEL.

The Regionalized Alternatives for high-level waste address transporting the relatively small number of WVDP high-level waste canisters to either the Hanford Site or SRS, both of which have existing or planned storage facilities that could accept these canisters in the near term. In contrast, INEL was eliminated from consideration as a storage site *for WVDP canisters* under the Regionalized Alternatives because it has no existing or approved storage facilities for high-level waste. However, adequate storage capacity would be constructed at INEL under the Regionalized Alternatives for managing high-level waste canisters produced onsite.

Comment (2881)
The State of Idaho supports those alternatives proposing to construct or operate waste treatment facilities on INEL consistent with requirements of the Spent Nuclear Fuel Court Order of 1995, the Federal Facility Compliance Act, and the INEL Site Treatment Plan. The State opposes any proposed alternative specifying the siting and operation of any waste disposal facility over the Snake River Plain

sole-source aquifer. Because of the State's dependence on the aquifer, it also opposes any alternatives under which large amounts of offsite waste would be brought to INEL for disposal.

Response

NEPA and CEQ implementing regulations require DOE to consider and evaluate reasonable alternatives to a proposed action; in this case, the potential for siting some waste management activities at INEL was analyzed as a reasonable option under some of the WM PEIS waste management alternatives. INEL is one of 17 "major" sites analyzed in the WM PEIS. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites.

INEL is analyzed in the WM PEIS as a candidate location for management of low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste.

For low-level mixed waste, DOE evaluated seven separate alternatives. Under four of these alternatives, INEL would serve as a disposal site for low-level mixed waste. Under the Decentralized Alternative, INEL would only dispose of its own low-level mixed waste. For Regionalized Alternatives 1 and 2, INEL would also receive wastes from other sites that would amount to 10% and 9%, respectively, of the total volume disposed of at INEL. Only under Regionalized Alternative 4 would INEL receive and dispose of a substantial amount of low-level mixed waste from other sites (76% of the total volume disposed of at INEL). Conversely, under Regionalized Alternative 3 and the Centralized Alternative, all INEL low-level mixed waste would be shipped off the site to another location for disposal.

For low-level waste, DOE evaluated 14 separate alternatives, 7 of which considered INEL as a potential site for disposal. For the No Action, Decentralized, and Regionalized 1, 2, 3, and 4 Alternatives, INEL would only dispose of its own waste. Under Regionalized Alternative 5, INEL would receive and dispose of low-level mixed waste from other sites (69% of the total volume disposed of at INEL). Under Regionalized Alternatives 6 and 7, and the five Centralized Alternatives, INEL low-level waste would be shipped off the site to another location for disposal.

Under several of the transuranic waste management alternatives, INEL would treat transuranic waste, and up to 31% of the total volume that it treats could come from other sites. However, no transuranic waste disposal would take place at INEL.

INEL currently stores high-level waste onsite. Under the alternatives for managing this waste type (with the exception of No Action), the existing and planned high-level waste stored at INEL would eventually be transported off the site to a permanent storage location. Under the No Action Alternative, current onsite storage and management practices for high-level waste would continue.

Four alternatives were analyzed for hazardous waste management. Under the Decentralized Alternative, all INEL hazardous wastes would be shipped off the site for commercial treatment. Under No Action and Regionalized Alternative 1, INEL would continue to treat some hazardous wastes produced on the site, with any remaining waste being shipped off the site for treatment at a commercial facility. For Regionalized Alternative 2, INEL would also serve as a "hub" location for receiving hazardous wastes from several western region sites prior to onsite or offsite treatment.

The PEIS analyzes for each candidate site the potential for environmental impacts resulting from programmatic waste management activities. See Volume I, Chapters 6 through 10 for results; see

3.5.5 Idaho National Engineering Laboratory

Volume III, Appendix C, for analysis methods. The affected environment at each major site was considered in the PEIS analysis. The analysis considered potential impacts from normal operations, operations accidents, incident-free transportation, and transportation accidents. In addition, the PEIS estimates cumulative impacts from past, present, and reasonably foreseeable future actions (see Volume I, Chapter 11). In general, the environmental impacts associated with waste management activities under all alternatives considered in the PEIS would be small. For those impacts that would not be small, DOE would incorporate mitigation measures to reduce or eliminate the impacts and, where applicable, comply with regulatory requirements. Therefore, there is no reason to believe that waste management activities at INEL would have a significant negative impact on the natural environment or public health and safety.

Volume I, Section 3.7, identifies DOE's preferred alternatives and the reasons they are preferred. The Records of Decision will announce DOE's decisions and the reasons for the decisions if they differ from the preferred alternatives provided in the Final PEIS. The WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets, schedules, and national priorities, as well as other DOE studies, will be considered in developing Records of Decision. Similarly, the position and comments from the State of Idaho will be considered by decisionmakers in selecting alternatives for implementation.

The PEIS addresses water resources as site-specific impact parameters. The major groundwater unit at INEL is the Snake River Plain Aquifer, which is considered a sole-source aquifer for area wells. Although groundwater monitoring for radioactive and nonradioactive parameters have shown elevated levels of some contaminants at onsite wells, no contaminants were found to exceed established EPA levels in offsite wells.

Actual design, siting, construction, and operation of disposal facilities will require additional analyses, such as performance assessments, and would be in compliance with all existing site-specific requirements, such as the INEL Land Use Plan. The Site Treatment Plans were developed in accordance with the Federal Facility Compliance Act for treatment of DOE low-level mixed waste. The DOE Disposal Workgroup and the National Governors Association have developed a process to identify sites subject to Site Treatment Plans that are suitable for further evaluation of their potential as disposal sites. Information obtained through this process will be considered in developing Records of Decision for the WM PEIS. Further information on this process is provided in Volume I, Section 1.8.2, of the PEIS.

DOE recognizes that the siting of waste management facilities may be perceived negatively by some people. DOE is committed to protecting human health and the environment. DOE takes its responsibility and accountability for waste management decisions seriously and intends to select a configuration for its waste management complex that provides human health and safety assurance to the public. The PEIS will help DOE make sound waste management decisions.

DOE prepared the PEIS as a part of its effort to develop an overall national strategy on which to base waste management decisions. Before selecting locations for waste management facilities or sites, DOE will consider the results of existing or require new sitewide or project-level NEPA reviews, which will evaluate in greater detail the potential for environmental impacts at sites selected for programmatic waste management activities.

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Comment (1488)
Do not bring wastes to LANL from other sites. It is not an appropriate site for waste treatment, storage, or disposal.

Response
NEPA and CEQ implementing regulations require DOE to consider and evaluate reasonable alternatives to a proposed action. In this case, the potential for siting some waste management activities at LANL is a reasonable option under some of the WM PEIS alternatives. LANL is one of 17 "major" sites analyzed in the WM PEIS. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites. However, designation of a major site does not mean the site will be selected for a programmatic waste management role.

LANL is analyzed in the WM PEIS as a candidate location for management of low-level mixed waste, low-level waste, transuranic waste, and hazardous waste.

The PEIS analyzes for each candidate site the potential for environmental impacts resulting from programmatic waste management activities. See Volume I, Chapters 6 through 10 for results; see Volume III, Appendix C, for analysis methods. The analysis considered potential impacts from normal operations, operations accidents, incident-free transportation, and transportation accidents. In addition, the PEIS estimates cumulative impacts from past, present, and reasonably foreseeable future actions (see Volume I, Chapter 11). In general, the environmental impacts associated with waste management activities under all alternatives at all sites considered in the PEIS would be small. For those impacts that would not be small, DOE would incorporate mitigation measures to reduce or eliminate impacts and, where applicable, comply with regulatory requirements. Therefore, there is no reason to believe that waste management activities at LANL would have a significant negative impact on the natural environment or public health and safety.

Volume I, Section 3.7, identifies DOE's preferred alternatives and the reasons they are preferred. The Records of Decision will announce DOE's decisions and the reasons for the decisions if they differ from the preferred alternatives provided in the Final PEIS. The WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets, schedules, and national priorities, as well as other DOE studies will be considered in developing Records of Decision.

DOE prepared the PEIS as part of its effort to develop an overall national strategy on which to base waste management decisions. Before selecting locations for waste management facilities on sites, DOE will consider the results of existing required new sitewide or project-level NEPA reviews, which will evaluate in greater detail the design of specific facilities and the potential for environmental impacts at sites selected for programmatic waste management activities.

Comment (1490)
Keep low-level waste onsite at LANL.

Response
DOE considered managing LANL's low-level waste onsite under the No Action, Decentralized, and Regionalized 1, 2, 3, and 4 Alternatives. Under the Regionalized 5, 6, and 7, and Centralized Alternatives, LANL would ship some or all of its low-level waste to other sites. The low-level waste alternatives are detailed in Section 7.3 in Volume I. DOE is required to evaluate reasonable

3.5.6 Los Alamos National Laboratory

alternatives. This allows decisionmakers to make meaningful comparisons of waste management alternatives. The preferred alternatives and the reasons they are preferred are described in Section 3.7 in Volume I of the WM PEIS. While the WM PEIS presents national strategy options, actual programmatic decisions will be announced in Records of Decision, which will be published in the *Federal Register*. Budgets, schedules and national priorities, as well as other DOE studies (e.g., Baseline Environmental Management Report, Risk Reports, Site Treatment Plans) will be factored into the decisionmaking process.

Comment (1566)
Bringing hazardous waste into the community for incineration is not a good idea. The controlled air incinerator planned for LANL just lost funding. DOE needs to consider other options for treatment. The Final WM PEIS needs to discuss incineration in more detail.

Response
For the Final WM PEIS, DOE modified the Decentralized Alternative for hazardous waste and eliminated LANL as a candidate for onsite treatment of such waste. LANL remains as a candidate site for onsite treatment under Regionalized Alternative 1 (see Section 10.3.3).

Also for this analysis, DOE used generic treatment technologies (incineration and fuel burning) to determine representative impacts. However, DOE will not use the PEIS to select technologies. Volume IV, Section H.3.2, of the PEIS discusses the technical issues, schedule, cost, and public acceptability associated with the incineration of DOE waste.

3.5.7 Lawrence Livermore National Laboratory

Comment (123)
If those commentors opposing the siting of programmatic waste management activities at LLNL, some commentors gave no reason for their opposition and others expressed one or more of the reasons listed below:

- The overall risks to public health and safety and the quality of the environment from normal operations, facility accidents, and transportation accidents;

- Specific Risks: Seismic risks associated with the location of Site 300 on an earthquake fault; potential groundwater and drinking-water contamination; and the dangers of transporting wastes over congested freeways that have "millions of commuters and frequent accidents";

- Factors: The prevailing winds in the area; the population density around the site; the potential cancer rates associated with programmatic waste management activities; that Site 300 is located only a few miles from the California aqueduct; and consistency with land-use and growth-planning issues;

- Opinions: That the thermal treatment technology is unproven; that Site 300 is currently a Superfund site, and as such DOE should not "dump" more waste there; that waste should be sent to unpopulated areas; that siting waste management activities at LLNL would cause property values to decrease; and that more studies are needed on possible health, safety, environmental, and economic impacts.

Response
NEPA and CEQ implementing regulations require DOE to consider and evaluate reasonable alternatives to a proposed action; in this case, the potential for siting some waste management activities at LLNL is a reasonable option under some WM PEIS management alternatives. LLNL is one of 17 "major" sites analyzed in the WM PEIS. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites. However, designation as a major site does not mean the site will be selected for a programmatic waste management role.

DOE considered the management of low-level mixed waste, low-level waste and transuranic waste at LLNL. Under 5 of the 36 alternatives in the PEIS (the Decentralized Alternative and Regionalized Alternative 1 for low-level mixed waste; the Decentralized Alternative and Regionalized Alternatives 1 and 2 for low-level waste), would DOE construct new disposal facilities to manage wastes at LLNL. These facilities would manage wastes generated at LLNL and at as many as six other sites. LLNL would receive offsite low-level mixed waste that would amount to 11% of the total low-level mixed waste volume disposed of at LLNL; it would receive offsite low-level waste that would constitute 56% of the total low-level waste volume disposed of at LLNL. Under the Centralized Alternative, all LLNL wastes would be managed at other DOE sites. For transuranic waste, LLNL would treat and store its own waste under the No Action and Decentralized Alternatives. No transuranic waste disposal would take place at LLNL.

The WM PEIS analyzes for each candidate site the potential for environmental impacts resulting from programmatic waste management activities. See Volume I, Chapters 6 through 10 for results; see Volume III, Appendix C for analysis methods. The affected environment at each major site, including existing land use (such as, for LLNL, the City of Tracy Comprehensive Plan) was considered in the

3.5.7 Lawrence Livermore National Laboratory

PEIS analysis. The analysis considered potential impacts, including most of the impacts that concern commentors, from normal operations, operations accidents, incident-free transportation, and transportation accidents. In addition, the PEIS estimates cumulative impacts from past, present, and reasonably foreseeable future actions (see Volume I, Chapter 11). In general, the environmental impacts associated with waste management activities under all alternatives at all sites considered in the PEIS would be small. For those impacts that would not be small, DOE would incorporate mitigation measures to reduce or eliminate the impacts and, where applicable, comply with regulatory requirements. Therefore, there is no reason to believe that waste management activities at LLNL would have a significant negative impact on the natural environment, public health and safety, or property values.

DOE recognizes that LLNL is one of the sites with the highest potential for being impacted by seismic effects (see Volume I, Section 4.3.4). Nonetheless, LLNL was included as a candidate site because it passed all of the screening criteria, one of which was that candidate sites could not be within 200 feet of an active fault. Major faults in the area are the San Andreas, Hayward, Calaveras, and Greenville Faults. However, local faults have the greatest potential for damaging earthquakes (see Section 4.4.6). The potential effects of accidents initiated by earthquakes at treatment facilities were calculated in the PEIS, assuming generic facility characteristics, and were estimated to produce minimal risks.

As to the other specific risks cited by commentors, refer to the following sections of the PEIS: water resources (Sections 6.6, 7.6, and 8.6) and air quality (Sections 6.5, 7.5, and 8.5). The PEIS also includes a detailed assessment of risks associated with accidents from both rail and truck transportation, including low-probability/high-consequence and high-probability/low-consequence accidents (Volume IV, Appendix E). DOE found that risks from transportation accidents would be low under all alternatives. DOE provides for Radiological Assistance Program teams consisting of trained experts equipped and prepared to quickly respond to an accident and assist local emergency response personnel, if requested by local agencies.

DOE used data from the 1990 U.S. Census to estimate that about 6,325,000 people live within 50 miles from the center of LLNL. This population could possibly be exposed to emissions released to the atmosphere from waste treatment or disposal facilities.

Human health risks (e.g., cancer) constitute a site-specific impact parameter analyzed in the PEIS (Volume I, Sections 6.4, 7.4, and 8.4). Offsite population human health risks and offsite maximally exposed individual health risks are also cumulative impact parameters addressed by the PEIS (see Volume I, Section 11.8). The health risk analyses indicate that there is a potential for increased adverse health effects from the operation of waste treatment or disposal facilities located at LLNL. However, if DOE decides to site a new waste management facility at LLNL, it would establish design and operational limitations to ensure that releases from the facility would be maintained below regulatory limits. Appendix D in Volume III describes in more detail waste management facility human health risk estimates.

Properly designed and operated incinerators have been shown to be as or more effective than other proven treatment technologies and DOE does not preclude their use at any site. DOE compared impacts from incineration with non-thermal treatment technologies and identified little or no difference in treatment risks to human health, DOE documented these findings in a technical report (M/B SR-03, September, 1995). DOE has an aggressive technical development program exploring alternatives to incineration. Alternatives will be tested and deployed depending on their potential to safely and effectively treat wastes.

As evidenced by the PEIS, DOE does not intend to "dump" waste in the ground. A major focus of the PEIS is to help DOE establish a Department-wide program to safely and efficiently manage radioactive and hazardous wastes. However, issues regarding existing pollution, a site's waste management record, and actual site cleanup efforts are more appropriately evaluated in sitewide or project-level studies.

DOE recognizes that the siting of waste management facilities might be perceived negatively by some. DOE is committed to protecting human health and the environment. DOE takes its responsibility and accountability for waste management decisions seriously and intends to select a configuration for its waste management complex that provides human health and safety assurance to the public. The PEIS will help DOE make sound waste management decisions.

The proximity of a waste management site to populated areas is only one of many factors in evaluating alternatives. DOE must consider and balance other factors to achieve its objective of safe and efficient treatment, safe and secure storage, and ultimate disposal of each waste type. For example, DOE must consider waste transportation requirements, and the PEIS presents alternatives that would minimize waste transportation (Decentralized Alternatives) or maximize waste transportation (Centralized Alternatives). Although siting waste management activities in less-densely populated or remote areas could reduce the potential for some impacts, the risks of transporting wastes over longer distances to reach remote sites would increase the potential for other impacts. Section 1.7.3 in Volume I lists and describes examples of the criteria and factors DOE will consider in the decisionmaking process.

DOE prepared the WM PEIS as a part of its effort to develop an overall national strategy on which to base waste management decisions. The development of this strategy took into consideration the actions addressed in related DOE NEPA documentation (see Volume I, Section 1.8.2), including the EIS for Continued Operations of Lawrence Livermore National Laboratory and Sandia National Laboratories. Additional sitewide or project-level NEPA studies will evaluate in greater detail the potential for environmental impacts at sites selected for programmatic waste management activities and will provide a basis for selecting treatment and disposal technologies.

Volume I, Section 3.7, identifies DOE's preferred alternatives and the reasons they are preferred. These are not final decisions. Records of Decision will announce DOE's decisions and the reasons for the decisions if they differ from the preferred alternatives provided in the Final PEIS. The WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets, schedules, and national priorities, as well as other DOE studies, will be considered in developing Records of Decision.

Comment (1597)
There are no alternative routes for commuters in the LLNL area and transporting waste through here would be a problem. DOE should consider other places for waste disposal that are not near heavily populated areas.

3.5.7 Lawrence Livermore National Laboratory

Response
The WM PEIS does consider and analyze sites other than LLNL as potential disposal sites. Criteria for selecting candidate sites included the characteristics of the waste, specialized treatment requirements, and existing facilities. The remoteness and lack of population density of a location for a waste management site constitutes only one factor in evaluating alternatives. Other criteria would include construction/modification of facilities, and increased transportation requirements.

The same roads are used whether DOE ships waste to or from a particular site. Should DOE decide to dispose of waste in less-densely populated areas (i.e., not LLNL), generally speaking, more waste would be transported from LLNL than would have been transported to LLNL. Specifically, more low-level mixed waste would be transported in the LLNL area if DOE decides not to dispose of waste at LLNL and about the same amount of low-level waste would be transported.

The PEIS includes a detailed assessment of risks associated with accidents from both rail and truck transportation, including low-probability/high-consequence and high-probability/low-consequence accidents. DOE provides for Radiological Assistance Program teams consisting of trained experts equipped and prepared to quickly respond to an accident and assist local emergency response personnel, if requested by local agencies.

Comment (1603)
The Draft WM PEIS states that for low-level mixed waste under the Regionalized Alternative, LLNL is the preferred option. DOE should explain where it will transport waste for disposal after it is brought to LLNL for treatment.

Response
As described in Section 6.3.3 in Volume I of the WM PEIS, the WM PEIS analyzes four regionalized alternatives for low-level mixed waste. Only under Regionalized Alternative 1 would LLNL serve as a regional treatment and disposal site. Under this alternative, low-level mixed waste treated at LLNL would be disposed of at LLNL or shipped to NTS. Section 3.7 in Volume I of the Final WM PEIS identifies DOE's preferred alternatives and the reasons they are preferred. The specific disposal location on a particular site will not be determined on the basis of the WM PEIS analysis, but rather, would be selected on the basis of subsequent NEPA analyses.

Comment (4048)
Based on the WM PEIS, DOE is considering plans to convert many of its facilities to what will, for many, become a permanent form of land use: nuclear waste dumps. LLNL is an example of this emerging pattern of conversion. LLNL has no permanent disposal options for the large quantities of mixed waste it generates. The WM PEIS forecasts within the preferred alternative that two regional waste management facilities at LLNL will be developed: (1) the Main Site will house a regional mixed waste management facility, which is now to begin construction without the benefit of a facility-specific EIS; and (2) Site 300, a more rural area adjacent to Tracy that generally has been used to conduct high-explosives tests, will become a low-level waste dump.

Response
The WM PEIS assumes generic treatment and disposal facilities to manage low-level and low-level mixed wastes. For purposes of analysis, the disposal units at LLNL were assumed to be located at Site 300. DOE has not proposed the locations for specific facilities on specific sites. DOE would make

those decisions only after considering the results of NEPA reviews that consider site-specific conditions in greater detail.

Note that DOE has canceled its plans for the Mixed Waste Management Facility at LLNL.

LLNL is considered in the WM PEIS for low-level mixed waste disposal facilities under the Decentralized Alternative and one of four Regionalized Alternatives. This site is also a candidate site for low-level waste disposal facilities under the Decentralized Alternative and two of seven Regionalized Alternatives. The combined and cumulative impacts of siting waste management facilities at LLNL are addressed in Section 11.8 in Volume I of the WM PEIS. DOE has identified its preferred alternatives, and the reasons they are preferred, for management of low-level mixed waste and low-level waste in Section 3.7 in Volume I of the WM PEIS. If DOE ultimately selected the alternatives involving LLNL in Records of Decision, actual siting and construction of waste management facilities at LLNL would not occur before completion of sitewide or project-level NEPA reviews.

Comment (4062)
Any efforts to develop the LLNL Main Site or Site 300 as regional waste management centers must include site-specific environmental review and analysis.

Response
The WM PEIS has been prepared to assist DOE decisionmaking on waste management at a broad, programmatic level. Should LLNL be selected for regional treatment, storage, or disposal, DOE will consider the results of sitewide and project-level NEPA reviews, which would include detailed analyses of potential environmental impacts based on site-specific conditions.

3.5.8 Nevada Test Site

Comment (109)
A commentor opposes transportation of radioactive waste through southern Utah to the Nevada Test Site.

Response
DOE believes the risks associated with transportation of radioactive waste through southern Utah to the NTS would be small, as indicated in tables with the total impact by alternative in Appendix E in Volume IV of the WM PEIS. The WM PEIS analysis enables a relative comparison of possible risks due to the transportation of waste among sites, which DOE could mitigate through careful planning and safety measures.

Comment (225)
Of those commentors opposing the siting of programmatic waste management activities at NTS, some commentors gave no reason for their opposition and others expressed one or more of the reasons listed below:

- The overall risks to public health and safety and the quality of the environment from potential waste management operations, considering "the known soil, surface water, and groundwater contamination" from past nuclear testing and related experiments;
- The State of Nevada does not produce any nuclear wastes, is rapidly growing, and should not be used as a nuclear waste "dump" for other sites;
- Sites outside Nevada, including in Canada and Mexico, should also be considered for managing this waste.

Response
NEPA and CEQ implementing regulations require DOE to consider and evaluate reasonable alternatives to a proposed action; in this case, the potential for siting some waste management activities at NTS was analyzed as a reasonable option under some WM PEIS waste management alternatives. NTS is one of 17 "major" sites analyzed in the WM PEIS. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites. However, designation as a major site does not mean the site will be selected for a programmatic waste management role. Foreign countries, such as Canada and Mexico, in light of the lack of U.S. Government jurisdiction and the criteria described in Section 4.2.1, do not presently appear to be reasonable siting alternatives for waste management activities.

NTS is analyzed in the WM PEIS as a candidate location for management of low-level mixed waste, low-level waste, and transuranic waste.

For low-level mixed waste, DOE evaluated seven separate alternatives. NTS would serve as a disposal site under five of these alternatives. Under Regionalized Alternatives 2 and 4, NTS would only dispose of the low-level mixed waste generated on the site. Under the Decentralized Alternative and Regionalized Alternatives 1 and 3, NTS would dispose of low-level mixed waste, nearly all of which would be generated off the site. Under the Centralized Alternative, all NTS low-level mixed waste would be shipped off the site to another location for disposal.

3.5.8 Nevada Test Site

For low-level waste, DOE evaluated 14 separate alternatives, 10 of which considered NTS as a potential site for disposal. For the Decentralized Alternative and Regionalized Alternatives 1 and 2, NTS would dispose of its own low-level waste. Under the No Action Alternative, Regionalized Alternatives 3, 4, 5, and 7, and Centralized Alternatives 2 and 4, NTS would receive wastes from several other sites that would constitute the majority of the total volume disposed of at NTS. Under the remaining four alternatives, all NTS low-level waste would be shipped off the site to another location for disposal.

Under the transuranic waste management alternatives, NTS would treat only its own transuranic waste, and would receive none from other sites. Similarly, no transuranic waste disposal would take place at NTS.

The PEIS analyzes for each candidate site the potential for environmental impacts resulting from programmatic waste management activities. See Volume I, Chapters 6 through 10 for results; see Volume III, Appendix C, for analysis methods. The analysis considered potential impacts, including most of the impacts that concern commentors, from normal operations, operations accidents, incident-free transportation, and transportation accidents. In addition, the PEIS estimates cumulative impacts from past, present, and reasonably foreseeable future actions (see Volume I, Chapter 11). In general, the environmental impacts associated with waste management activities under all alternatives at all sites considered in the PEIS would be small. For those impacts that would not be small, DOE would incorporate mitigation measures to reduce or eliminate the impacts and, where applicable, comply with regulatory requirements. Therefore, there is no reason to believe that waste management activities at NTS would have a significant negative impact on the natural environment or public health and safety.

DOE used data from the 1990 U.S. Census to estimate that about 14,300 people live within a 50-mile radius of an existing waste disposal facility at NTS. This population could possibly be exposed to emissions released to the atmosphere from waste management activities. However, the risk analyses in the PEIS suggest that the adverse health effects, if any, from the operation of waste treatment facilities at NTS would be small (see Volume I, Sections 6.4, 7.4, and 8.4).

Human health risks (e.g., cancer) constitute a site-specific impact parameter analyzed in the PEIS. Offsite population human health risks and offsite maximally exposed individual health risks are cumulative impact parameters addressed by the PEIS (see Volume I, Section 11.10). The health risk analyses suggest that adverse health effects from the operation of waste treatment facilities located at NTS would be small. Public health impacts from disposal would similarly be small after implementation of mitigation measures necessary to ensure that DOE would not exceed radionuclide- and/or chemical-specific limits. Volume III, Appendix D, describes in more detail waste management facility human health risk estimates.

The NTS waste management sites are currently undergoing extensive investigation for the purpose of determining the sites' ability to isolate the wastes from the environment. Further studies are ongoing to determine the potential that disposal of wastes may have of commingling with any other contamination that might exist on the surface or underground. All indications at this point are that no commingling occurs. An evaluation of all the interacting source terms will also be conducted.

Groundwater monitoring at NTS in 1991 showed that eight parameters exceeded comparison criteria at onsite wells. However, any future waste management facilities would be appropriately designed and constructed to minimize the potential for leaks affecting groundwater.

3.5.8 Nevada Test Site

DOE is committed to protecting human health and the environment. DOE takes its responsibility and accountability for waste management decisions seriously and intends to select a configuration for its waste management complex that provides human health and safety assurance to the public. The PEIS will help DOE make sound waste management decision.

DOE intends to properly manage the wastes to protect human health and the environment. DOE considered equity in selecting the PEIS preferred alternatives, and DOE decisionmakers will consider equity issues when developing Records of Decision. As indicated in Section 1.7.3, DOE favors alternatives that distribute waste management facilities in ways that are equitable. Although storage and disposal in less populated regions may lessen some impacts, the risks from transporting waste to these remote areas would increase. These trade-offs are described in the WM PEIS and are important factors that will be considered in the decision process.

A major focus of the PEIS is to help DOE establish a Department-wide program to efficiently and safely manage radioactive and hazardous wastes. However, issues regarding existing pollution, a site's waste management record, and actual site cleanup efforts are more appropriately evaluated in sitewide or project-level studies. The potential disposal of wastes in a geologic repository at Yucca Mountain is not within the scope of the WM PEIS. Possible environmental impacts from the construction, operation, and eventual closure of a potential repository for spent nuclear fuel and high-level radioactive waste at Yucca Mountain will be addressed in a separate EIS.

DOE prepared the WM PEIS as part of its effort to develop an overall national strategy on which to base waste management decisions. Before selecting locations for waste management facilities on sites, DOE will consider the results of sitewide or project-level NEPA analyses, which would evaluate in greater detail the design of specific facilities and the potential for environmental impacts at sites selected for programmatic waste management activities.

Volume I, Section 3.7, identifies DOE's preferred alternatives and the reasons they are preferred. These are not final decisions. The Records of Decision will announce DOE's decisions and the reasons for the decisions if they differ from the preferred alternatives provided in the Final PEIS. The WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets, schedules, and national priorities, as well as other DOE studies, will be considered in developing Records of Decision.

Comment (1551)
People who work at NTS consider it a great national resource, and it should be used more.

Response
Thank you for your comment. While certain WM PEIS Centralized or Regionalized Alternatives might offer particular benefits to a local community or region over another approach, DOE must base its waste management strategy on the diverse national needs and issues that affect many sites and regions.

DOE has prepared a sitewide EIS for NTS that addresses the environmental impacts of alternatives for the continued operations of NTS and other DOE activities in the State of Nevada. DOE proposes to continue managing NTS and its resources in a manner that meets evolving DOE missions and responds to stakeholder concerns, as well as those of affected and interested individuals and agencies. The NTS sitewide EIS examines existing and potential impacts to the environment that have resulted, or could result, from current and future DOE operations in southern Nevada. The EIS analyzes the impacts from DOE programs at NTS, the Tonopah Test Range, portions of the Nellis Air Force Range Complex, the Central Nevada Test Area, and the Project Shoal Area. These programs include ongoing activities for the stewardship of the Nation's nuclear weapons stockpile, management of radioactive waste, nondefense research and development, work for others, and environmental restoration. The EIS also examines newer programs such as the proposed Solar Enterprise Zone sites at NTS, Dry Lake Valley, Eldorado Valley, and Coyote Spring Valley, in accordance with the NTS mission of demonstrating the capability to provide alternative energy sources, including solar energy, to meet power needs for the southwestern United States. A copy of the Final NTS EIS, which was published in November 1996, can be reviewed at the DOE Nevada Operations Office public reading room located at 2621 Losee Road, Building B-3, Las Vegas, Nevada.

Comment (1588)
Apart from being considered for waste disposal actions, NTS should also be considered for treatment facilities because the latter bring the benefits of research and development, as well as employment.

Response
NTS is considered a candidate site for treatment of low-level mixed waste and transuranic waste. For low-level waste, all sites, including NTS would do "minimum treatment," which consists of solidification of liquids and powdered materials, packaging, and shipment. NTS is not considered in the WM PEIS as a candidate site for additional low-level waste treatment activities (e.g., thermal organic destruction, size reduction, and compaction followed by solidification) because it has a small volume of low-level waste compared to other DOE sites and has no existing treatment facilities.

Comment (1627)
Yucca Mountain as a permanent geologic repository has been studied for a long time without any answers. Nevada does not need aboveground storage of wastes at NTS that could last forever.

Response
The potential disposal of high-level wastes in a geologic repository at Yucca Mountain is not within the scope of the WM PEIS. DOE is preparing a Yucca Mountain Repository EIS and has established a tentative date of 2000 for the Record of Decision.

Under five alternatives, the WM PEIS analyzes the impacts of high-level waste canister storage options pending disposal. DOE analyzes five alternatives (No Action, Decentralized, Regionalized, and Centralized). For each alternative, DOE assumed that a geologic repository would begin accepting DOE-managed high-level waste in 2015 at the rate of 800 canisters per year. For purposes of analysis, DOE also evaluated a scenario that assumed that there would be a delay in acceptance of DOE-managed high-level waste at a repository until after 2015, but at the same rate of acceptance of 800 canisters per year. Under no alternative would NTS store vitrified high-level waste.

Comment (1759)
The WM PEIS does not include an adequate discussion for a national strategy for waste management.

Response
The WM PEIS is a nationwide study that examines the environmental impacts of management alternatives for DOE radioactive and hazardous wastes. The PEIS analyzes a range of broadly defined

3.5.8 Nevada Test Site

waste management alternatives that could affect environmental resources across the country. The analysis will help decisionmakers make quantitative comparisons between the alternatives that will lead, in turn, to a national strategy and decisions on waste management.

The waste management alternatives described in this PEIS could affect a number of environmental resources (human health and safety, socioeconomic conditions, etc.). For this PEIS, DOE developed an approach for the characterization of these resources in relation to the affected environments at sites across the country. In addition, the PEIS provides general and cumulative information on the affected environments at DOE sites that can be used in future sitewide or project-level NEPA analyses.

Comment (1803)
As noted in the WM PEIS, NTS is one of only two sites assessed as a potential regional and/or centralized waste disposal location for large volumes of defense low-level and low-level mixed radioactive waste.

Response
NTS is considered as a disposal location under four of the seven low-level waste Regionalized Alternatives. Of those, under three alternatives (Regionalized Alternatives 3, 4, and 5), NTS is one of six disposal locations, and under the fourth, it is considered as one of two possible disposal sites.

Comment (2337)
My choice for low-level mixed waste is Regionalized Alternative 1; Site Treatment Plans enhance this choice. NTS has been chosen as a candidate for storage because of a pending permit. Without knowing the contents or conditions of said permit, I question whether Nevada can accommodate the increased volume. Under RCRA, *any* State accepting low-level mixed waste requires a permit. Therefore, arbitrarily choosing NTS *because* of a pending permit is invalid.

Response
The rationale and criteria for selecting candidate disposal sites for low-level mixed waste are described in Volume I, Section 6.3.5, of the WM PEIS. NTS was added as a candidate disposal site for low-level mixed waste because it has an interim-status low-level mixed waste disposal facility. As pointed out by the commentor, NTS has applied to EPA for a permit under RCRA for the disposal facility. This application requires that the waste be treated to meet RCRA's land disposal restrictions. The application is for a facility with built-in liners and a leachate collection system, but will be amended to have an alternative design, as provided for in the design and operating requirements for landfills found in 40 CFR 264.301(d). The application is pending. In summary, the potential availability of a disposal facility, not the filing of a permit application, was important in selecting NTS for analysis.

DOE's preferred alternative for low-level mixed waste disposal, and the reasons they are preferred, is provided in Section 3.7 in Volume I of the Final PEIS. The selection of this alternative was based on the decision criteria and factors described in Section 1.7.3 in Volume I of the PEIS.

Comment (3311)
According to Table 7.1-2, several of the largest inventories [of low-level waste] are at sites that have very little capacity (e.g., SRS, ORR, and the Portsmouth Plant) and are a long distance from NTS. The Hanford Site's current and planned disposal capacity will be absorbed by its own projected

inventory. Therefore, we conclude that NTS, the only site in addition to Hanford that accepts wastes generated off the site, is the current candidate for disposal of offsite, low-level waste.

Nonetheless, even with 449,000 cubic meters disposal capacity, NTS could not dispose of the inventory from even the five largest generators. NTS would have to double its low-level waste disposal capacity to accept the projected inventory from the five largest sites. It would have to triple its capacity to accept the projected waste from the 27 sites evaluated in the WM PEIS. And again, this does not include environmental restoration waste. How would the various treatments affect the volumes (reference p. 7-3) requiring disposal? Would additional treatment significantly reduce the curies disposed, and if so, by how much?

Response

DOE used the existing and planned low-level waste facilities and capacities listed in Volume I, Table 7.1-2, to establish the baseline capacities for treatment and disposal and to determine the need for new or expanded facilities. Planned facilities include only the facilities for which a conceptual design has been completed.

The WM PEIS analysis assumes use of existing and planned facilities until their capacities are met. If additional capacity is needed, use of new generic facilities is assumed. These conceptual facilities provide the difference in treatment, storage, and disposal capacity between the baseline reported in Table 7.1-2 and what is necessary to manage the waste a given site would receive under any given alternative. Conceptual facilities are based on generic designs with set impacts (e.g., cost, performance/efficiency). Where necessary for analysis, DOE assumed that the impact of existing facilities essentially reflects the impact of generic facilities.

Ten sites conduct different degrees of low-level waste treatment using existing facilities. Size reduction and compaction facilities typically used to reduce the total volume of waste requiring disposal are the most prevalent existing facilities for low-level waste treatment. Six DOE sites have operating low-level waste disposal facilities. Of these, three (INEL, LANL, and ORR) accept only onsite wastes, one (SRS) accepts small amounts of waste from several small generators, and two (the Hanford Site and NTS) accept large quantities of waste from other DOE sites.

Treatment can reduce the volume of waste disposed of and can increase the stability of the disposal waste form; however, the activity (curie content) of the waste depends on the concentration of radionuclides. Treatment that changes only the physical and chemical form of the waste does not affect the concentration of radionuclides and, therefore, does not reduce the curies in the disposed of waste. Radionuclides can be destroyed through nuclear transmutation; however, the feasibility of nuclear transmutation as a treatment technology on an industrial scale is currently speculative.

Comparison of disposal volumes between minimum treatment alternatives and volume reduction alternatives for low-level waste in Appendix I in Volume IV, show how treatment can reduce disposal volumes by nearly a factor of two. The curies would remain the same.

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Comment (1693)
Regionalizing has been done before. Major environmental problems have occurred as a result of the last effort to regionalize disposal. In reviewing the *Performance Evaluation of the Capabilities of DOE sites for Disposal of Mixed Low Level Waste*, it is apparent that ORR is technically one of the least favorable disposal sites for low-level mixed waste (LLMW). Under the regionalized alternatives, ORR would be a prime candidate for treating, storing, and disposing of LLMW. Explain how the PEIS will be modified to more closely match the capabilities of sites to handle specific waste types.

Response
The document entitled *Performance Evaluation of the Capabilities of DOE Sites for Disposal of Mixed Low-Level Waste* is a report developed for the DOE Federal Facility Compliance Act Disposal Workgroup. The report provides simple, conservative representations of site-specific performance assessments using site-specific data and consistent analyses. This evaluation found that ORR had more limited capability for the disposal of some long-lived radionuclides, such as uranium, than other DOE sites evaluated. A site-specific performance assessment at ORR was not included as part of the performance evaluation and might produce different results.

Under the LLMW Regionalized Alternatives evaluated in the WM PEIS, ORR would dispose of only its own LLMW under Regionalized Alternative 1, dispose of its own waste as well as LLMW generated at other sites under Regionalized Alternatives 2 and 4, and ship LLMW offsite for treatment and disposal under Regionalized Alternative 3. Offsite waste accounts for 35% and 38%, respectively, of the amount of LLMW proposed for disposal at ORR under Regionalized Alternatives 2 and 4.

The results of the LLMW disposal risk analysis presented throughout Section 6.4.1 of the PEIS suggest that the disposal of LLMW at ORR under Regionalized Alternatives 2 and 4 would require more controls than those used in the generic assessment. Estimated groundwater concentrations of technetium-99 could exceed drinking water standards under the assumed conditions of the conceptual disposal scenario used in the analysis.

In the actual design of a disposal facility at ORR or any DOE site, more detailed site-specific analyses would be conducted in accordance with the requirements of DOE Order 5820.2A. The implementation of the requirements of the Order might involve (1) modifying the engineering design of the disposal facility (e.g., adding a clay liner to increase contaminant adsorption or a concrete cap to reduce water filtration); (2) modifying the form of the waste to be disposed of (e.g., changing from grout or polymer to a vitrified waste form); and (3) imposing waste acceptance criteria (i.e., restricting the amounts of radionuclides or hazardous chemicals allowed in a given disposal facility).

If DOE selects a particular site for a new waste management treatment, storage, and disposal operation as a result of the PEIS analysis, additional sitewide or project-level NEPA reviews will be needed before a facility could be sited.

Comment (1697)
The capability of ORR to dispose of LLMW is limited. It appears from Volume I, Table 3.4-1, that Regionalized Alternative 3 is the only viable Regionalized Alternative for ORR.

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Response
The WM PEIS alternatives reflect different national configurations of particular sites evaluated for waste management. In order to determine reasonable proposed sites for regionalized waste management facilities, DOE determined where the largest waste volumes are located and where transportation requirements would be minimized. The character of the waste and existing facilities were also taken into account.

A population risk vulnerability analysis to compare low-level mixed waste and low-level waste disposal alternatives using measures that characterize their relative potential to cause disposal risk to offsite populations was added to the Final WM PEIS. Table 5.4-2 in Volume I of the WM PEIS indicates that ORR is in the highest risk vulnerability group.

DOE considered public comments and other factors (e.g., existing environmental conditions) in its selection of preferred alternatives to manage the five waste types considered in the WM PEIS. Section 3.7 in Volume I identifies DOE's preferred alternatives and the reasons they are preferred.

Comment (1871)
The Governor of Tennessee and others strongly oppose any attempt by DOE to "site" large waste management activities in Oak Ridge, Tennessee. They oppose alternatives in the WM PEIS that consider disposal of low-level mixed waste and low-level waste at ORR.

Response
NEPA and CEQ implementing regulations require DOE to consider and evaluate reasonable alternatives to a proposed action; in this case, the potential for siting some waste management activities at ORR is a reasonable option under some WM PEIS management alternatives. ORR is one of 17 "major" sites analyzed in the WM PEIS. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites. However, designation as a major site does not mean the site will be selected for a programmatic waste management role.

For low-level mixed waste, DOE evaluated seven separate alternatives. Under four of these alternatives, ORR would serve as a disposal site for low-level mixed waste. For the Decentralized Alternative and Regionalized Alternative 1, ORR would only dispose of its own waste. Under Regionalized Alternatives 2 and 4, ORR would also receive wastes from several other sites that would amount to 35% and 38%, respectively, of the total volume disposed of at ORR. Under Regionalized Alternative 3 and the Centralized Alternative, all ORR low-level mixed waste would be shipped offsite to another location for disposal.

For low-level waste DOE evaluated 14 separate alternatives, 7 of which considered ORR as a potential site for disposal. For the No Action, Decentralized, and Regionalized Alternatives 1 and 2, ORR would only dispose of its own waste. Under Regionalized Alternatives 3, 4, and 5, ORR would receive wastes from several other sites that would amount to 52% of the total volume disposed of at ORR. Under the remaining 7 alternatives, ORR low-level waste would be shipped offsite to another location for disposal.

Under the transuranic waste management alternatives, ORR would treat transuranic waste, and up to 17% of the total volume that it treats would come from other sites. However, no transuranic waste disposal would take place at ORR.

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For each of the alternatives proposed for hazardous waste management, ORR would treat some of the hazardous wastes produced onsite, with any remainder being shipped offsite for treatment at a commercial facility. Under two of the four alternatives analyzed, ORR would also receive and treat hazardous wastes from as many as four other DOE sites.

The PEIS analyzes for each candidate site the potential for environmental impacts resulting from programmatic waste management activities. See Volume I, Chapters 6 through 10, for results; see Volume III, Appendix C, for analysis methods. The analysis considered potential impacts, from normal operations, operations accidents, incident-free transportation, and transportation accidents. In addition, the PEIS estimates cumulative impacts from past, present, and reasonably foreseeable future actions (see Volume I, Chapter 11). In general, the environmental impacts associated with waste management activities under all alternatives considered in the PEIS would be small. For impacts that would not be small, DOE would incorporate mitigation measures to reduce or eliminate the impacts and, where applicable, comply with regulatory requirements. Therefore, there is no reason to believe that waste management activities at ORR would have a significant negative impact on the natural environment or public health and safety.

DOE takes its responsibility and accountability for waste management decisions seriously and intends to select a configuration for its waste management complex that provides human health and safety assurance to the public. The PEIS will help DOE make sound waste management decisions.

A population risk vulnerability analysis to compare low-level mixed waste and low-level waste alternatives using measures that characterize their relative potential to cause disposal risk to offsite populations was added to the Final WM PEIS. As shown in Table 5.4-2 in Volume I, ORR is in the highest risk vulnerability group.

Volume I, Section 3.7, identifies DOE's preferred alternatives and the reasons they are preferred. Records of Decision will announce DOE's decisions and the reasons for the decisions if they differ from the preferred alternatives provided in the Final PEIS. It should be noted that the WM PEIS will not be the only basis for ultimately making waste management decisions; budgets, schedules, and national priorities, as well as other DOE studies, will be considered in developing Records of Decision.

3.5.10 Paducah Gaseous Diffusion Plant

Comment (369)
Of those commentors opposing the siting of programmatic waste management activities at PGDP, some commentors gave no reason for their opposition and others gave one or more of the reasons listed below:

- Overall risks to public health and safety and the quality of the environment from normal operations, operations accidents, and truck and rail transportation accidents. DOE's questionable ability, according to one commentor, to adequately characterize potential releases of toxic substances into streams, soil, air and groundwater, the size of the potentially affected population around PGDP, and what the commentor believes are the harmful effects of suspected past releases by DOE;

- Specific risks: Earthquake hazards; the potential for groundwater and drinking-water contamination; the potential for pollution of the Ohio River and local surface water systems; the potential for disruption of ecological resources; airborne radioactivity that would result from an incinerator; potential impacts to local agriculture;

- Factors: The site is on low ground in the floodplain of the Tennessee River; there are many people living near the site; there is a "high" cancer incidence in western Kentucky; the site has a "poor" waste management history; the Ohio River is currently polluted; the technology for dealing with waste is "in its infancy"; the public opposes storing waste at the site; the Governor of Kentucky has declared that there will be no nuclear waste dumps in Kentucky;

- Opinions: That more "poisons" should not be dumped into the ground; the characteristics of these wastes are unclear; waste should be stored where it is generated; waste should be taken to unpopulated, desolate, or desert areas; wastes should not be stored in barrels that could leak and need to be replaced after 20 years; efforts should focus on cleaning up existing "pollution" and ridding PGDP of its own waste; restaurants will close because food would get poisoned.

Response
NEPA and CEQ implementing regulations require DOE to consider and evaluate reasonable alternatives to a proposed action; in this case; PGDP was analyzed as a reasonable potential waste management site for its own low-level mixed waste, low-level waste, and transuranic waste. PGDP is one of 17 "major" sites analyzed in the WM PEIS. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites. However, designation as a major site does not mean the site will be selected for a programmatic waste management role.

PGDP currently does not have an inventory of high-level waste, nor is it considered a major generator of hazardous waste. Under five of the 36 alternatives in the PEIS (the Decentralized Alternative and Regionalized Alternative 1 for low-level mixed waste, and the Decentralized Alternative and Regionalized Alternatives 1 and 2 for low-level waste) DOE would construct new disposal facilities to manage wastes at PGDP. These facilities would manage low-level mixed and low-level wastes generated at PGDP, and a small quantity of low-level mixed waste (less than 1%) and low-level waste (less than 1%) generated offsite. Under the other Regionalized Alternatives and Centralized Alternatives for these waste types, all PGDP waste would be managed at other sites. The characteristics associated with these waste types are discussed in Volume I, Section 1.5.

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The PEIS analyzes for each candidate site the potential for environmental impacts resulting from programmatic waste management activities. See Volume I, Chapters 6 through 10, for results; see Volume III, Appendix C, for analysis methods. The analysis considered potential impacts, including most of the impacts that concern commentors, from normal operations, operations accidents, incident-free transportation, and transportation accidents. In addition, the PEIS estimates cumulative impacts from past, present, and reasonably foreseeable future actions (see Volume I, Chapter 11). In general, the environmental impacts associated with waste management activities under all alternatives at all sites considered in the PEIS would be small. For those impacts that would not be small, DOE would incorporate mitigation measures to reduce or eliminate the impacts and, where applicable, comply with regulatory requirements. Therefore, there is no reason to believe that waste management activities at PGDP would have a significant negative impact on the natural environment, public health and safety, or the local economy.

DOE recognizes that PGDP is one of the sites with the highest potential for being impacted by seismic effects (see Volume I, Section 4.3.4). However, PGDP was included as a candidate site because it passed all of the screening criteria, one of which was that candidate sites could not be within 200 feet of an active fault (see Volume I, Section 6.3.5). The site is near two active seismic zones--the New Madrid Fault zone and the Wabash Valley Fault zone (see Section 4.4.10). The potential effects of accidents initiated by earthquakes at treatment facilities were calculated in the PEIS, assuming generic facility characteristics, and were shown to be minimal. However, it should be emphasized that no decision would be made to locate new facilities for waste treatment, storage, or disposal at PGDP until DOE has considered the results of sitewide or project-level NEPA reviews. Any new waste management facility would be built to conform to Federal criteria that take into account the somewhat higher seismic risk at PGDP relative to some of DOE's other sites.

As to the other specific risks cited by the commentors, refer to the following sections of the PEIS: air quality (Sections 6.5, 7.5, and 8.5); water resources (Sections 6.6, 7.6, and 8.6); and ecological resources (Sections 6.7, 7.7, and 8.7). Risks to local agriculture are not considered in the PEIS as a specific impact parameter; however, as environmental risks would be small, there is no reason to believe that there would be any negative impact to local agriculture. Further, although the site is near the Ohio River, it would not be affected by the probable 500-year maximum flood.

The PEIS used generic treatment and disposal technologies and a number of conservative assumptions to develop its programmatic evaluations of the relative impacts of different waste management alternatives. The results of these impact analyses are screening-level estimates; more precise estimates of potential impacts can be better developed through sitewide or project-level NEPA reviews.

For example, the PEIS analysis indicates that DOE should carefully control the disposal of low-level waste at PGDP to prevent potential groundwater contamination (see Volume I, Section 7.6.2). DOE Order 5820.2A requires DOE to conduct a detailed performance assessment before it can develop a low-level waste facility. This assessment would require more detailed site-specific information to identify the precise location and design of any proposed facility. The facility design, in turn, would require a number of mitigating factors to help limit potential groundwater contamination.

DOE used data from the 1990 U.S. Census to estimate that about 500,000 people live within 50 miles from the center of PGDP. This population could possibly be exposed to emissions released to the atmosphere from waste treatment facilities. However, the WM PEIS risk analysis suggests that adverse health effects, if any, from the operation of waste treatment facilities at PGDP would be small (Volume I, Sections 6.4, 7.4 and 8.4).

Human health risks (e.g., cancer) constitute a site-specific impact parameter analyzed in the PEIS. Offsite population human health risks and offsite maximally exposed individual health risks are cumulative impact parameters addressed in the PEIS (See Volume I, Section 11.12). The health risk analysis suggests that adverse health effects from the operation of waste treatment facilities located at Paducah would be small. Public health impacts from disposal would similarly be small after implementation of mitigation measures necessary to ensure that DOE would not exceed radionuclide- and/or chemical-specific limits. Volume III, Appendix D, describes in more detail waste management facility human health risk estimates.

A major focus of the PEIS is to help DOE establish a Department-wide program to safely and efficiently manage radioactive and hazardous wastes. However, issues regarding existing pollution, a site's waste management record, and actual site cleanup efforts are more appropriately evaluated in sitewide or project-level studies. Likewise, the specific types and characteristics of containers and packages that would be used in managing the different waste forms are not discriminating factors that would affect the programmatic decisions supported by the PEIS, and it is more appropriate that such factors be addressed in site-level analyses.

Properly designed and operated incinerators have been shown to be as or more effective than other proven treatment technologies and DOE does not precluding their use at any site. DOE compared impacts from incineration with non-thermal treatment technologies and identified little or no difference in treatment risks to human health; DOE documented these findings in a technical report. (M/B SR-03, September, 1995). DOE has an aggressive technical development program exploring alternatives to incineration. Alternatives will be tested and deployed depending on their potential to safely and effectively treat wastes.

DOE recognizes that the siting of waste management facilities may be perceived negatively by some persons. DOE is committed to protecting human health and the environment. DOE takes its responsibility and accountability for waste management decisions seriously and intends to select a configuration for its waste management complex that provides human health and safety assurance to the public. The PEIS will help DOE make sound waste management decisions.

As evidenced by this PEIS, DOE does not intend to "dump" waste in the ground. DOE intends to properly manage the wastes to protect human health and the environment. The opinion that waste should be managed where it is generated most closely matches the No Action and Decentralized Alternatives (see Volume I, Chapter 3), which are carefully evaluated in this PEIS.

The proximity of a waste management site to populated areas is only one of many factors in evaluating alternatives. DOE must consider and balance other factors to achieve its objective of safe and efficient treatment, safe and secure storage, and ultimate disposal of each waste type. For example, DOE must consider waste transportation requirements, and the PEIS presents alternatives that would minimize waste transportation (Decentralized Alternatives) or that would maximize waste transportation (Centralized Alternatives). Although siting waste management activities in less-densely populated or remote areas could reduce the potential for some impacts, the risks of transporting wastes over longer distances to reach remote sites would increase the potential for other impacts. Section 1.7.3 in

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Volume I lists and describes examples of the criteria and factors DOE will consider in making its decisions.

DOE prepared the PEIS as part of its effort to develop an overall national strategy on which to base waste management decisions. When selecting locations for waste management facilities on sites, DOE will consider the results of relevant existing or required new sitewide or project-level NEPA reviews, which will evaluate in greater detail the potential for environmental impacts at sites selected for programmatic waste management activities.

A population risk vulnerability analysis to compare low-level mixed waste and low-level waste alternatives using measures that characterize their relative potential to cause disposal risk to offsite populations was added to the Final WM PEIS. As shown in Table 5.4-2 in Volume I, PGDP is in the highest risk vulnerability group.

Volume I, Section 3.7, identifies DOE's preferred alternatives and the reasons they are preferred. The Records of Decision will announce DOE's decisions and the reasons for the decisions if they differ from the preferred alternatives provided in the Final PEIS. The WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets, schedules and national priorities, as well as other DOE studies, will be considered in developing Records of Decision. Similarly, the position and comments of the Governor of Kentucky will be factored into the decisionmaking process.

Comment (2180)
Will any foreign waste be brought to PGDP?

Response
Assuming that the commentor refers to waste from outside the United States, the WM PEIS does not consider the receipt of "foreign waste" at any DOE site. Volume I, Section 1.8.1, does discuss the Foreign Research Reactor Spent Nuclear Fuel EIS, and its relationship to the WM PEIS. DOE does not plan to manage any of the foreign research reactor spent nuclear fuel (which is not considered "waste") at PGDP. The Record of Decision for the Foreign Research Reactor Spent Nuclear Fuel EIS was issued in May 1996. The decision allows for acceptance of spent nuclear fuel from 1996 to 2009 with management of the spent fuel to occur at the Savannah River Site or Idaho National Engineering Laboratory.

Assuming that the commentor refers to waste from outside Kentucky, under five of the 36 alternatives in the PEIS (the Decentralized Alternative and Regionalized Alternative 1 for low-level mixed waste, and the Decentralized Alternative and Regionalized Alternatives 1 and 2 for low-level waste) DOE would construct new waste management facilities at PGDP. These facilities would manage low-level mixed and low-level wastes generated at PGDP, and a small quantity of low-level mixed waste (less than 1%) and low-level waste (less than 1%) generated offsite. Under the other Regionalized Alternatives and Centralized Alternatives for these waste types, all PGDP waste would be managed at other sites. The characteristics associated with these waste types are discussed in Volume I, Section 1.5.

Comment (2228)
A commentor prefers a modified No Action Alternative for PGDP and to treat waste onsite or store it aboveground until onsite technologies are available. Supporting reasons are: (1) earthquakes,

(2) community safety, (3) contamination of other communities, (4) transportation accidents, and (5) worker safety.

Response
The WM PEIS human health risk assessment and the ecological risk assessment examined the potential effects on humans and the environment of waste management activities at PGDP. DOE found that public health and environmental risks would be low at PGDP under all alternatives. Health risks due to seismic events (earthquakes) are evaluated in the PEIS. PGDP site has been recognized as one of the sites with the highest potential for being impacted by seismic effects (Section 4.3.4). The site is near two active seismic zones: the New Madrid Fault zone; and the Wabash Valley Fault zone (Section 4.4.10). Accidents initiated by earthquakes at treatment facilities were included in the PEIS, assuming generic facility characteristics, and were shown to produce minimal risks. Any new waste management facility would be built to conform to Federal criteria that take into account the somewhat higher seismic risk at PGDP relative to some of DOE's other sites.

The PEIS includes a detailed assessment of risks associated with accidents from both rail and truck transportation, including low-probability/high-consequence and high-probability/low-consequence accidents. DOE found that risks from transportation accidents would be low under all alternatives. DOE provides for Radiological Assistance Program teams consisting of trained experts equipped and prepared to quickly respond to an accident and assist local emergency response personnel, if requested by local agencies. These teams will help mitigate the remaining risks associated with transportation accidents.

DOE is concerned with health and safety and the need for emergency preparedness in and around its sites. Emergency response plans are required for sites and in their surrounding communities by Federal, State, and local authorities that deal with emergency situations such as floods, tornadoes, and other natural or man-made disasters. These plans are continually updated. DOE, the U.S. Department of Transportation, and the Federal Emergency Management Agency are available to assist State and local authorities with their emergency plan reviews.

Comment (3180)
A commentor opposes disposal of either low-level waste or low-level mixed waste at PGDP. The shallow depth to groundwater and high annual rainfall would produce adverse environmental consequences if PGDP were chosen as a disposal site. PGDP is close to the Ohio River and the area has a high infiltration rate, which makes PGDP unsuitable as a disposal site.

Response
For low-level mixed waste, Section 6.2.3 in Volume I of the WM PEIS provides assumptions for facilities and disposal. The document analyzes two types of disposal: engineered disposal and shallow land burial. However, when disposing of smaller quantities of waste (i.e., less than 700 cubic meters per year) aboveground silos were assumed. Both types of low-level mixed waste disposal facilities were assumed to be designed to meet all applicable RCRA disposal requirements. Before locating a disposal facility on a site, DOE will conduct a performance assessment and define waste acceptance criteria.

Section 7.2.3 in Volume I of the PEIS identifies assumptions for facilities and disposal for low-level waste at sites with shallow groundwater and high precipitation rates. Engineered concrete structures

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are typically used for disposal to reduce potential radionuclide migration. DOE assumed the use of aboveground engineered concrete structures for sites located in the eastern United States, including PGDP.

Section 1.8.2 in Volume I of the PEIS identifies other programs and their relationship to the WM PEIS. One of these is the DOE Disposal Workgroup, which has discussed disposal of low-level mixed waste and is comprised of both DOE staff and State representatives. Section 1.8.2 states that information from the DOE Disposal Workgroup process will be considered in the WM PEIS decisionmaking process, and that identification of sites that might dispose of low-level mixed waste will follow State and Federal siting and permitting regulations.

A population risk vulnerability analysis to compare low-level mixed waste and low-level waste alternatives using measures that characterize their relative potential to cause disposal risk to offsite populations was added to the Final WM PEIS. As shown in Table 5.4-2 in Volume I, PGDP is in the highest risk vulnerability group.

Comment (4570)
A commentor asked several questions: (1) What is this comment period all about and why is the comment period so short? (2) What types of wastes were analyzed? (3) What are the half-lives of the wastes? (4) What are the waste management options for PGDP? (5) How dangerous are the options to the ecosystem? (6) When will the PGDP operating contractor answer all these questions?

Response
NEPA requires that EISs be released in draft for public review and comment to ensure that the public has the opportunity for meaningful participation in the NEPA process. NEPA requires a comment period of at least 45 days; DOE's comment period for the Draft WM PEIS totaled 150 days.

The WM PEIS analyzes management alternatives for low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste. The characteristics of these wastes are addressed in the individual waste-type chapters (Chapters 6 through 10 in Volume I).

Half-lives of radionuclides in the waste range from fractions of seconds to thousands of years. The consideration of half-lives is implicit in DOE's waste classification system. For example, transuranic waste contains more than 100 nanocuries of alpha-emitting radionuclides with half-lives greater than 20 years and an atomic number greater than that of uranium (92). Section 1.5 in Volume I describes the four classes of radioactive wastes (low-level mixed waste, low-level waste, transuranic waste, and high-level waste) evaluated in the WM PEIS. Of these, low-level mixed waste, low-level waste, and transuranic waste were evaluated at PGDP.

The radionuclide content (activities) of the various radioactive wastes are described in detail in the supporting technical reports. These reports are listed in Section 15.2 in Volume I and are available in the DOE public reading rooms listed in Section 1.9 in Volume I.

The waste management alternatives are discussed in Chapter 3. Tables 3.4-1, 3.4-2, and 3.4-3 identify the proposed waste management actions at DOE sites under the alternatives for low-level mixed, low-level, and transuranic wastes, respectively. PGDP would undertake waste management activities under some alternatives for these waste types. The impacts of all alternatives on ecological resources are discussed in the individual waste-type chapters.

In accordance with NEPA, DOE (and not the operating contractor for PGDP) is responsible for answering all comments on the WM PEIS.

3.5.11 Pantex Plant

Comment (3236)
Pantex should be excluded from any consideration as a candidate low-level radioactive mixed waste, low-level waste, or hazardous waste disposal site because (1) all hazardous waste generated at Pantex is scheduled for treatment and disposal off the site; (2) the National Governors Association Task Force and Site Treatment Plan efforts involve only treatment units (as opposed to disposal) possibly being brought to Pantex; and (3) because Pantex is located directly above the sole-source Ogallala Aquifer, the primary source of water for the multi-billion dollar agricultural industry in the Panhandle.

Response
NEPA and CEQ implementing regulations require DOE to consider and evaluate reasonable alternatives to a proposed action; in this case, the potential for the Pantex Plant to serve as a disposal site is a reasonable option under some of the WM PEIS alternatives. Pantex is one of 17 "major" sites analyzed in the WM PEIS. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites. However, designation of a major site does not mean the site will be selected for a programmatic waste management role.

DOE considered the management of low-level mixed waste and low-level waste at the Pantex Plant. Under five of the 36 alternatives in the PEIS (the Decentralized Alternative and Regionalized Alternative 1 for low-level mixed waste; the Decentralized Alternative and Regionalized Alternatives 1 and 2 for low-level waste) DOE would construct new disposal facilities to manage wastes at Pantex. The Pantex Plant is not considered a potential centralized waste management facility in the WM PEIS and would not receive wastes from other sites under any of the alternatives. Conversely, all Pantex hazardous waste would be shipped off the site for treatment and disposal either at commercial facilities or at other DOE sites.

Waste management alternatives considered in this WM PEIS are waste-type specific. Thus, a strategy relative to hazardous waste does not necessarily apply to other waste streams. The Site Treatment Plans were developed in accordance with the Federal Facility Compliance Act for treatment of DOE low-level mixed waste. The DOE Disposal Workgroup and the National Governors Association have developed a process to identify sites subject to Site Treatment Plans that are suitable for further evaluation of their potential as disposal sites. Information obtained through this process will be considered in developing Records of Decision for the WM PEIS. Further information on this process is provided in Volume I, Section 1.8.2, of the WM PEIS.

The PEIS analyzes for each candidate site the potential for environmental impacts resulting from programmatic waste management activities. See Volume I, Chapters 6, 7, and 10 for discussions of specific impacts at the Pantex Plant; see Volume III, Appendix C, for analysis methods. In general, the environmental impacts associated with waste management activities under all alternatives at all sites considered in the PEIS would be small. For impacts that would not be small, DOE would incorporate mitigation measures to reduce or eliminate the impacts and, where applicable, comply with regulatory requirements. Therefore, there is no reason to believe that waste management activities at Pantex would have a significant negative impact on the natural environment or public health and safety. Risks to local agriculture are not considered in the PEIS as a specific impact parameter; however, as environmental risks would be small, it is not anticipated that there would be any negative impact to local agriculture. As described in Section 4.4.11 in Volume I, although the Ogallala Aquifer is the major source of water for the Pantex region, EPA has not classified the Ogallala as a sole-source aquifer.

3.5.11 Pantex Plant

DOE is committed to properly managing its waste to protect human health and the environment. DOE takes its responsibility and accountability for waste management decisions seriously and intends to select a configuration for its Waste Management Program that provides human health and safety assurance to the public.

DOE prepared the WM PEIS as part of its effort to develop an overall national strategy on which to base waste management decisions. Before locating waste management facilities on sites, DOE will consider the results of relevant existing or required new sitewide or project-level NEPA reviews, which will evaluate in greater detail the potential for environmental impacts at sites selected for programmatic waste management activities.

Volume I, Section 3.7, identifies DOE's preferred alternatives and the reasons they are preferred. The Records of Decision will announce DOE's decisions and the reasons for the decisions if they differ from the preferred alternatives provided in the Final PEIS. The WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets, schedules and national priorities, as well as other DOE studies, will be considered in developing Records of Decision.

3.5.12 Portsmouth Gaseous Diffusion Plant

Comment (2076)
Will incineration or thermal treatment occur at the Portsmouth Plant? We do not want to be considered for thermal treatment.

Response
Thermal treatment was used as a generic technology in the WM PEIS analysis to allow a relative comparison of potential impacts across sites. DOE compared impacts from incineration with an alternative treatment technology and identified little change in the total risks to human health from treatment and disposal. DOE documented these findings in a technical report, that is available in the DOE public reading rooms listed in Volume I, Section 1.9, in the WM PEIS.

Properly designed and operated incinerators are as or more effective than other treatment technologies, and DOE does not preclude their use at any site. EPA's combustion strategy states, "If properly designed and operated in compliance with regulatory standards, combustion is a technology that provides sound management of hazardous waste." Fact sheets on radioactive and mixed waste incineration published jointly by EPA and DOE (EPA 402-F-95-004 through 007, January 1996) recognize the effectiveness of incineration as part of the DOE Waste Management Program and that alternatives are not entirely comparable. Optimal operation of incinerators in conjunction with existing pollution control technologies, can minimize generation of dioxins and furans and radiation releases.

DOE prepared the PEIS as a part of its effort to develop an overall national strategy on which to base waste management decisions. Before locating waste management facilities on sites, DOE will consider the results of relevant existing or required new sitewide or project-level NEPA reviews, which would evaluate in greater detail the potential for environmental impacts at sites selected for programmatic waste management activities and will provide a basis for selecting treatment technologies.

Comment (2093)
DOE needs to consider the transuranic elements in Building 333 at the Portsmouth Plant.

Response
In Volume I, Section 8.1.2, DOE acknowledges that there are small amounts of transuranic waste that were not assessed in the WM PEIS. These small amounts of transuranic waste would not affect programmatic results. Radioactive waste having concentrations greater than 100 nanocuries per gram of transuranic elements with half-lives greater than 20 years is considered and included as transuranic waste in the WM PEIS.

Comment (2715)
The issue of allowing additional waste to be stored on the Portsmouth Plant should consider the following factors: (1) legally right is not always morally right, as evidenced by use by the Plant of the exemption contained in 40 CFR 264 and relative to earthquake consequences for areas east of the Mississippi River, although newer data and seismic history, compounded by deep-injection processes, suggest a moral obligation to consider earthquake hazards; (2) local risk should not be increased by offsite waste just because of the economics of the region; (3) the cost to public health and the environment should always be factored into the equation when calculating the cost of a project; and (4) people already live with the constant hazard presented by leaking, corroded drums and toxics.

3.5.12 Portsmouth Gaseous Diffusion Plant

Response

DOE must comply with all applicable laws and regulations. NEPA and CEQ regulations require DOE to analyze the potential environmental consequences related to its proposed actions and to prepare a detailed statement on the consequences, alternatives to the proposed action, and measures that could avoid or minimize adverse impacts. The Portsmouth Plant is one of 17 "major" sites analyzed in the WM PEIS. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites. However, designation as a major site does not mean the site will be selected for a programmatic waste management role.

DOE considers Portsmouth a potential site for the management of low-level and low-level mixed wastes. At present, the Portsmouth Plant manages its own low-level and low-level mixed wastes. Under the Decentralized Alternative and some Regionalized Alternatives, Portsmouth is a candidate for managing not only its own low-level and low-level mixed wastes, but also wastes from other DOE sites. Under the Centralized Alternative, the Portsmouth Plant is one of seven DOE sites that would receive wastes from other sites for treatment prior to disposal.

The WM PEIS analysis calculates the potential effects of accidents initiated by earthquakes at treatment facilities. While deep-injection processes could impact seismic activity, there are no geologic faults in the Portsmouth region of influence. The potential for damage from seismic activity is small.

Eleven impact parameters were evaluated in the WM PEIS, including human health risks, economic, social, and cost impacts. Human health risks (e.g., cancer) constitute a site-specific impact parameter analyzed in the PEIS. Offsite population human health risks and offsite maximally exposed individual health risks at Portsmouth are cumulative impact parameters addressed in the PEIS (see Volume I, Section 11.14). The health risk analysis suggests that adverse health effects from the operation of waste treatment facilities located at the Portsmouth Plant would be small. Public health impacts from disposal would similarly be small after implementation of mitigation measures necessary to ensure that DOE would not exceed radionuclide- and/or chemical-specific limits. Volume III, Appendix D, describes in more detail waste management facility human health risk estimates. As to socioeconomic impacts at Portsmouth, the data presented in Volume II, Section 13.0, of the PEIS shows the socioeconomic impacts for treatment and disposal.

Chapters 6 and 7 in Volume I discuss the estimated impacts to selected sites from the management of low-level and low-level mixed wastes, and Chapter 11 discusses cumulative impacts from the various alternatives and from existing and planned programs. These discussions do not express potential impacts in terms of cost, but the impact analysis presented will be an important factor in the WM PEIS decisionmaking process.

A major focus of the PEIS is to help DOE establish a Department-wide program to safely and efficiently manage radioactive and hazardous wastes. However, issues regarding existing pollution, a site's waste management record, and actual site cleanup efforts are more appropriately evaluated in sitewide or project-level studies. Likewise, the specific types and characteristics of containers and packages that would be used in managing the different waste forms are not discriminating factors that would affect the programmatic decisions supported by the PEIS, and it is more appropriate that such factors be addressed in site-level analyses.

3.5.13 Rocky Flats Environmental Technology Site

Comment (1764)
A commentor believes that most members of the public would not favor a No Action Alternative for RFETS, but might consider an enhanced No Action Alternative that includes a state-of-the-art treatment facility for processing wastes.

Response
The WM PEIS analyzes 36 alternatives in four categories, and DOE believes these alternatives provide a sufficient base of information on which decisionmakers can determine DOE's waste management strategy. Volume I, Section 3.7, identifies DOE's preferred alternatives and the reasons they are preferred. NEPA allows DOE to select partial alternatives or combinations of alternatives, as long as they fall within the bounds of the alternatives considered in the PEIS. In these cases, DOE would explain in the Records of Decision how and why it made its decisions, and how the decisions related to the alternatives analyzed in the Final PEIS.

Comment (1778)
Do not bury low-level waste at RFETS. We need monitorable retrievable storage.

Response
The WM PEIS analysis finds that impacts from disposal of low-level waste at RFETS (under the Decentralized, Regionalized 1, and Regionalized 2 Alternatives) would be small. Disposal facilities would be designed and sited only after additional analyses required by the DOE performance assessment process. Facilities would be constructed and operated in compliance with applicable regulations. These actions should further minimize the potential for contamination.

DOE has identified the preferred alternative for low-level waste disposal for sites such as RFETS in Volume I, Section 3.7, of the Final WM PEIS.

Comment (2578)
Why is RFETS excluded from treating offsite transuranic waste?

Response
Based on inventory and expected generation rates, RFETS houses or is expected to generate approximately 6,200 cubic meters of transuranic waste over the next 20 years. DOE developed the transuranic waste treatment configurations to present reasonable alternatives, considering a No Action Alternative and Decentralized Alternatives under which each site would treat only its own transuranic waste. Of the three Regionalized Alternatives in which transuranic waste is consolidated at two to five sites, RFETS would treat its own waste under two alternatives, and ship its wastes off the site under the third. Under the Regionalized Alternatives, the rationale was that transuranic waste treatment should be consolidated at the four largest sites where approximately 80% of the waste is located or expected to be generated over the 20-year analytical period. RFETS does not fall into this category.

Comment (3218)
Commentors oppose the siting of programmatic waste management activities at RFETS because of the location of the site near an urban environment; bringing materials onsite for treatment and burial is not acceptable to the surrounding community; and DOE should have long-term responsibility for storing the waste rather than disposing of it.

3.5.13 Rocky Flats Environmental Technology Site

Response

NEPA and CEQ implementing regulations require DOE to consider and evaluate all reasonable alternatives to a proposed action; in this case, the potential for siting some waste management activities at RFETS was analyzed as a reasonable option under some WM PEIS alternatives. RFETS is one of 17 "major" sites analyzed in the PEIS. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites. However, designation as a major site does not mean the site will be selected for a programmatic waste management role.

DOE evaluated 36 alternatives in the PEIS. Under 12 alternatives (Decentralized and Regionalized Alternatives for low-level mixed waste and transuranic waste; Decentralized, Regionalized, and Centralized Alternatives for low-level waste) new facilities would be constructed to manage wastes at RFETS. These facilities would manage wastes generated primarily at RFETS; wastes received from offsite under any of the alternatives considered would be less than 1% of the total volume of that waste type disposed of at RFETS. Under certain Regionalized and Centralized Alternatives, RFETS wastes would be managed at other DOE sites.

The PEIS analyzes for each candidate site the potential for environmental impacts resulting from programmatic waste management activities. See Volume I, Chapters 6 through 10, for results; see Volume III, Appendix C, for analysis methods. The analysis considered potential impacts, including most of the impacts that concern commentors, from normal operations, operations accidents, incident-free transportation, and transportation accidents. In addition, the PEIS estimates cumulative impacts from past, present, and reasonably foreseeable future actions (see Volume I, Chapter 11). In general, the environmental impacts associated with waste management activities under all alternatives at all sites considered in the PEIS would be small. For those impacts that would not be small, DOE would incorporate mitigation measures to reduce or eliminate the impacts and, where applicable, comply with regulatory requirements. Therefore, there is no reason to believe that waste management activities at RFETS would have a significant negative impact on the natural environment or public health and safety.

Specifically, the PEIS human health risk assessment and ecological risk assessment examined potential Waste Management Program effects on humans and the environment near RFETS. DOE found that public health and environmental risks from treatment would be low at RFETS under all waste management alternatives. Public health and environmental risk from disposal would be low after implementation of mitigation measures to ensure that DOE would not exceed radionuclide- and/or chemical-specific limits.

Disposal of waste is preferable to a long-term storage for several reasons. First, disposal involves placement of treated waste in facilities that will effectively remove the material from contact with human or environmental receptors for very long periods of time. For example, disposal of treated transuranic waste and high-level waste in geological repositories will isolate these materials for the long periods of time they are expected to remain hazardous. If these materials were kept in long-term storage facilities they could be subject to potential releases as a result of continued processing (repackaging), facility accidents, or natural disasters. Second, fewer resources are required to dispose of treated materials than to store them for indefinite periods of time. For example, operation of disposal facilities is expected to require only security and monitoring functions after emplacement of the wastes, whereas storage in aboveground facilities would have higher operational costs.

3.5.13 Rocky Flats Environmental Technology Site

DOE is committed to protecting health and the environment. DOE takes its responsibility and accountability for waste management decisions seriously and intends to select a configuration for its waste management complex that provides human health and safety assurance to the public. The WM PEIS will help DOE make sound waste management decisions.

The proximity of a waste management site to populated areas is only one of the factors in evaluating alternatives. DOE must consider and balance other factors to achieve its objective of safe and efficient treatment, safe and secure storage, and ultimate disposal of each waste type. For example, DOE must consider waste transportation requirements, and the PEIS presents alternatives that would minimize waste transportation (Decentralized Alternatives) or that would maximize waste transportation (Centralized Alternatives). Although siting waste management activities in less-densely populated or remote areas could reduce the potential for some impacts, the risks of transporting wastes over longer distances to reach remote sites would increase the potential for other impacts. Section 1.7.3 in Volume I lists and describes examples of the factors and criteria DOE will consider in the decisionmaking process.

DOE prepared the PEIS as part of its effort to develop an overall national strategy on which to base waste management decisions. Before selecting locations for waste management facilities on sites, DOE will consider the results of existing relevant or required new sitewide or project-level NEPA reviews, which would evaluate in greater detail the potential for environmental impacts at sites selected for programmatic waste management activities.

Section 3.7 in Volume I of the WM PEIS identifies DOE's preferred alternatives and the reasons they are preferred. These are not final decisions. The Records of Decision will announce DOE's decisions and the reasons for the decisions if they differ from the preferred alternatives provided in the Final PEIS. The WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets, schedules and national priorities, as well as other DOE studies, will be considered in developing to Records of Decision.

Comment (3260)
The WM PEIS Summary document, Section 6.2.1, states that all sites are assumed to have adequate capabilities to package and store future-generated transuranic waste (TRUW). It is not clear that this is the case at RFETS.

DOE should clarify to what extent this assertion is true for RFETS and all assumptions underlying this assertion. To what degree does the proximity of RFETS to a large metropolitan area figure into the selection of alternatives to package and store future-generated TRUW?

Response
To establish the existing capacities for TRUW treatment and identify the need for new or expanded facilities, DOE compiled a list of existing and planned TRUW facilities. Total capacities of these identified facilities are presented in Table 8.1-2, Volume I. Six sites, including RFETS, have existing or planned treatment facilities. These facilities are each capable of performing different aspects of treatment including aqueous treatment, shredding, solidification, thermal treatment, and repackaging. DOE also assumed that the basic capabilities to package and store TRUW are available at every site that would generate TRUW in the future. This includes 11 sites projected to generate contact-handled

TRUW and 5 sites with projected remote-handled TRUW, as shown in Table 8.1-1 in Volume I of the WM PEIS.

Based upon its current and projected waste volumes, RFETS is considered as a candidate site for TRUW treatment and storage under two alternatives and treatment only under two additional alternatives. Criteria, such as risk to nearby populations are included in the risk and impacts analyses, as described in Volume I, Chapter 8, of the WM PEIS. Impacts to RFETS would be small.

Comment (3267)

The WM PEIS contains alternatives within each category that would allow for shipment of waste to RFETS for treatment. Some alternatives also call for onsite disposal of materials at RFETS. The WM PEIS should not consider alternatives that require materials to be imported to RFETS, nor those that require onsite disposal at RFETS.

Response

NEPA requires DOE to analyze reasonable alternatives. RFETS is a large site that currently generates or is projected to generate three of the waste types analyzed in the PEIS. Inventoried and projected volumes indicate that RFETS has the fifth largest low-level mixed waste and transuranic waste volumes, and eighth largest low-level waste volume of the 54 DOE sites considered. Although the volumes are relatively small compared to total waste within the complex, it is reasonable to consider RFETS as a candidate treatment, storage, and disposal site under some alternatives.

3.5.14 Sandia National Laboratories-New Mexico

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3.5.15 Savannah River Site

Comment (182)
DOE needs to clarify the role of the SRS Consolidated Incineration Facility as a potential Regionalized Alternative for the acceptance of low-level mixed waste (LLMW).

Response
The WM PEIS evaluated both on- and offsite waste to be treated at the SRS Consolidated Incineration Facility. Volume I, Section 6.3.3, identifies sites that would ship LLMW to SRS for treatment under the Regionalized Alternatives. The Consolidated Incineration Facility is considered only for non-alpha LLMW; therefore, it would only treat waste from the Charleston Naval Shipyard, the Norfolk Naval Shipyard, and the Pinellas Plant. However, alpha LLMW treatment is also evaluated for SRS, with any alpha LLMW at Bettis Atomic Power Laboratory, the Mound Plant, the University of Missouri, and WVDP sent to SRS for treatment. The maximum percent of offsite LLMW to be treated at SRS under any alternative would be approximately 1%, with the remaining 99% originating at SRS. Additional alpha LLMW treatment capacity would be required to accommodate the treatment of on- and offsite alpha LLMW at SRS.

Comment (1682)
A commentor opposes the use of SRS for dumping, storage, or disposal of radioactive waste because of the past history of environmental neglect at the site and the risk of an increased incidence of cancer in area.

Response
NEPA requires DOE to consider and evaluate reasonable alternatives to a proposed action; in this case, the potential for siting some waste management activities at the SRS is a reasonable programmatic waste management alternative. SRS is one of 17 "major" sites analyzed in the WM PEIS. See Volume I, Section 4.2.1, for a full description of how DOE identified major sites.

SRS was analyzed as a candidate location for management of low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste. For low-level mixed waste, DOE evaluated nine separate alternatives. Under four of these alternatives, SRS would serve as a disposal site for its own low-level mixed waste, and would also receive wastes from seven smaller sites that would amount to only 1% of the total volume disposed of at SRS.

For low-level waste, DOE evaluated 14 separate alternatives, 7 of which considered SRS as a potential site for disposal. Under the No Action, Decentralized, and Regionalized 1, 2, 3, 4, and 5 Alternatives, SRS would dispose of its own waste and a small quantity (less than 1%) of waste generated offsite. Under Regionalized Alternatives 6 and 7, SRS would receive wastes from several other sites that would amount to 51% of the total volume disposed of at SRS. Under the five Centralized Alternatives, SRS low-level waste would be shipped offsite to another location for disposal.

Under the transuranic waste management alternatives, SRS would treat transuranic waste, and up to 17% of the total volume that it treats would come from other sites. However, no transuranic waste disposal would take place at SRS.

SRS currently stores high-level waste onsite. Under each of the alternatives for managing this waste type, all of the existing and planned high-level waste being stored at SRS would eventually be transported

3.5.15 Savannah River Site

offsite. Under Regionalized Alternative 1, SRS would also receive and temporarily store high-level waste from WVDP prior to its shipment to a permanent storage location.

Four alternatives were analyzed for hazardous waste management. Under the No Action Alternative, SRS would continue to ship hazardous waste offsite for commercial treatment. Under the Decentralized and Regionalized 1 Alternatives, SRS would treat some of the hazardous wastes produced onsite, with any remainder being shipped offsite for treatment at a commercial facility. Under Regionalized Alternative 2, all SRS hazardous wastes would be shipped to another DOE "hub" site (ORR) for treatment.

The PEIS analyzes for each candidate site the potential for environmental impacts resulting from programmatic waste management activities (see Volume I, Chapters 6 through 10 for results; see Volume III, Appendix C, for analysis methods). The analysis considered potential impacts from normal operations, operations accidents, incident-free transportation, and transportation accidents. In addition, the PEIS estimates cumulative impacts from past, present, and reasonably foreseeable future actions (see Volume I, Chapter 11). In general, the environmental impacts associated with waste management activities under all alternatives considered in the PEIS would be small. For those impacts that are not small, DOE would incorporate mitigation measures to reduce or eliminate the impacts. Therefore, there is no reason to believe that waste management activities at SRS would have a significant negative impact on the natural environment or public health and safety.

Human health risks (e.g., cancer) constitute a site-specific impact parameter analyzed in the PEIS (Volume I, Sections 6.4, 7.4, 8.4, 9.4, and 10.4). Offsite population human health risks and offsite maximally exposed individual health risks are also cumulative impact parameters addressed by the PEIS (see Volume I, Section 11.17). The health risk analyses indicate that there is a potential for increased adverse health effects from the operation of waste treatment or disposal facilities located at SRS. However, if DOE decides to site a new waste management facility at SRS, it would establish design and operational limitations to ensure that releases from the facility would be maintained below regulatory limits. Appendix D in Volume III describes in more detail waste management facility human health risk estimates.

Recent studies, as summarized in Appendix E of the Tritium Supply and Recycling PEIS (DOE, 1995), indicate no excess cancer incidence or mortality in the general public in the vicinity of the SRS, although evidence of an excess number of leukemia deaths has been reported in workers at the SRS. These reports of excess cancers are being investigated.

The WM PEIS examines potential radiation exposure to offsite populations resulting from implementation of the waste management alternatives. In addition, in the evaluation of cumulative impacts, estimates of annual radiation doses from existing activities and other ongoing actions at the sites are considered. Historical site-specific radiation doses have not been addressed because the availability of this information is limited. However, estimated offsite population risks from the proposed waste management actions generally would add little incremental risk to whatever the historical radiation exposures might be at the various sites.

DOE is committed to managing its waste to protect human health and the environment. DOE takes its responsibility and accountability for waste management decisions seriously and intends to select a configuration for its waste management complex that provides human health and safety assurance to the public. The WM PEIS will help DOE make sound waste management decisions.

3.5.15 Savannah River Site

Section 3.7 in Volume I of the WM PEIS, identifies DOE's preferred alternatives and the reasons they are preferred. The subsequent Records of Decision will announce DOE's decisions and the reasons for the decisions if they differ from the preferred alternatives provided in the Final PEIS.

3.5.16 Waste Isolation Pilot Plant

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3.5.17 West Valley Demonstration Project

Comment (555)
Why didn't DOE consider disposal of low-level mixed waste and low-level waste at WVDP, which already has two disposal facilities?

Response
DOE considered WVDP a candidate site for disposal of its own low-level mixed waste and low-level waste. WVDP was not considered as a candidate site for disposal of wastes from other DOE sites. All reported WVDP low-level mixed waste was categorized as alpha low-level mixed waste. WVDP has no disposal facilities for disposal of alpha low-level mixed waste and all of that waste is currently shipped to SRS for disposal. In addition, DOE anticipates that WVDP has and will generate only a small amount of low-level mixed waste (55 cubic meters), as compared to other DOE sites. See Figure 6.1-1 in Volume I of the WM PEIS. For these reasons, and because the West Valley Demonstration Act likely precludes management of waste generated elsewhere, WVDP was not considered as a candidate disposal site for low-level mixed waste from other sites.

With respect to low-level waste, WVDP was considered as a candidate disposal site for low-level waste generated onsite under the Decentralized Alternative. DOE did not analyze disposal at WVDP of low-level waste generated at other sites because of the relatively low volume of low-level waste at WVDP (42,000 cubic meters), as compared to other DOE sites. See Figure 7.1-1. Further, because of the interrelationship between low-level waste and low-level mixed waste, DOE used the same treatment and disposal locations for low-level waste and low-level mixed waste.

As described in Section 1.8.1, DOE and the New York State Research and Development Authority are currently preparing an EIS for Completion of the WVDP and Closure or Long-Term Management of Facilities that is being closely coordinated with the WM PEIS and will access the site-specific impacts of future waste management at WVDP.

Comment (4444)
WVDP would not be a good regional site, as it already has problems with waste leaching.

Response
DOE considered the management of low-level mixed waste, low-level waste, transuranic waste, and high-level waste at WVDP. DOE would construct new treatment and/or disposal facilities to manage wastes at WVDP under 3 of the 36 alternatives considered in the WM PEIS (the Decentralized Alternatives for low-level mixed, low-level, and transuranic wastes). Under these alternatives, WVDP would only treat and/or dispose of waste generated onsite. WVDP is not considered a potential regionalized or centralized waste management site and would not receive wastes from other sites. Under the Regionalized Alternatives, low-level mixed waste and low-level waste would be shipped off the site for treatment and/or disposal, transuranic waste would be shipped off the site for treatment pending disposal, and high-level waste would be shipped off the site for storage pending disposal in a geologic repository.

As discussed in PEIS Volume I, Section 4.4.17, groundwater monitoring at WVDP in 1991 showed that all parameters except gross beta and tritium were within comparison criteria. However, monitoring at 10 offsite residential wells indicated no evidence of contamination by activities at WVDP. Sitewide or project-level NEPA analyses will evaluate in greater detail the design of specific facilities and the potential for environmental impacts at sites selected for programmatic waste

3.5.17 West Valley Demonstration Project

management activities. Issues such as containment structures to prevent waste leaching would be addressed in such analyses. DOE and the New York State Energy Research and Development Authority have prepared a draft EIS for completion of the WVDP and closure or long-term management of the Western New York Nuclear Service Center that is being closely coordinated with the WM PEIS and will assess the site-specific impacts of future waste management at WVDP.

3.6 Geologic Repositories

Comment (143)
A commentor is not convinced that Yucca Mountain is a satisfactory storage site.

Response
The question of whether Yucca Mountain is a suitable disposal site is outside the scope of the WM PEIS. DOE is investigating the suitability of the Yucca Mountain site as the Nation's first licensed geologic repository for spent nuclear fuel and high-level radioactive waste. DOE is preparing a Yucca Mountain Repository EIS and has established a tentative date of 2000 for the Record of Decision. Because the Yucca Mountain site is the only candidate repository site currently being studied, DOE used its location to analyze the impacts of transporting high-level waste to a potential disposal facility.

Comment (196)
DOE needs to consider what assurances there are that WIPP will open and what conditions are associated with that assumption.

Response
For analytical purposes, DOE assumed that WIPP will operate as a transuranic waste repository. However, the No Action Alternative does evaluate the impacts if there is a delay in the receipt of transuranic waste at WIPP for disposal and waste continues to be stored at the generating sites for the 20-year period of analysis. DOE has prepared the WIPP SEIS-II to evaluate the impacts associated with transuranic waste disposal at WIPP. The WIPP SEIS-II No Action Alternatives evaluate the continued management of transuranic waste at the generator and/or treatment sites, and decommissioning of the WIPP facility.

Comment (1140)
The WM PEIS inappropriately continues to exclude consideration of high-level and transuranic waste disposal sites. The PEIS must include waste disposal alternatives other than Yucca Mountain and WIPP because one or both of those sites may never become operational. Even if they become operational, Yucca Mountain could not handle all high-level waste and WIPP cannot handle all transuranic wastes.

Response
Because the environmental evaluation process for geologic high-level waste (HLW) disposal was established by the Nuclear Waste Policy Act, the WM PEIS does not analyze the environmental impacts of disposal at Yucca Mountain or alternative locations for a geologic repository. The WM PEIS does analyze the environmental impacts of longer-term storage of treated HLW in the event that the construction and operation of a national geologic repository for HLW is delayed. Yucca Mountain is currently being studied for its suitability as a potential site for a geologic repository. If Yucca Mountain is found suitable, the Secretary of Energy will recommend the site to the President, at which time Yucca Mountain will be the proposed site for the first geologic repository. If the HLW repository is not established at Yucca Mountain, DOE would have to reevaluate its long-term plan for disposition of HLW.

The WM PEIS analysis of high-level waste storage includes consideration of high-level waste canister storage requirements if a permanent geologic repository does not open until after 2015. Under this scenario, which is analyzed as part of the Centralized Alternative, all canisters would be shipped to Hanford for storage until a geologic repository begins accepting high-level waste. Impacts are

3.6 Geologic Repositories

evaluated on an incremental annual basis. For the purposes of analysis, DOE assumes that WIPP will become operational. Although the WM PEIS does not evaluate WIPP or its suitability for disposal, the No Action Alternative does evaluate the impacts if there is a delay in the receipt of transuranic waste (TRUW) at WIPP and waste continues to be stored at the generating sites.

DOE has already examined alternatives to geologic disposal at WIPP in previous NEPA documents. Moreover, the disposal impacts from operating WIPP as a TRUW repository are addressed in the WIPP SEIS-II. The WIPP SEIS-II No Action Alternatives evaluate the continued management of TRUW at the generator and treatment sites, and decommissioning of the WIPP facility. These alternatives analyze environmental impacts if the waste were not disposed of at WIPP.

The capacity of WIPP is limited by the WIPP Land Withdrawal Act (Public Law 102-579) and by the Consultation and Cooperation Agreement with the State of New Mexico. Under these limits, as analyzed in the WIPP SEIS-II, WIPP would not be able to accommodate all of DOE's defense remote-handled transuranic waste.

Comment (1513)
The public is concerned about accepting more waste into the State of New Mexico at WIPP. The people of the State of New Mexico do not want WIPP to open. The Mayor of Carlsbad, New Mexico, might want WIPP, but the citizens do not.

Response
The decision of whether to operate WIPP as a transuranic waste repository is outside the scope of the WM PEIS. Rather, as identified in Volume I, Section 1.1, the WM PEIS analyzes alternative locations for treatment and storage sites. However, for purposes of analysis, DOE assumed WIPP would be operational as a transuranic waste disposal facility.

As described in Volume I, Section 1.8.1, DOE has prepared the WIPP SEIS-II to evaluate the potential environmental impacts of transuranic waste disposal at WIPP. This information will be used to support DOE's decision on whether to operate WIPP as a transuranic waste disposal facility.

In addition, disposal of transuranic waste cannot begin until DOE meets the requirements imposed under the WIPP Land Withdrawal Act and other applicable regulations.

Comment (1621)
A commentor supports the use of Yucca Mountain for storage of high-level waste.

Response
Thank you for your comment.

Comment (1636)
DOE should consider other sites besides Yucca Mountain for high-level waste (HLW) storage.

Response
Because the environmental evaluation process for geologic disposal was established by the Nuclear Waste Policy Act, the WM PEIS does not analyze environmental impacts of disposal at Yucca Mountain or alternative locations for a geologic repository. However, the WM PEIS does analyze the

environmental impacts of the longer term storage of treated HLW in the event that the construction and operation of a national geologic repository is delayed.

The total HLW volume of 378,000 (inventory plus generation within the next 20 years) is equivalent to an estimated 21,600 canisters of vitrified HLW. Under the No Action Alternative and Decentralized Alternative, the Hanford Site, INEL, SRS, and WVDP would store HLW canisters. Under Regionalized Alternatives 1 and 2, the Hanford Site, INEL, and SRS would store HLW canisters. Under the Centralized Alternative, the Hanford Site would store HLW canisters.

DOE is addressing possible environmental impacts from the construction, operation, and eventual closure of a potential repository for spent nuclear fuel and HLW at Yucca Mountain in a separate EIS.

Comment (2215)
I am getting sick of hearing about Yucca Mountain. I believe in Santa Claus more than I believe in Yucca Mountain.

Response
Thank you for your comment.

Comment (3214)
The WM PEIS does not analyze alternatives to the Yucca Mountain repository. DOE should examine all alternatives for management of high-level waste, including other disposal sites, extended storage at the point of generation, and regionalized and centralized storage. The impacts of transporting waste to Yucca Mountain, and for all other alternatives, should be examined.

Response
Because the environmental evaluation process for geologic disposal was established by the Nuclear Waste Policy Act, the WM PEIS does not analyze environmental impacts of disposal at Yucca Mountain or alternative locations for a geologic repository. However, the WM PEIS does analyze the environmental impacts of the longer term storage of treated high-level waste in the event that the construction and operation of a national geologic repository is delayed. A separate EIS will be prepared as part of the evaluation of the Yucca Mountain site as a repository.

If the high-level waste repository is not established at Yucca Mountain, DOE would have to reevaluate its long-term plan for the disposition of high-level waste. The PEIS does analyze the environmental impacts of longer term storage of treated high-level waste in the event of a delay in the construction and operation of a national geologic repository for high-level waste. It also addresses regionalized and centralized storage of vitrified high-level waste and transportation of the vitrified waste to the storage location.

The potential impacts of transporting high-level waste to Yucca Mountain for disposal will be evaluated in the Repository EIS. Transportation-related impacts for the alternatives considered in the WM PEIS are discussed for each waste type under health risks, air quality, and environmental justice (e.g., for low-level waste, see Sections 6.4, 6.5, and 6.10 respectively), and in Volume IV in Appendix E.

3.6 Geologic Repositories

Comment (3333)
The Waste Management Program supposes a licensed geologic repository, although WIPP is unsuitable because of (1) its failure to meet EPA standards; (2) questionable deals cut between DOE and EPA to weaken oversight; (3) the presence of dangerous gases that cannot be monitored; and (4) the presence of tritium, which also threatens the Ogallala Aquifer.

Response
The WM PEIS does not analyze the environmental impacts of disposal at WIPP or alternative locations for a geologic repository. Rather it evaluates all reasonable programmatic alternatives for transuranic waste treatment and storage configurations. For purposes of analysis, DOE assumed that WIPP will become operational. Although the WM PEIS does not evaluate WIPP or its suitability for disposal, the No Action Alternative does evaluate for the period of analysis (20 years) the impacts if there is a delay in the receipt of transuranic waste at WIPP and waste continues to be stored at the generating sites.

The disposal impacts from operating WIPP as a transuranic waste repository are addressed in the WIPP SEIS-II. The WIPP SEIS-II No Action Alternatives will in part evaluate the continued management of transuranic waste at the generator and/or treatment sites, and decommissioning of the WIPP facility. These alternatives will be analyzed to provide a baseline for environmental impacts if transuranic waste were not disposed of at WIPP. This information will be used to support DOE's decision of whether to operate WIPP as a transuranic waste disposal facility.

Comment (3599)
The WM PEIS continues the saga of the DOE asserting that it is going to prove that waste will not migrate beyond the WIPP boundary within the 10,000-year statutory requirement, regardless of the gas generation problem. We understand that the WM PEIS is a document based on changing processes and decisions that impact the document. Nonetheless, it is difficult to take the assumptions and petitions for exemptions seriously because the underlying focus is not the health and safety of the environment and the people and animals that live within the area, but to get the waste out of sight and out of mind as quickly as possible. The assumption of non-defense waste at WIPP and the no-migration petition are two examples of that focus.

Response
As described in Section 1.8.1 in Volume I of the WM PEIS, which highlights a number of DOE NEPA documents that are related to the WM PEIS, the impacts of disposal of transuranic waste (TRUW) at WIPP, including the types of TRUW to be disposed of and the long-term performance of the repository, are evaluated in the WIPP SEIS-II. The WM PEIS assumes, for analytical purposes only, that WIPP will operate as a TRUW disposal facility, but also analyzes the impacts of no TRUW disposal at WIPP and continued storage at the generating sites.

Since publication of the Draft WM PEIS, the 1997 Defense Authorization Act, which contains amendments to the WIPP Land Withdrawal Act, was signed into law on September 23, 1996. The amendments exempt waste to be disposed of at WIPP from RCRA's provisions regarding land disposal restrictions, thus eliminating the need to obtain a No Migration Determination prior to commencing proposed disposal operations. The Final WM PEIS reflects this change in requirements.

3.6 Geologic Repositories

Comment (3931)
Several commentors stated that the WM PEIS assumption that Yucca Mountain will be licensed as the nation's permanent geologic repository is unrealistic, especially in light of Secretary O'Leary's indications that there is only a 50% chance of this occurring. Some commentors further indicated that DOE must fully address Yucca Mountain in a credible programmatic EIS, including industry-known problems concerning the site such as exceedance of dose limits and inadequate disposal capacity.

Response
The WM PEIS does not evaluate disposal of high-level waste or spent nuclear fuel because this issue (and associated dose limit and capacity concerns) is not within the scope of DOE's proposed action. The facility at Yucca Mountain would have space for at least a portion of the high-level waste canisters if it is developed. As stated in Volume I, Section 1.8.1, DOE is preparing a separate EIS for disposal of high-level waste and spent nuclear fuel at Yucca Mountain. Because the environmental evaluation process for geologic disposal was established by the Nuclear Waste Policy Act, the WM PEIS does not analyze environmental impacts of disposal at Yucca Mountain or alternative locations for a geologic repository. However, the WM PEIS does analyze the environmental impacts of the longer-term storage of treated high-level waste in the event that construction and operation of a national geologic repository is delayed. In addition, because the Yucca Mountain site is the only candidate repository site being studied at this time, DOE used this location to analyze the impacts of transporting high-level waste to a potential disposal facility.

Two different timing scenarios were evaluated in the WM PEIS to determine the impacts of storing vitrified high-level waste prior to disposal in a geologic repository. In the first scenario, DOE assumed that the geological repository would begin accepting DOE-managed high-level waste in 2015. In the second scenario, acceptance of DOE-managed high-level waste at the repository is assumed to be delayed past 2015. For the latter case, impacts of high-level waste storage are presented on an annualized or incremental basis to account for variability in the length of any potential delays. If DOE is unsuccessful in obtaining regulatory approval for Yucca Mountain, it would have to reevaluate its long-term plans for disposal of high-level waste.

Comment (3940)
Does DOE plan to site the WIPP, near Carlsbad, New Mexico, regardless of the results of site characterization and feasibility studies presently being conducted?

Response
Since 1970, DOE has stored all of its transuranic waste, including transuranic waste containing hazardous components that are subject to RCRA. DOE could decide to dispose of this post-1970 retrievably stored transuranic waste in the WIPP geologic repository near Carlsbad, New Mexico, after the completion of appropriate NEPA analyses and if acceptable disposal performance can be demonstrated and regulatory requirements can be met. Several studies are underway to characterize and more fully understand the potential long-term behavior of the disposal of transuranic waste at WIPP. One of these studies is the WIPP Disposal Phase Supplemental EIS (SEIS-II), which has been prepared by DOE to evaluate the environmental impacts of disposing of transuranic wastes at WIPP. Based on the results of these studies and independent of the WM PEIS, DOE will determine whether to dispose of transuranic waste at WIPP and the extent to which transuranic waste must be treated before disposal. However, to reduce the potential for delays in future transuranic waste disposal at WIPP,

3.6 Geologic Repositories

DOE will use the WM PEIS analysis to support the decision(s) about where to treat and store transuranic waste before it is disposed of at WIPP.

Comment (4045)
The timelines for both WIPP and Yucca Mountain have been extended as new regulatory and environmental issues emerge related to these facilities. Therefore, DOE should not assume that WIPP and Yucca Mountain will be available in the future. The PEIS should give greater weight to alternatives that are not based on a reasonably foreseeable centralized geologic repository.

Response
The evaluation of transuranic waste treatment and storage alternatives in the WM PEIS, which provides advance planning information on transuranic waste even if the operation of WIPP is delayed, also required that transportation to a repository location be assessed. For the WM PEIS analysis, WIPP was chosen as the final destination for evaluation of transportation impacts; operation of the WIPP repository was not evaluated.

DOE has prepared the WIPP SEIS-II to evaluate the environmental impacts of disposing of transuranic waste at WIPP. As part of the WIPP SEIS-II, the No Action Alternatives evaluate the continued management of transuranic waste at the generator facilities and decommissioning or other disposition of the WIPP facility. These alternatives will evaluate environmental impacts if the waste were not disposed of at WIPP. The WM PEIS transuranic waste No Action Alternative also evaluates the impacts of continued storage of transuranic waste at the generator sites for the period of analysis (20 years).

Section 9.1.1 describes why Yucca Mountain was used in the high-level waste analyses. In part, this section states that since Yucca Mountain is the only site that is required to be evaluated as a high-level waste repository by the Nuclear Waste Policy Act, Yucca Mountain was assumed, for purposes of analysis, to be the location of the high-level waste repository. Impacts from the construction, operation, and closure of a geologic repository at Yucca Mountain will be examined in the Yucca Mountain Repository EIS, although the Nuclear Waste Policy Act, as amended, does not require DOE to examine alternative locations. The WM PEIS does analyze the environmental impacts of the longer term storage of treated high-level waste in the event that the construction and operation of a national geologic repository is delayed.

4. Site Characteristics and Affected Environments

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(No comments were received for this section)

4.1 Environmental Resources and Conditions

Comment (251)
Referring to the "unusually high incidence of breast cancer in the county," a commentor stated that DOE lacks information and understanding of the human element that makes up the local environment around Argonne National Laboratory-East (ANL-E).

Response
The WM PEIS health risk analysis addresses the potential risks from the construction and operation of new waste treatment, storage and disposal facilities. Volume I, Section 5.4.1, of the WM PEIS provides a description of the methods used to assess health risks. The results for each waste type are presented in Chapters 6 through 10. In addition, Chapter 11 summarizes the risks of the waste management actions for a combination of the applicable waste types at each site. Chapter 11 also addresses, by site, the cumulative health impacts of the proposed waste management actions, the existing conditions, and other proposed actions at the site.

Note that the WM PEIS health risk analysis considers site baseline risk only as a component of cumulative impacts. In Chapter 11, baseline risk is considered as the potential effect of existing site-related actions on population exposure and risk. The analysis does not include regional epidemiological or health statistics information, such as the breast cancer incidence in the counties surrounding ANL-E. The estimated risks of the proposed waste management actions at ANL-E should be considered as excess latent cancer incidence or fatality risks that would be added to the existing baseline. The estimated incremental risks from the proposed treatment and disposal of low-level mixed waste and low-level waste at ANL-E are presented in Section 6.4 and 7.4 in Volume I, respectively, and in the Volume II Site Data Tables. For both waste types, less than one additional cancer incidence is estimated in the offsite population living within a 50-mile radius of the site as a result of the proposed treatment actions. Probabilities of cancer fatality for the offsite maximally exposed individual are less than 1 in 1 million. Disposal risks for the hypothetical farm family maximally exposed individual are less than 1 in 1 million for low-level mixed waste and 3 in 100,000 for low-level waste.

Comment (1554)
The Hanford Site map in Figure 4.4-4 contains numerous deficiencies in labeling, and an inaccurate site boundary. The NTS map also has inaccurate borders. It should include Area 51, and not include Pahute Mesa.

Response
The Hanford Site map (Figure 4.4-4 in Volume I) was corrected for the Final WM PEIS to provide accurate labeling and site boundaries.

The borders of the NTS map shown in Figure 4.4-8 in Volume I of the WM PEIS have also been revised. However, the WM PEIS Affected Environment Technical Report indicates that Pahute Mesa is managed as part of NTS. The NTS boundaries are designated by four Public Land Orders and a Memorandum of Understanding with the Air Force for the Pahute Mesa area. Land withdrawn under Public Land Order 1662 is not considered under any alternative for use by DOE and, therefore, is not addressed in the WM PEIS.

Comment (1644)
The PEIS should address the issue of air quality in Nevada.

Response
WM PEIS Volume I, Section 4.4.8, and the WM PEIS Affected Environment Technical Report describe the air quality at Nevada Test Site (NTS). The State of Nevada is divided into Air Quality Control Regions (AQCRs). NTS is located in Nevada AQCR No. 147. This region is designated as an attainment or unclassified area with respect to the National Ambient Air Quality Standards. An attainment area is an area with air quality better than those standards. The nearest nonattainment area is in Las Vegas Intrastate AQCR No. 13, which includes Clark County. This AQCR is classified as nonattainment for carbon monoxide and particulate matter less than 10 microns in diameter.

Major sources of nonradiological air emissions from NTS are test drilling, mining, and sampling operations for underground nuclear tests and, possibly, evaporation of containment pond water. Other air pollutant emissions are from construction activities, fugitive dust from unpaved roads, fuel burning equipment, open burning, fuel storage facilities, and asbestos removal activities. These activities contribute to the existing air quality within AQCR No. 147.

Comment (1718)
In Volume I, Tables 4-10 and 4-11, provide information that separates radioactive materials totals from radioactive waste totals for incoming and outgoing shipments.

Response
Tables 4.3-6 and 4.3-7 (formerly Tables 4-10 and 4-11) show the incoming truck and rail shipments, respectively, of hazardous materials to each of the major waste generating and storage sites during Fiscal Year 1993. The data provided in Tables 4.3-6 and 4.3-7 are for the purposes of establishing a transportation baseline for the current rail and truck shipments to and from DOE sites. Source data are derived from the 1993 Shipment Mobility/Accountability Collection and the Waste Manifest System FY 1993. Data are presented for each site without reference to source or destination of shipments. This database includes all radioactive materials shipments, not just waste shipments. The database does not specifically characterize the components that make up the site shipments beyond a division into radioactive and other hazardous materials categories. Because the table is intended as a summary of transportation-related activity in general, it is not useful as a source for waste volume, or other materials volume information.

Comment (1726)
In Volume I, Section 4.4.9, include information on the variety of Federal and State protected plant life that can be found on the Oak Ridge Reservation (ORR).

Response
Section 4.4.9 in Volume I of the WM PEIS is a summary of the affected environment information for ORR. Additional information on ecological resources at ORR, including sensitive plant species, is contained in Section 2.8.4 of the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (1729)
The WM PEIS refers to radioactive and nonradioactive parameters that exceeded water quality comparison criteria at ORR in 1992. Please include information about the parameters that exceeded comparison criteria in 1993 and 1994.

4.1 Environmental Resources and Conditions

Response
In general, DOE elected not to update or supplement the data in the WM PEIS with more recently published data because conditions rarely change drastically from year to year. Exceptions were made in instances where DOE determined that the updated data might affect the comparisons of alternatives. DOE believes that the water quality information provided gives an adequate characterization of the conditions at the sites, especially for a programmatic EIS that will not select locations for waste management facilities on the sites. More up-to-date site-specific information would be included in sitewide or project-level NEPA analyses.

Data on water quality parameters for 1993 and 1994 are available in the ORR environmental reports for those years.

Comment (1829)
The WM PEIS does not sufficiently reflect reasonable present and future conditions to allow one to draw conclusions about the impacts of the proposed actions at the ANL-E.

Response
To conduct any analysis using data that is continually being updated, the data must be "locked" at some point in time. If the data were not locked, and the analysis were updated each time new data are available, the analysis would be a "moving target" that would never be completed. As described in Section 4.4.1 in Volume I of the Draft WM PEIS and in the Draft WM PEIS Affected Environment Technical Report, the information on current conditions at ANL-E was obtained largely from reports prepared from 1990 through 1994. The low-level mixed waste volumes used in the Draft WM PEIS were obtained from the 1994 Mixed Waste Inventory Report.

More recent data at ANL-E shows a 60-fold decrease in waste generation. As a consequence, all low-level mixed waste impacts were included with the updated, lower, estimates of low-level mixed waste for ANL-E. The Final WM PEIS was revised to reflect resulting impacts from this reevaluation.

Comment (2078)
The ecological resources discussion in Volume I, Section 4.4 2, is grossly inadequate. Brookhaven National Laboratory (BNL) is located in the Central Pine Barrens State Forest Preserve, which is protected under New York State law. The site is also located within the environmentally sensitive Peconic National Estuary, which has been designated as part of the Pine Barrens Maritime Bioreserve and the National Estuary Program. Effluent from the BNL wastewater treatment plant discharges into the Peconic River, and groundwater at BNL recharges into the Peconic, Greater South, or Moriches Bays. These bays are among the most productive estuaries in the Country. They are primarily known for the production of filter feeding foods, such as clams, oysters, and scallops. Filter feeders are especially prone to bioaccumulation of toxic substances, primarily due to the amount of water filtered by each organism. A possible release of radioactive and/or hazardous materials into an estuary where commercial harvests of filter feeders occurs is not environmentally sound.

Response
BNL is in an area designated by the Pine Barrens Protection Act as "Compatible Growth Area" and "Core Preservation Area." A Compatible Growth Area is that portion of the pine barrens that has been designated to be compatible for limited development. The Core Preservation Area is the area designated to receive greater protection from development.

The headwaters of the Peconic River Estuary are also located on BNL. While this estuary is groundwater-fed, discharge from BNL's sewage treatment plant makes up much of the surface flow in the upper reaches of the Peconic River. This surface flow typically dries up prior to leaving BNL property. Groundwater beneath BNL would recharge downstream sections of the Peconic River and, to a lesser extent, the Carmans River. These rivers discharge into the Peconic Bay and Bellport Bay portion of the Great South Bay, respectively. Theoretically, a portion of groundwater beneath BNL will eventually recharge the Moriches Bay; however, given the slow rate of groundwater movement, this has not yet occurred.

DOE considers impacts to the pine barrens and Peconic and Carmans River estuaries in all BNL project-level NEPA reviews. In addition, DOE consults the Central Pine Barrens Planning Commission about many activities at BNL and provides the Commission the opportunity to comment on environmental assessments prepared under NEPA. Also, the New York State Department of Environmental Control considers the estuaries and pine barrens during relevant permit actions. This open communication between DOE, the State of New York, and the Central Pine Barrens Planning Commission will continue.

The WM PEIS does not specifically address the potential impacts to aquatic organisms from the treatment, storage, and disposal of waste management waste, although groundwater contamination from disposal of low-level mixed waste and low-level waste is expected to be limited by design and siting considerations, as described in Sections 6.6.2.1 and 7.6.2 in Volume I of the WM PEIS.

Section 5.4.3 in Volume I states that seepage of contaminated groundwater from disposal facilities could contaminate surface water and that this would be expected to occur at sites with shallow groundwater and surface water bodies that are fed by groundwater discharge (springs). Where contaminated groundwater discharges to the surface, dilution in "clean" surface waters would cause concentrations of contaminants in surface water to be lower than concentrations in groundwater. Section 5.4.3 also states that DOE will evaluate the performance of disposal facilities at each site, and if significant groundwater contamination were predicted, changes in the waste acceptance criteria would be made to limit disposal of the waste with the potential to cause significant groundwater contamination. In no case would DOE knowingly dispose of waste in violation of legal requirements.

In addition, the Final WM PEIS was revised to include a qualitative analysis of the vulnerability of the DOE sites to surface-water impacts. This new text is located in Section 5.4.3 in Volume I and Section C.4.3.4.10 in Volume III. This text states that although BNL is somewhat vulnerable to surface-water contamination, impacts from the incremental addition of waste management activities are not expected to be major.

Comment (2130)
The Ohio Department of Health has detected radiation in Piketon, in our houses, on our yards, in our gutters, on our sidewalks, and in our water. DOE needs to be concerned about damage being done to people, pets, and personal and public property from the fallout from the Portsmouth Plant.

Response
A brief description of the existing environmental conditions at Portsmouth is provided in Section 4.4.12 in Volume I of the WM PEIS. Additional information is provided in the WM PEIS Affected

4.1 Environmental Resources and Conditions

Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9, Volume I, of the Final WM PEIS.

DOE prepares annual site environmental monitoring reports that provide information about environmental monitoring activities and releases. These reports are available to the public. In 1992, DOE reported a radiation dose of 0.26 mrem to the maximally exposed individual from airborne radionuclides. This is well below the National Emission Standards for Hazardous Air Pollutants standard of 10 mrem per year. It is DOE policy to maintain releases at a level that is as low as reasonably achievable. DOE is committed to operating its facilities and managing its wastes safely and in compliance with all applicable laws and regulations.

DOE encourages the public to immediately report any unusual activities and concerns related to its sites, to the site management.

Comment (2138)
The public is concerned about the water supply around Paducah Gaseous Diffusion Plant (PGDP) and the Portsmouth Plant. DOE needs to consider that the Portsmouth Plant is located above an aquifer, and that leaks of hazardous materials at PGDP could contaminate the water. The WM PEIS does not mention that Cairo, Illinois, which is downstream of PGDP, gets its drinking water from the Ohio River.

Response
DOE understands that PGDP and the Portsmouth Plant have the potential to impact the surface water and groundwater near the sites. These impacts are evaluated at a programmatic level in the WM PEIS. DOE would consider site-specific control measures when planning new facilities or activities for specific sites. These control measures could include: modifying the design of generic disposal facilities (used in the PEIS analysis) to fit site-specific conditions; modifying waste form requirements; optimizing the location of a facility at a site; and imposing waste acceptance criteria.

Any eventual waste storage or disposal facilities would be structured with sufficient containment and would be carefully monitored. Furthermore, sites would be equipped with sufficient safety and emergency response measures to minimize the potential for leaks to contaminate surface water or groundwater. The WM PEIS Affected Environment Technical Report contains more detailed descriptions of the sites. Section 2.9.2.1 of the WM PEIS affected Environment Technical Report accounts for the fact that Cairo, Illinois, is downstream of PGDP and obtains its drinking water from the Ohio River. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2216)
DOE needs to explain why there is no wildlife in the neighboring creeks around PGDP. DOE claims there is no contamination of a dangerous level. This does not seem likely.

Response
There is wildlife in the neighboring creeks around PGDP. As described in the WM PEIS Affected Environment Technical Report, PGDP is surrounded by the West Kentucky Wildlife Management Area. Beaver, mink, muskrat, frogs, turtles, and several fish species reside in neighboring creeks around PGDP. Fish and wildlife in and around the creeks are monitored and sampled on a regular

basis by the Commonwealth of Kentucky. Low levels of polychlorinated biphenyls and radionuclides have been discovered in one of the creeks close to PGDP. Controls designed to limit access to these areas were presented to the public for comment, sanctioned by the Commonwealth, and instituted. A second creek had even lower levels of contamination and the Commonwealth concluded that no controls were necessary. The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2387)
Place the listed endangered species into context by discussing and comparing the relationships within the local and regional ecosystem. Simply listing the endangered species does not communicate the potential impacts of waste management activities.

Response
DOE did not attempt to evaluate impacts to endangered or threatened species, either directly from waste management activities or through effects on their local or regional ecosystems, in the PEIS. Such analyses would be too complex for a programmatic evaluation of effects at 17 different sites and would require identifying specific waste management facility locations at each site; siting location decisions are not being made in the PEIS. When selecting locations for waste management facilities on sites, DOE will consider the results of relevant existing or required new sitewide or project-level NEPA reviews, which would include analyses of potential impacts to ecosystems, particularly any effects on threatened and endangered species or critical habitats. The WM PEIS identifies listed endangered and threatened and other sensitive species at the candidate sites simply to highlight for DOE decisionmakers the need to identify and address potential ecological impacts once DOE makes initial waste management facility siting proposals.

Comment (2482)
Attainment status should be clarified for Idaho National Engineering Laboratory (INEL), since there are INEL facilities within less than 50 miles of a nonattainment area for PM_{10} (portions of Bannock and Power Counties).

Response
Attainment and nonattainment areas are areas with specific boundaries designated by EPA pursuant to its air quality regulations. The WM PEIS considers a site to be in a nonattainment area only if a part of the site is actually located within a nonattainment area or borders a nonattainment area. Therefore, INEL is considered to be in an attainment area for all criteria air pollutants.

Comment (2487)
The WM PEIS states that most DOE sites are in geologically stable areas, that the greatest seismic risks are believed to be at Lawrence Livermore National Laboratory (LLNL) and PGDP, and that no DOE site is in an area of known substantial volcanic hazard. A commentor argues that INEL, based on its inclusion within the Intermountain Seismic Zone and close proximity to two historical magnitude 7+ earthquakes, is in a region of significant seismic potential and that this is supported by the region being included in seismic hazard zone 3. Additionally, due to the recent (approximately 1,200 years before present) volcanic activity within about 20 miles of the site, INEL is at least in a region of uncertain volcanic hazard.

4.1 Environmental Resources and Conditions

Response
The WM PEIS Affected Environment Technical Report contains more information on historic environmental conditions at INEL. Section 2.3 of that report states that INEL lies outside the Centennial Tectonic Belt, an area of seismic activity within the Intermountain Seismic Belt. Seismographs installed in 1970 show that the eastern Snake River Plain has experienced only microearthquakes (earthquakes with a magnitude less than 1.5) and that the numbers of microearthquakes are very small compared to the numbers of earthquakes outside the Snake River Plain. In fact, since 1972, only 19 microearthquakes have been recorded within the eastern Snake River Plain. The closest large earthquakes to INEL were the 1959 Hebgen Lake earthquake (magnitude 7.5) and the 1983 Borah Peak earthquake (magnitude 7.3). Both were felt at INEL, but neither caused damage to INEL facilities. Based on known earthquake sources and a hypothetical unknown random earthquake in the eastern Snake River Plain, it is estimated that an earthquake with a maximum horizontal acceleration of about 0.15g has a probability of occurrence of 1 in 5,000 per year at a centralized INEL location (Idaho Chemical Processing Plant). Note that a seismic hazards study is currently being performed at INEL. This study is expected to be completed in fiscal year 1997.

Section 2.3 of the WM PEIS Affected Environment Technical Report further states that no historical eruptions have occurred on the eastern Snake River Plain and volcanic hazards to INEL are primarily related to future basaltic and rhyolithic eruptions along the volcanic rift zones in the eastern Snake River Plain. The likelihood of basalt lava inundation or related ground disturbance is estimated to be less than 1 chance in 40,000 per year for the southern INEL. Risks from these phenomena in the northern INEL are even lower. The probability of significant impacts from all other volcanic phenomena, such as growth of new rhyolite domes on the eastern Snake River Plain or thicker than 8 centimeters (3.3 inches) ashfall from distant volcanoes, is estimated to be less than 1 chance in 100,000 per year due to the combined effects of great distance, infrequency, low volume, and topographic or atmospheric barriers to the dispersal of ash on INEL. Therefore, INEL was not considered to be in an area of substantial volcanic hazard.

The WM PEIS Affected Environment Technical Report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2490)
In Volume I, Table 4-9, how can the peak load (550 megawatts) be greater than the total capacity (351.74 mega voltampere) at Hanford?

Response
The commentor is correct; the peak load should not be greater than the total capacity. According to the WM PEIS affected environment technical report (DOE, 1995), the peak load for Hanford should be 59.36 megawatts. DOE corrected the table (now Table 4.3-5).

Comment (2491)
Volume I, Section 4.4.5: The first bullet under *Air Quality* omits Clark and Bannock Counties. Should this bullet include all of the counties in the socioeconomic region of influence?

Response
INEL is located in Air Quality Control Region (AQCR) 3, which includes Butte, Jefferson, Bonneville, and Bingham Counties, but not Clark and Bannock Counties. AQCRs are designated by EPA and were

created by EPA for regulatory purposes that are not related to the creation of the socioeconomic regions of influence for the WM PEIS.

Comment (2492)
Volume I, Section 4.4.5, and Volume III, Section C.4.2.1.3.1 and Table C.4-3, state that Butte, Jefferson, Bonneville, and Bingham are classified as attainment areas for the six National Ambient Air Quality Standards. To designate an area as in attainment, ambient air monitoring must be performed to verify the attainment status. If an area has not had ambient air monitoring performed, like most of the area described, it is determined to be unclassified. In Volume III, the area around INEL is considered in attainment.

Response
The commentor is correct that an area that has not had ambient air monitoring performed should be designated unclassified. However, as of 1996, INEL is located in an attainment area for ambient air quality. The State of Idaho and EPA classify the counties surrounding INEL as attainment areas for the six National Ambient Air Quality Standards criteria air pollutants.

Comment (2493)
Volume I, Section 4.4.5, states that no known Federally or State-listed threatened, endangered, or candidate plant species are found at INEL and that eight Federal candidate species are found at the site. This seems contradictory.

Response
DOE revised Volume I, Section 4.4.5, of the WM PEIS to clarify that no known Federally or State-listed threatened or endangered plant species are found on INEL. However, one plant is listed by the State of Idaho as imperiled, and eight Federal candidate species (two are State species of special concern) and five State species of special concern are found on INEL.

Comment (2495)
Volume I, Section 4.4.5, gives the names of the major surface water features on and around INEL and then states that none of the rivers flow off the site. This is misleading, because the rivers all flow toward INEL, with only the Big Lost River actually flowing onto INEL in years of high precipitation.

Response
DOE has revised Section 4.4.5 in Volume I of the WM PEIS to clarify that the rivers flow toward INEL and that stream flows are often depleted before reaching INEL.

Comment (2496)
Volume I, Section 4.4.5, states that the Idaho Chemical Processing Plant the Naval Reactors Facility, and Test Area North would be flooded in the event that the Mackay Dam fails. This contradicts the conclusion of Koslow and Van Haaften (*Flood Routing Analysis for a Failure of Mackay Dam*, EEG-EP-7184, 1986). Please verify that the statement is correct. If it is found that the statement is not correct, please clarify that the existing INEL flood diversion system should prevent flooding of INEL facilities in the event that a catastrophic failure of the Mackay Dam occurs.

4.1 Environmental Resources and Conditions

Response
The WM PEIS Affected Environment Technical Report states that flooding scenarios that involve the failure of MacKay Dam have been evaluated. The results indicate that in the event of a dam failure, there would be flooding at the Idaho Chemical Processing Plant, the Naval Reactors Facility, and Test Area North. The low velocity and shallow depth of the water would not, however, pose a structural damage threat to these facilities. Section 4.8.1.3 in Volume 2 of the SNF/INEL EIS, which referenced the Koslow and Van Haaften report cited in the comment, is consistent with these statements.

Comment (2497)
Volume I, Section 4.4.5, states that no onsite sampling of surface water is performed at INEL because no surface water flows off the site. This is misleading and inaccurate; surface water is sampled on the site when flows occur by both the State of Idaho INEL Oversight Program and by the U.S. Geological Survey INEL Project Office.

Response
The WM PEIS Affected Environment Technical Report states that, because the creeks and rivers at INEL are ephemeral, surface water sampling on INEL can only be performed infrequently, after heavy precipitation events. DOE modified the sentence in Volume I, Section 4.4.5, to reflect the information in the technical report.

Comment (2499)
The WM PEIS ignores all land uses but grazing. The Spent Nuclear Fuel EIS lists grazing, wildlife management, rangeland, mineral and energy extraction, recreation, and crops.

Response
Section 4.1 in Volume I of the WM PEIS indicates that the data and analyses included in the WM PEIS are commensurate with the importance of the potential impact, and that information less crucial to the analysis is summarized or referenced. The discussion in Section 4.4.5 presents the dominant land uses for INEL. A more detailed description of land uses in the INEL region of influence can be found in Section 2.3.5.5 of the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2599)
Volume I, Table 4-12, lists one INEL site on the National Register of Historic Places, but Section 4.4.5 states there are two.

Response
DOE revised Table 4.3-8 in Volume I of the WM PEIS to provide more detailed information on the National Register of Historic Places status of known archaeological sites. For INEL, this table indicates that one property has been listed on the Register and one property has been designated as eligible. DOE also revised the related text description of cultural resources at INEL (Section 4.4.5 in Volume I of the WM PEIS).

Comment (2625)
Volume I, Section 11.5: There are *two* phosphate plants in Pocatello, Idaho, that release radionuclides to the atmosphere.

Response
DOE revised the discussion of INEL cumulative impacts in Volume I, Chapter 11, of the Final WM PEIS to indicate two phosphate plants are present in Pocatello. Information on these facilities was not included in the cumulative impacts analysis. However, it is unlikely that the omission would cause the relative impact of alternatives to change. DOE considers the current cumulative impacts analysis sufficient to make programmatic decisions.

Comment (2865)
Volume I, Section 4.4.5, lists Interstate 90 in the infrastructure description for INEL. Interstate 90 is not even close to the INEL. This section should list Interstates 15, 86, and possibly 84, as well as U.S. Highway 20.

Response
DOE deleted the reference to Interstate 90 from Section 4.4.5 in Volume I of the WM PEIS and added the correct roads in the vicinity of INEL.

Comment (2871)
Volume I, Section 4.3.4, should note and discuss the presence of highly permeable soils that do not naturally attenuate many contaminants. This is the case at BNL and it should be noted.

Response
Section 4.4.2 in Volume I states that soils on the BNL site consist of deep, well-drained to excessively drained, coarse-textured soils, although detailed site-specific information on geology and soil and water resources conditions is not included in Chapter 4.

Section 2.15.2.1 of the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS, contains more detailed information on soil and groundwater conditions at BNL. Section 2.15.2.2 of the WM PEIS Affected Environment Technical Report states that the major groundwater units in the BNL region of influence include the deeper lower aquifer system (Magothy and Raritan Formations) and the shallower Pleistocene Upper Glacial Aquifer. The Upper Pleistocene deposits are generally highly permeable--water penetrates these deposits readily-and little direct runoff into surface streams occurs. On average, about 50% of the annual precipitation percolates through the soil to recharge groundwater, and less than 2% becomes surface-water runoff.

BNL has been identified as being over a deep recharge zone for the lower aquifer system. About two-fifths of the recharge from rainfall moves into the deeper aquifers. About 350 billion gallons of recharge per year occurs from precipitation in Suffolk County.

Comment (2874)
There is no clear definition of the region of influence (ROI) related to the INEL. It seems that the ROI should include all counties that might potentially be impacted by the waste management activities. Regarding groundwater and possibly air quality, this would include the region to the southwest (Magic Valley), since any contamination would move toward that area. At a minimum, the ROI should include the entire Snake River Plain. The ROI for socioeconomics leaves out Madison County. A significant number of site workers live in Rexburg, and that community is probably an economic hub for much of Clark and Jefferson Counties.

4.1 Environmental Resources and Conditions

Response
Because the geographic area affected by any anticipated impacts will differ depending on the environmental parameter under consideration, the ROIs for groundwater, air quality, socioeconomics, etc., will differ. Table 4.2-1 in Volume I of the WM PEIS presents the ROI definition for each WM PEIS environmental parameter. Environmental conditions in the actual ROIs for INEL are presented in the discussion of INEL in Section 4.4.5 in Volume I of the WM PEIS and in much greater detail in Section 2.3 of the WM PEIS Affected Environment Technical Report.

The analytical basis for the socioeconomic ROI is explained in Section 5.4.5 in Volume I of the WM PEIS. This ROI was based on the residence patterns of the current site workforce plus the host county. For INEL, this six county area included 95% of the total site workforce. As described in the Impacts Methods and Results Technical Report the six-county ROI for INEL includes Bannock, Bingham, Bonneville, Butte, Clark, and Jefferson Counties.

Comment (2876)
Volume I, Section 4.3.5, should note that the Peconic River watershed, to which BNL is adjacent, is known to contain the highest concentration of rare and endangered plant and animal species in New York State.

Response
Section 4.3.5 in Volume I of the WM PEIS presents an overview of types of ecological resources considered in the PEIS. Section 2.15.4 of the WM PEIS Affected Environment Technical Report contains a detailed description of the ecological resources at BNL. That section describes the terrestrial communities at BNL: common fauna (mammals and birds), ecosystems that promote biodiversity, unique habitats, and nonactive species.

The technical report also states that as of September 1992, the State of New York included the banded sunfish (*Enneacanthus obesus*) as a species of special concern. The Peconic River is one of only two locations in the State known to support a population of banded sunfish. State-protected wildlife found in the Peconic basin include the tiger salamander, swamp darter (candidate for threatened species status), and the spotted turtle (species of special concern).

Comment (2878)
The list of ecological resources in Volume I, Section 4.3.5, which is oriented toward officially endangered and threatened species, should also note species that are rare or in significant decline but not officially listed. These include neotropical migratory songbirds such as warblers.

Response
The WM PEIS Affected Environment Technical Report contains detailed descriptions of ecological resources at the major sites considered in this PEIS. Federal threatened, endangered, and candidate species, and State threatened and endangered species and species of concern are considered. This level of information is adequate to support programmatic decisions. Sitewide and project-level NEPA reviews would more fully analyze potential impacts to threatened, endangered, and rare species.

Comment (2880)
Volume I, Table 4-6, and Chapters 6 and 7, note only one State-listed endangered species in the BNL Region of Influence. BNL is known to either contain or potentially contain many more endangered and

rare species than is noted. Furthermore, according to Table 4-3, the Region of Influence is to include the site and adjacent resource areas where sensitive habitats or sensitive species could be affected by the proposed action. Based on this definition and footnote "a" to Table 4-6, the WM PEIS grossly underrepresents the endangered, threatened, and rare species on and adjacent to BNL. The fact that the Peconic River and its associated wetlands and tributaries, an area known to contain the highest concentration of rare and endangered plant and animal species in New York State, are located on BNL should have generated a much more extensive list. (The commentor provided a list of species that "should be included in the site data for BNL.") BNL's own Draft Site-wide Biological Inventory Report notes some of these species as being present on the site. Furthermore, the Peconic River, found on the BNL site, flows into the Peconic Bay system, in which a number of Federally listed endangered sea turtles, particularly the rarest, Kemp's Ridley, are often found.

Response
DOE agrees and has revised Volume I, Table 4.3-2, to list one Federally and State-listed endangered, one State-listed endangered, four State-listed threatened species and 13 species of special concern for BNL. Table 4.3-2 provides a summary of the Federal and State-listed threatened and endangered species information by site. The ecological resources text section on BNL in Chapter 4 has also been updated to reflect the more recent BNL data obtained from the site's 1995 biological inventory. Section 2.15.4 of the WM PEIS Affected Environment Technical Report provides a more detailed description of the ecological resources at BNL.

When selecting locations for facilities on sites, DOE will consider the results of relevant existing or required new sitewide or project-level NEPA analyses, which would include analyses of potential impacts to threatened and endangered species and critical habitats based on site-specific conditions.

Comment (2892)
In Figure I-2b the location of the Poospatuck Indian Reservation is not correct. The Poospatuck Tribal lands are located on the Mastic peninsula, approximately 5.5 miles due south of BNL. The arrow on Figure I-2b actually locates the Shinnecock Native American Nation. The WM PEIS should be corrected to note that the Poospatuck and Shinnecock Native American Tribal Lands are located within 50 miles of BNL.

Response
Maps in Section C.4.7 in Volume III of the Final WM PEIS have been revised to reflect the presence of any Federally recognized Native American Tribes at each site. Although there also could be Tribal groups in the BNL region that are not Federally recognized, the WM PEIS does not consider these groups as cultural units (though it does consider their members in the evaluation of environmental justice impacts). The Poospatuck and the Shinnecock Tribes are included in the evaluation of environmental justice impacts even though they are not designated as Federally recognized Tribal groups.

"Recognized Native American groups" refers to those Native American groups recognized by the Federal Government as having cultural identity with an ancestral claim to lands on or in proximity to a DOE site. DOE has added a definition of Federally recognized Native American groups to Section 4.3.7 in Volume I of the WM PEIS. Table 4.3-3 has been retitled to indicate that the groups listed are Federally recognized.

4.1 Environmental Resources and Conditions

Comment (2897)
Volume I, Section 4.4.16, states that since there is no radioactive material at the Waste Isolation Pilot Plant, no radiological measurements have been performed. This statement is incorrect; preoperational radiation surveillance has been conducted by the New Mexico Environmental Evaluation Group."

Response
DOE corrected Section 4.4.16 in response to this comment.

Comment (2898)
The 3,608 available acres shown in Volume I, Table 4-8, for BNL is incorrect. According to the Future Land Use Plan for BNL (1995), the total developed area of the site is approximately 1,655 acres, leaving 3,608 acres of undeveloped land. However, this undeveloped land includes extensive wetlands areas, surface waters, areas where the water table is less than 10 feet beneath the surface, significant ecological habitats and buffer areas that have obviously not been subtracted from the site's total 5,263 acres. Therefore, DOE should not claim in Volume I, Section 5.4.4, that the figure for land available was obtained by subtracting both existing developed and land unavailable including wetlands and buffers, from the total site acreage. Furthermore, Volume I, Chapters 4 and 7, should note that all of the BNL site is located in the State-designated Central Pine Barrens and much of the site is located in the Core Preservation Area, which is designated for preservation. The Central Pine Barrens is an area recognized by New York State in Article 57 of the State Environmental Conservation Law for the significance of its ecological and groundwater resources. Therefore, the figure of 3,608 acres is wrong and must be corrected, taking into account all of the environmentally sensitive areas discussed above.

Response
DOE revised Volume I, Section 4.4.2, of the WM PEIS to show that, after subtracting developed areas, wetlands, and areas where the water table is close to the surface, approximately 2,900 acres would be available for waste management facility development at BNL.

DOE revised Section 4.4.2 to indicate that BNL is located in the Central Pine Barrens and the Peconic Estuary Systems.

Comment (2901)
Volume I, Sections 4.3.11 and 6.10.2.4.3, state that cultural resources inquiries were also sent to the State Historic Preservation Offices. It should be noted that the New York State Office of Parks, Recreation and Historic Preservation does not have complete records of archaeological and prehistoric resources. Accordingly, the New York State Museum Anthropological Survey section, the Suffolk County Archaeological Association, the Nassau County Museum, and the Department of Anthropology at the State University at Stony Brook should also be contacted. It should also be noted that much of BNL is considered to have high likelihood for the presence of aboriginal cultural resources, particularly in areas near the Peconic River. Accordingly, a complete cultural resources survey of the site, including standard subsurface testing, should be conducted.

Response
Because DOE has not proposed specific locations for waste management facilities on sites, it could not perform thorough analyses of potential cultural resources impacts. DOE recognizes that existing

cultural resources documentation might be insufficient for final facility location decisions to be made, especially where a site has not been the subject of a comprehensive cultural resource investigation.

Section 4.4.2 in Volume I of the Final WM PEIS notes that BNL has not been subjected to a comprehensive cultural resource investigation, but that three areas of BNL have been designated as eligible for inclusion on the National Register of Historic Places. A more detailed discussion of the cultural and historic background of BNL is presented in Section 2.15.7.1 of the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

As noted in Volume I, Section 5.4.10, implementing regulations of the National Historic Preservation Act of 1966 require Federal agencies to determine the effect of proposed actions on significant historic properties within the defined area of potential effects. Therefore, a complete cultural resources survey of the site would be required before any final facility location decision. DOE would seek input from local and State societies, museums, libraries, and academic institutions to augment information from the State Historic Preservation Office. DOE appreciates the commentor's assistance in providing names of potential additional sources of information.

Comment (2906)
Volume I, Section 4.4.2, discounts and underplays the significance of the water resources found on and near BNL. Significant surface waters, including the Peconic River headwaters, are found adjacent to BNL on the west side of William Floyd Parkway and northwest of the site. In addition, groundwater flows south from BNL toward the Forge River, a major river on the south shore of Brookhaven Town. Also, BNL is located in the Federally designated Peconic Estuary and development and activities at BNL are of great significance for this system, including the presence of brown tide in the estuary. The WM PEIS water resources subsection fails to note that BNL lies over a deep-flow aquifer and that BNL contains a groundwater divide from which groundwater flows eastward and southward, thereby creating greater potential for groundwater contamination. BNL also contains both discharge and recharge zones. These factors must be accounted for in Section 4.4.2.

Response
Section 4.4.2 in Volume I of the WM PEIS is a summary of information contained in Section 2.15 of the WM PEIS Affected Environment Technical Report. This technical report provides more detailed information on water resources at BNL. The report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

If BNL were selected for disposal, the facility would be designed and located in accordance with all applicable regulations. Best management practices for stormwater management would be implemented to ensure that no significant quantities of potentially contaminated runoff would reach the river. In addition, a detailed performance assessment would be prepared that would evaluate the performance of the disposal facilities over time. The performance assessment would be considered in the decisions about where and how to build the disposal facility.

Comment (2907)
DOE should use more recent data in the discussion of water resources in Volume I, Section 4.4.2.

4.1 Environmental Resources and Conditions

Response
In general, DOE elected not to update or supplement the data in the WM PEIS with more recently published data because conditions rarely change drastically from year to year. Exceptions were made in instances where DOE determined that the updated data might affect the comparisons of alternatives. DOE believes that the water quality information provided gives an adequate characterization of the conditions at the sites, especially for a programmatic EIS that will not select locations for waste management facilities on the sites. More up-to-date site-specific information would be included in sitewide or project-level NEPA analyses.

Comment (2908)
Volume I, Section 4.4.2, should include a discussion of the possibility of perched groundwater feeding the Peconic River.

Response
Section 4.4.2 in Volume I of the WM PEIS is intended to provide a broad overview of the affected environment at BNL. Additional information is presented in the WM PEIS Affected Environment Technical Report. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I.

Section E.2.15.2.1 of the technical report states that BNL is on the western rim of the Peconic River drainage basin. The onsite tributary of the Peconic River both recharges and receives water from the groundwater aquifer, depending on the elevation of the water table. In times of drought, the tributary typically recharges to groundwater, while in times of normal to above average precipitation, the tributary receives water from the aquifer. Liquid effluent from the BNL Sewage Treatment Plant constitutes the principal source of water in the tributary's river bed during drought periods. During times of low precipitation, water in the tributary does not flow offsite.

DOE has confirmed the presence of perched groundwater while conducting monitoring of groundwater quality and elevation around the Peconic River and surrounding wetlands. Since specific locations for waste management facilities on the sites are not being selected at this time, site-specific issues such as the potential impacts from perched groundwater on the Peconic River would be considered during sitewide or project-level NEPA analyses.

Comment (2909)
Volume I, Section 4.4.2, briefly mentions the significance of the underlying aquifer as being a sole-source aquifer. First of all, it should be noted that the aquifer underlying Long Island was designated a sole-source aquifer by the EPA pursuant to 42 USC 300h-3(e) (published in the *Federal Register* on June 21, 1988). BNL is in the midst of a deep recharge zone for Long Island's sole source aquifer system. Two and a half million people draw their water from this system. Soils of this aquifer are very permeable and would easily transmit contaminants to great depths. Residence times in the deeper aquifers is measured in centuries. The WM PEIS discussion of the aquifer system is extremely inadequate and more detail must be provided.

Response
Section 4.4.2 in Volume I of the WM PEIS summarizes the information contained in Section 2.15 of the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading

rooms listed in Section 1.9 in Volume I of the Final WM PEIS. The discussion requested in the comment is in the technical report.

Comment (2915)
Volume I, Section 4.4.2, geology and soils: Gardiner's clay is not a glacial deposit--it is a Cretaceous-age deposit. Its presence at BNL has not been confirmed and is, in fact, widely doubted. There are intervals of a clay layer between the Magothy-Matawan Deposit and the glacial deposits. However, it is believed that there is a strong hydrologic connection between the upper and lower aquifers under most of the BNL site; thus its designation as a deep recharge zone.

Response
The source document used by DOE, the *Brookhaven National Laboratory 1993 Technical Site Information Document*, describes Gardiner's clay as a glacial deposit. Figure 2.15-3 in the WM PEIS Affected Environment Technical Report shows the clay being thin or absent near BNL. This figure also shows BNL in the deep recharge zone for the lower aquifer system. Section 2.15.2.2 of the affected environment technical report states that about two-fifths of the recharge from rainfall moves into the deeper aquifers. The affected environment technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. The BNL information document is cited in the affected environment technical report.

Comment (2916)
Volume I, Section 4.4.2: Unconsolidated sediments above the "basement rock" are usually not called "rock."

Response
The commentor is correct. DOE replaced the term "rock units" with "geologic units" in Section 4.4.2 in Volume I of the WM PEIS.

Comment (2928)
Volume I, Section 4.4.2, oversimplifies the complexity of land use surrounding the BNL site. It should note significant existing or planned residential, commercial and industrial developments, parklands and recreation areas, and cultural and ecological resources.

Response
Section 4.4.2 in Volume I of the WM PEIS was intended to provide a broad overview of the affected environment at BNL. Additional information, including surrounding land use, is contained in Section 2.15 of the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final WM PEIS.

The proximity of residential, commercial, recreational, and ecological resources to sites selected for new waste management operations would also be considered as a part of sitewide or project-level NEPA analyses.

Comment (2948)
At BNL, the wastewater flow is greater than 90% of the receiving water's baseline flow rate. This should be noted as a site-specific exception in Volume I, Section 5.4.3.

4.1 Environmental Resources and Conditions

Response
Although it is true that effluent from BNL's sanitary wastewater treatment plant forms a large percentage of the flow in the upper reaches of the Peconic River, this is considered to be a baseline condition. The analysis performed in the WM PEIS examines the percent change in current conditions due to effluent discharges associated with the waste management alternatives. As described in Sections 6.6.1 and 7.6.1 in Volume I, the change in current effluent discharges would be less than 1%.

Comment (2958)
The ecological resources discussion in Volume I, Section 4.4.2, is grossly inadequate. The following concerns should be addressed. Open space in a highly developed region of the Country such as BNL plays a more significant role than in more rural areas. DOE figures show that the region of influence for BNL is the greatest of all the sites under consideration, and yet BNL is among the smallest of the candidate sites, and has one of the smallest acreage's available for waste management facilities among the candidate sites. The impact of developing this open space should be discussed.

Response
The WM PEIS ecological resources impacts analysis included evaluation of the potential loss or degradation of terrestrial habitats and the potential toxicity resulting from exposure to radioactive and hazardous contaminants released from waste treatment facilities. As shown in the Volume II data tables for BNL, low-level mixed waste facilities would require no more than 1.6 acres at BNL. In addition, the construction of low-level waste facilities would require no more than 2.8 acres at BNL. Even given the revisions to the BNL available land estimates presented in Volume I, Table 4.3-4, sufficient land appears to be available at BNL to implement any proposed waste management actions. The small amount of land required for the low-level mixed waste and low-level waste facilities should give DOE a great degree of flexibility in making facility location decisions. Mitigative measures can also be used to ensure that site clearing would not affect nearby sensitive habitats.

Comment (3003)
Volume I, Section 4.4, presents information regarding the affected environment at major waste sites. This information is not consistently presented across sites even though some of the information, like meteorological records or depth to groundwater, might be the site-specific information pulled in to certain portions of the analysis.

Response
Chapter 4 of the WM PEIS is not intended to provide comprehensive information on all site parameters. Rather, the most pertinent facts are presented. A list of appendices and technical reports is provided in Volume I. These reports provide more comprehensive information than could be presented in the body of the WM PEIS. Affected environments at individual WM PEIS sites are detailed in a two-volume affected environment technical report.

Source data for the analysis are derived from multiple sources such as site development plans and environmental reports, DOE and national laboratory technical reports, and national databases such as from the U. S. Bureau of the Census. Whenever possible, DOE used existing data in conducting the analysis; however, when addressing so many sites and corresponding regions of influence, some limitations on data availability and uniformity can be anticipated.

4.1 Environmental Resources and Conditions

To assure a consistent and uniform analysis across all 17 sites, standard, generic models (or modules in the case of the cost analysis) were used to describe potential activities for each of the waste management sites. Use of these models greatly assists the comparability of the analysis. Because individual variations among the sites cannot be incorporated into these generic descriptions, the correlation between the generic description and the conditions at any one site are imperfect. These variations are assumed as part of the overall comparison of alternatives and addressed as a recognized limitation on the analysis.

Comment (3008)
Single-year weather summaries are of no use for decisionmaking that is expected to have implications over centuries. Average summary data, covering decades at a minimum, should be included for all sites.

Response
Section 4.4 in Volume I was intended to provide summaries of the most important features of the affected environment for each of the major sites. The characterization of the affected environment (including meteorological conditions) was used to establish baseline conditions against which to measure the potential impacts of the waste management alternatives. This information enabled DOE to compare the waste management programmatic alternatives, and to make decisions at the programmatic level.

The WM PEIS impacts methods and results technical report provides more detailed information on environmental modeling/analysis criteria. Criteria used were functions of the models and generally not based on data specific to a single year. For meteorological data, 5-year wind rose data from the National Weather Service were used. The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

The precision of the modeling was sufficient to enable comparisons across sites. More detailed/precise analyses will be conducted as part of a project-level NEPA reviews.

Comment (3038)
Using 1992 as a baseline year to describe the affected environment at each site suggests that much of the data are out of date. Where possible in Section 4.4, summary information should be updated.

Response
To allow completion of the Draft WM PEIS impacts analyses, the base year for the analysis data was set at 1992. Continuing revisions with more recent data would have prevented publication of the Draft PEIS within a reasonable time frame. Some sections of the WM PEIS have been revised in response to public comments to include updated information. However, DOE did not make changes to the PEIS solely to present more recent information. Changes were generally limited to those that might reasonably be expected to affect the decisions to be made based on the WM PEIS. All changes made from Draft to Final WM PEIS are indicated with a sidebar next to the changed text, or shading in tables.

Comment (3040)
Section 4.3.5 does not discuss the land area that constitutes habitat for threatened or endangered species, although the land area involved may be quite extensive.

4.1 Environmental Resources and Conditions

Response
Volume I, Section 4.3.5, provides an overview of the ecological resources identified in defining the baseline conditions at each of the sites. DOE has modified Section 4.3.5 to refer the reader to additional information contained in the WM PEIS Affected Environment Technical Report. This technical report is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final WM PEIS.

Section 5.4.4.1 of the WM PEIS describes the evaluation of habitat impacts and Section 5.4.4.3 describes how effects on sensitive species were addressed. The WM PEIS analysis is a screening-level assessment conducted to identify potential impacts. The land area designated by the sites for waste management activities or calculated in the PEIS as available for waste management facility construction generally excludes habitats supporting endangered or threatened species. This waste management designated or available acreage was used to evaluate waste management facility construction requirements in the PEIS. Results indicate DOE has more than sufficient lands available to support new waste management facilities so as not to require use of any lands supporting threatened and endangered species. Site-specific analyses would further evaluate the extent and severity of any ecological resource impacts resulting from the potential implementation of waste management actions.

Comment (3041)
The number of threatened and endangered species at each site is an inadequate basis for decisionmakers to compare siting options because there are more facets to ecological resources. For example, Table 4-6 fails to mention the discovery by the Nature Conservancy of three plant and seven insect species new to science at the Hanford Site and also fails to mention how much of the Hanford Site contains State priority habitat.

Response
Volume I, Table 4.3-2, presents summary information for each site. Detailed information about the ecological resources at the Hanford Site is presented in Section 2.2.4 of the WM PEIS Affected Environment Technical Report. This technical report is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final PEIS.

A detailed analysis of impacts to sensitive species and habitats was not conducted in the PEIS because specific waste management facility locations have not been proposed. Impacts to sensitive species, including species listed as threatened or endangered by the U.S. Fish and Wildlife Service or by the State of Washington as sensitive or of concern, would be addressed in sitewide or project-level analyses. Based on the small fraction of land required for waste management facilities at any site, DOE would have sufficient flexibility in locating facilities on sites to avoid or mitigate impacts to sensitive species and habitats.

Comment (3043)
It is not clear where the figure of 14,496 acres in Table 4-8 for waste management facilities originated. The reference appears to be U.S. DOE 1995, but is not clearly cited. This figure is 140% above the 6,000 acres recommended by the Hanford Future Site Uses Working Group. If the additional acreage is located on the Central Plateau, then waste management activities will have significant effects on State Priority Habitat (shrub steppe) and Priority Species, which could lead to listing for several shrub-steppe-dependent species.

Response
The total acreage data for each site shown in Volume I, Table 4.3-4 (formerly Table 4-8), were compiled from *DOE Real Property: A Yearly Statistical Handbook, FY 1993*. The available acres for waste management facilities were obtained from available site development reports. These sources of information are listed in Volume I, Section 4.3.8, of the Final WM PEIS.

DOE has updated Table 4.3-4 to indicate that there are 6,000 acres available at Hanford for waste management facilities. The 6,000-acre figure excludes acreage that was originally considered available for waste management facilities. DOE revised other sections of the WM PEIS to reflect this new acreage figure.

According to Section 11.6 in Volume I of the PEIS, the proposed waste management alternatives for all of the waste types considered at Hanford would require a maximum of about 178 acres (Table 11.6-1). Therefore, given that the available acreage is 6,000 instead of 14,500, any of the waste management alternatives would still require only a small percentage of available land area.

DOE revised Section 11.6 to indicate that the Draft Hanford Remedial Action EIS analyzed remediation to a level suitable for unrestricted land use for portions of the Columbia River area, as well as the area on the river where reactors are located. All other areas at Hanford were analyzed under alternatives which call for restricted use, except for the Central Plateau, which would be used for waste management activities (an exclusive use).

Section 4.4.4 identifies the wildlife and plant species that could potentially be affected by waste management activities at Hanford.

Comment (3046)
Table 4-12 does not note that archaeological surveys have been completed for only a fraction of the Hanford Site.

Response
To provide a basis for the comparison of the acreage surveyed for archaeological resources with the total site acreage, DOE has updated Table 4.3-8 in Volume I to indicate both the number of acres at each site and the percentage of the total site that have been inventoried. The revised table shows that 21,358 acres, or 6%, of the Hanford Site have been surveyed sufficiently to identify all readily apparent archaeological properties.

Comment (3047)
Section 4.4.4 is not sufficient to understand the affected environment at Hanford, because it completely ignores the nature and extent of contamination and wastes currently on the site. The description of the environment and its significance is overly brief (e.g., there is no mention of the regional importance of the Columbia River).

Response
To keep the WM PEIS to a manageable size, DOE elected to provide summary descriptions of the sites' affected environments in Chapter 4, Volume I, of the WM PEIS. The WM PEIS Affected Environment Technical Report provides detailed descriptions of the WM PEIS sites including site contamination. The technical report is available in the DOE public reading rooms listed in Volume I,

4.1 Environmental Resources and Conditions

Section 1.9, of the Final WM PEIS. Some of the information that the commentor is interested in is located in the introductory text of Chapter 4 in Volume I of the WM PEIS. Hanford's wastes are listed in Volume I, Chapter 1 and Chapters 6 through 10. Section 4.3.3 in Volume I briefly describes surface water, groundwater, and sediment contamination at the sites, and Section 4.3.4 describes soil contamination at the sites.

Comment (3048)
The water resources section should include the amount of annual precipitation for the Hanford Site, which is approximately 16.5 centimeters on Central Hanford.

Response
The WM PEIS Affected Environment Technical Report contains more detailed information on environmental conditions at the sites. Precipitation is a meteorological event and is described in the air quality section of the technical report. Section 2.2.3 of the WM PEIS Affected Environment Technical Report states that average annual precipitation at the Hanford Meteorological Station Tower is 16 centimeters (6.3 inches). The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3052)
In Volume I, Section 4.4.4, the statement that, at Hanford, soils vary from sand to silty sand and sandy loam, but are predominantly sandy loams, is true only for surficial soils. For example, the Hanford Formation, a deposit of coarse-grained soils ranging in size from fine gravels to boulders, comprises most of the soil column above the basalt.

Response
As used in the WM PEIS, the term "soil" is defined as the upper layer of earth in which plants can grow, that generally exhibits some soil horizon development. Therefore, unconsolidated sediments within the Hanford Formation are not considered soils in the WM PEIS. Nonetheless, to clarify this point, DOE revised Section 4.4.4 in Volume I to read, "Surficial soils vary from sand to silty sand and sandy loam, but are predominantly deep, well-drained sandy loams."

Additional information on the affected environments at the sites is provided in the WM PEIS Affected Environment Technical Report. This technical report is available in the DOE public readings rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3053)
In Volume I, Section 4.4.4, Hanford affected environment description, the first bullet under ecological resources, should read "The Hanford Site contains the largest tract of undisturbed native shrub steppe remaining in the State of Washington, and is 6 linear miles from the second largest tract in the State, the Yakima Training Center. The National Biological Service [sic] has listed native shrub and grassland steppe in Washington and Oregon as an endangered ecosystem."

The third bullet should read "Of ecological importance, the Hanford Reach is the only significant mainstream spawning habitat remaining for Fall Chinook salmon. The Hanford Reach comprises the only significant remaining section of the inland Columbia River where White Sturgeon are able to spawn. Three plant and seven insect species new to science have been discovered on the Hanford Site since 1994, indicating a unique ecosystem exists at the Hanford Site."

Response
DOE made the requested changes to Section 4.4.4 in Volume I of the WM PEIS.

Comment (3072)
The WM PEIS does not contain enough site-specific geological and hydrological information to adequately analyze the impacts of waste management at Hanford, or at any of the other sites.

Response
Chapter 4 in Volume I contains summary information on the affected environments at the sites. Although additional information on geology and soils and hydrologic systems would help to round out the affected environment descriptions presented in the WM PEIS, additional details for the 17 major sites evaluated would have added significantly to the size of the document. DOE determined that it would be adequate to include this information the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. For additional detailed information on the Hanford Site, consult the Tank Waste Remediation System, Hanford Site Final EIS, 1996, and the Hanford Remedial Action EIS.

Comment (3077)
WM PEIS discussions of land-use impacts (Sections 6.11, 7.11, 8.11, 9.11, and 10.11) should include tables that list the suitable acreage for each site, especially since the data tables do not contain this information.

Response
Table 4.3-4 in Volume I identifies the land available for waste management facilities at the DOE sites. To keep the PEIS to a manageable length, these data are not reproduced in each impact chapter.

Comment (3115)
The numbers in Table C.4-19 are misleading because (1) it is not clear whether the wastewater capacity shown is for sanitary or process wastewater; (2) it is not clear how these numbers were obtained; and (3) for most of the Hanford Site, the capacity for sanitary wastewater is much less than the current demand.

Response
All data contained in Volume III, Section C.4.9.3, represent baseline onsite infrastructure capacities and current use only. For wastewater capacity and current use, the data presented include sanitary wastewater only. No process wastewaters are included. DOE added a note to Volume III, Table C.4-20, to clarify that the data pertains to sanitary wastewater only.

The data in Table C.4-20 are generally contained in the WM PEIS affected environment report (DOE, 1995). The data in the technical report were obtained from numerous sources, which are identified in the technical report. The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

The data obtained for Hanford indicate that current use is less than the available sanitary wastewater treatment capacity (see Table C.4-20).

4.1 Environmental Resources and Conditions

Comment (3116)
The description of Native American Resources in Section C.4.10.1.2 seems applicable to all of the Hanford Site, based on reserved rights with local tribes under the Treaty of 1855.

Response
DOE agrees that the language in Section C.4.10.1.2 would appear to indicate that all of the Hanford Site can be considered "Native American Resources," if literally interpreted. This was not the intent and DOE has modified the language to more accurately reflect the law and DOE policy.

DOE recognizes that American Tribal Governments have a special government-to-government relationship with the U.S. Government as defined by history, treaties, statutes, court decisions, and the U.S. Constitution. Although the U.S. Department of the Interior, through the Bureau of Indian Affairs, has the principal responsibility for upholding obligations of the Federal Government to Native Americans, the responsibility extends to all Federal agencies. As stated in the revised Section 1.4.5 in Volume I, and consistent with DOE American Indian Policy, at each DOE site with areas of cultural or religious concern to them, Native Americans will be consulted about the potential impacts of proposed DOE actions on these resources.

Comment (3117)
In Section C.4.10.2, it is not clear whether a "historic property" would include the Hanford B-Reactor and whether its preservation would be balanced against use of other Hanford lands more culturally important to Native American tribes.

Response
The identification of the Hanford B Reactor as a cultural resource is a function of its status as having been designated for listing on the National Register of Historic Places. As a result, it comes under the protection of Section 106 of the National Historic Preservation Act of 1966 and must be considered in the WM PEIS analysis for any potential adverse impact by the proposed actions. The determination that a given site meets eligibility criteria for listing on the National Register of Historic Places is an action independent of the PEIS and, therefore, outside the scope of this analysis.

For purposes of the PEIS description of cultural resources, a National Register of Historic Places property is presented without placing any other value on the quality of the property. Therefore, no effort is made to determine if one site is more or less valuable or deserving of protection. DOE is required to consider all such properties as equally subject to protection under the law.

Comment (3120)
Chapter 4 contains sparse information, which leads to the "unknowns" mentioned in Section C.4.10.3.

Response
The "unknowns" mentioned in Volume III, C.4.10.3, refer to two aspects of cultural resources assessment. First, the locations of waste management activities at individual sites have not been identified. Second, the survey status at different sites varies; few sites have undergone sitewide systematic surveys and, as a result, all cultural resources have not been identified. The level of detail provided in Chapter 4 does not lead to these unknowns, these unknowns lead to the level of information provided in Chapter 4.

4.1 Environmental Resources and Conditions

To keep the WM PEIS to a manageable size, DOE elected to provide summary descriptions of the sites' affected environments in Chapter 4 in Volume I, and present the detailed descriptions of the affected environments in a technical report. References to the technical report are included in Chapter 4 in Volume I and Appendix C in Volume III, and a reference to the report was added to the text in Section C.4.10.3 in Appendix C. The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3153)
The WM PEIS uses obsolete or inaccurate data for various DOE sites, including Pantex. For example, the document contains no analysis of the emissions from the Burning Grounds and more than 100 other emissions points that are identified in the Pantex Resource Conservation and Recovery Act (RCRA) permit but do not have ongoing air monitoring. Therefore, statements about specific air emissions cannot be supported.

Response
As described in Section 5.4.2 in Volume I, the WM PEIS examines impacts to air quality from the incremental addition of waste management emissions. These waste management emissions are evaluated to determine if they would have major adverse impacts to existing air quality in the air quality control region. The impacts of non-waste management activities are outside the scope of the WM PEIS.

Existing facility emissions are considered as impacts of existing operations in the cumulative impacts section (Chapter 11 in Volume I). Additional details of the impacts of these site-specific activities are included in sitewide EISs that have been prepared for many DOE sites, including Pantex.

Section 4.4.11 in Volume I and Section 2.10 in Volume II of the WM PEIS Affected Environment Technical Report contain an overview of the more pertinent facts characterizing the affected environment for Pantex. The WM PEIS Affected Environment Technical Report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. Sitewide and project-level NEPA analyses can more fully consider site-specific air quality conditions and impacts.

Comment (3196)
Seismic risks at Hanford are mischaracterized. Contrary to Section 4.4.4, all of Eastern Washington is regulated as a Seismic Zone 2B, not 1. Also in Section 4.3.4, Hanford is in a Seismic Zone 2B, not Zone 1. This section states that the accident scenarios were based in part on the seismic rating of the sites. These need to be recalculated for Hanford. Additionally, there are many surface features that align from the west-northwest to the east-southeast across the site. These surface features coincide with a broad band of small earthquake activity stretching from Puget Sound to the INEL site. These features and earthquake activity suggest possible unidentified faults throughout the region. It is therefore difficult to be sure that a fault does not exist within 200 feet of any proposed facility. These features and earthquake activity should be assessed and incorporated into the accident and risk assessments. Also, the Uniform Building Code requires the use of a 1.5 importance factor for construction of facilities such as those considered in the WM PEIS.

Response
The reference to Seismic Zone 1 for Hanford was removed from the Final WM PEIS, since this information is not consistent with the detail presented for the other sites. Section 4.4.4 in Volume I of the WM PEIS was changed to indicate that the seismicity of the Columbia Plateau is relatively low,

4.1 Environmental Resources and Conditions

although shallow, low-intensity earthquakes occur throughout the Hanford Site area. Nevertheless, the seismic zone designation of any of the DOE sites did not factor into the accident analysis. An assumption of the analysis was that the probability of failure due to earthquakes was the same across all DOE sites, and that facility engineering would ensure that this was the case because more robust construction would be required at the more earthquake prone sites.

The information in Section 4.4.4 summarizes the detailed information presented in the WM PEIS Affected Environment Technical Report. The report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. With respect to unidentified faults, Section 2.2.1.1 of the technical report describes existing known faults within the Hanford area and seismic history of the Columbia Plateau. DOE knows of no capable faults within 200 feet of the Hanford Site 200 Areas where waste management facilities would most likely be sited.

If DOE selected Hanford for a new waste management treatment, storage, or disposal facility as a result of the WM PEIS analysis, the specific design basis and exact locations of the waste management facilities would be identified; reviews would consider potential earthquake impacts. DOE would design, construct, operate, and maintain waste management facilities in accordance with appropriate local seismic standards. The Uniform Building Code importance factor would be considered in design of waste management facilities at all DOE sites, including Hanford.

Comment (3199)
The WM PEIS does not adequately consider site-specific environmental factors. Since it will be used in the decisionmaking process to identify preferred strategies and sites for waste management, the WM PEIS should include all applicable site-specific environmental factors in the analysis.

Response
Due to its programmatic nature, the WM PEIS does not include project-level analyses. Rather, the WM PEIS analysis is generic in character to allow for meaningful comparison of potential programmatic alternatives. However, before DOE selects locations for waste management facilities on sites, it will consider the results of project-level NEPA reviews.

Comment (3200)
Volume I, Section 4.3.5. In addition to species listed or under consideration for listing as rare, threatened, or endangered by the State and Federal governments, The Nature Conservancy recently completed one phase of an ecologic assessment of the Hanford Site. They identified several species of plants and animals that were previously unknown. Their analysis focused along the river. DOE canceled planned surveys of the rest of the site. These should be reinstated, with priority given to the shrub steppe habitat on the Central Plateau. This is needed before site selections are considered.

Response
Section 2.2.4 of the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final WM PEIS, contains a detailed description of the ecological resources of the Hanford Site. Summary information for the Hanford Site is presented in Section 4.4.4 in Volume I of the WM PEIS.

While DOE intends to use the WM PEIS as a tool to help select sites for waste management activities, DOE will not select specific locations for waste management facilities at sites based on this PEIS.

Specific locations will be selected based on sitewide or project-level NEPA reviews, which would consider impacts to sensitive species or habitats at particular locations on sites.

The commentor's request to reinstate the survey has been forwarded to the DOE Richland Operations Office.

Comment (3204)
Volume I, Section 4.3.11: Cultural resources also include all of the lands obligated under Tribal Treaty restrictions. The American Indian Religious Freedom Act and the Native American Graves Protection and Repatriation Act might also apply.

Response
Section 1.4.1 in Volume I identifies several applicable laws and regulations, including the American Indian Religious Freedom Act and the Native American Graves Protection and Repatriation Act. A more detailed definition of the elements included in the term "cultural resources" is provided in Section 5.4.10. DOE revised Section 4.3.11 to include a cross-reference to the more detailed discussion in Section 5.4.10.

Comment (3265)
Section 4.4.13 gives Rocky Flats Environmental Technology Site (RFETS) wind speed and direction information from Stapleton International Airport in Denver, rather than from the Rocky Flats site. The prevailing winds at Stapleton International Airport are in a pattern opposite to that which exists at RFETS. Please describe the impact of this mistake on the analysis of alternatives related to RFETS.

Response
National Weather Service wind rose data, including data collected at Stapleton International Airport, was utilized only to obtain descriptive data in a consistent format for all sites. The wind rose data are presented in the WM PEIS Affected Environment Technical Report and summarized in Chapter 4 in Volume I of the WM PEIS. However, these data were not used in the impacts analysis. The impacts analysis used wind direction data obtained from meteorological towers at the sites.

Comment (3269)
The NTS region of influence should be expanded to include all of Clark County, Nevada, where significant impacts could occur. All potential impacts addressed in the WM PEIS are confined to a 50-mile radius around the potential waste management facilities at NTS, which eliminates major population, resort, commercial, and transportation centers that could be affected by implementation of the waste management alternatives.

Response
As presented in Table 4.2-1 in Volume I of the WM PEIS, general regions of influence for 13 environmental resources considered in this document often vary by resource. Not all regions of influence are confined to a 50-mile radius around the potential waste management facilities. For example, the socioeconomic region of influence includes the site, the counties that contain the site or a part of the site, and counties in the area where 90% of the site employees reside. Thus, all of Clark County is in the NTS socioeconomic region of influence. The air quality analysis also considers impacts to Clark County.

4.1 Environmental Resources and Conditions

Comment (3374)

The region of influence (ROI) for PGDP is not accurate. It actually includes these additional counties: Lyon, Livingston, Crittendon, Caldwell, Trigg, Calloway, Fulton, Hickman, and parts of other counties to the northeast in Kentucky; Pope, Hardin, Gallatin, Saline, Williamson, Union, Johnson, Alexander, and Pulaski in Illinois. There are also counties in Tennessee and southeastern Missouri within the ROI. "It appears DOE is deliberately trying to fool the public into thinking the affected environment is less than it really is...The failure of DOE to accurately describe the ROI indicates a foundational failure to properly analyze the impacts of the proposal."

Response

As described in Volume I, Section 4.2.2, of the WM PEIS, the area encompassed by an ROI varies by site according to the potentially affected environmental resource area. For example, the ROI for air quality extends a considerable distance from the site boundary, while the ROI for cultural resources consists primarily of the onsite area that might be disturbed by implementation of the proposed action. The ROI cited in the comment as inaccurate appears to be the ROI for socioeconomic conditions, which is defined to include the site, counties that contain the site or part of the site, and counties in which 90% of site employees reside. In contrast, the ROI for human health risk at PGDP includes the site and nearby offsite area (within 50 miles from the center of the site) where worker and general public exposure is likely. According to the definition of ROI for socioeconomic conditions, the counties included in the WM PEIS for the PGDP ROI are accurate.

Comment (3375)

Within the PGDP region of influence, there is wide variety of agricultural activities. There are vegetable farms, cattle, swine, chickens, orchards, and row crops all very near to PGDP. There are processing facilities for just about all of these agricultural products, and significant amounts are locally marketed at various times of the year. This is not mentioned or analyzed at all.

Response

A more detailed description of PGDP regional and site land uses is provided in Section 2.11.5.5 of the WM PEIS Affected Environment Technical Report. This report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

As described in Section D.2.4.1 in Volume III of the PEIS, health risk analysis does include evaluation of an agricultural exposure pathway for offsite population receptors. This pathway results from releases of radionuclide and chemical contaminants to the atmosphere from waste management treatment and storage facilities. Airborne contaminants are assumed to be deposited onto surface soils, where they are taken up by plants. The plants are consumed by the local population, and are fed to livestock, which is also consumed by the local population. Offsite population receptors, therefore, are assumed to be exposed to contaminants released from treatment and storage facilities through inhalation of airborne contaminants, as well as by ingestion of contaminated locally produced plants and livestock.

Comment (3379)

DOE should look carefully at the PGDP region of influence in Missouri. There may very well be wild and scenic rivers within that area. Also, there are five candidate wild and scenic rivers, at least four of which are within the region of influence in Illinois.

Response
Section 4.2.2 in Volume I states that the region of influence for water resources includes surface water bodies within the site's boundaries and adjacent surface water bodies that could be affected by site activities. DOE considers surface water bodies in Missouri and Illinois (except for the Ohio River) to be outside the PGDP region of influence.

Comment (3398)
Southern Illinois, western Kentucky, and southeastern Missouri all contain some of the most ecologically significant areas in the Midwest. This needs to be acknowledged and considered in the WM PEIS. An internationally significant wetland area, the Cache River area in southern Illinois, is not only within the PGDP region of influence (ROI), but very near the site. This is certainly an area of ecological concern. There are at least five Congressionally designated wilderness areas in southern Illinois within the ROI in the Shawnee National Forest, and more than likely wilderness areas in the ROI in Missouri. These areas, as well as other designated natural areas, are locations of numerous State-listed threatened and endangered species in Illinois and Missouri. What about The Land Between the Lakes? This area is certainly ecologically important, and is the location of the gray bat, a Federally listed species not mentioned in the affected environment description. The Land Between the Lakes is within the ROI and not that far from PGDP. It provides habitat for many species that have no other such habitat in western Kentucky. For example, Price's Groundnut, a Federally listed endangered plant species occurs in The Land Between the Lakes. There are sites for Mead's milkweed within the ROI in southern Illinois. Mead's milkweed is a Federally listed endangered plant species. There is habitat for the peregrine falcon, another Federally listed species, in the ROI. The information in the WM PEIS concerning this issue is incomplete.

Response
As stated in Section 4.2.2 in Volume I, the area encompassed by the ROI varies by site according to the potentially affected environmental resource area. For example, the ROI for air quality extends a considerable distance from the site boundary, while the ROI for cultural resources consists primarily of the onsite area that might be disturbed by facility development of the proposed action. The ROI for ecological resources includes the site and adjacent areas where sensitive habitats or sensitive species could be affected by the proposed action and, in particular, could be exposed to contaminants from waste management activities through one or more pathways. DOE considers most areas in Missouri and Illinois to be outside the PGDP ecological resources ROI and, therefore, has not included them in the site descriptions.

The Cache River in southern Illinois flows west and then south to its confluence with the Ohio River near Cairo, Illinois. At its closest point to PGDP, it is about 10 miles away, and at its confluence, about 15 miles away. The confluence of the Cache and the Ohio Rivers is downstream from PGDP; however, it is sufficiently distant via the surface water pathway that significant dilution of any pollutants would occur in the Ohio River. Where the Cache River is closest to PGDP, it is not in the direction of prevailing winds.

The Shawnee National Forest is quite large. Its closest part is approximately 10 miles from PGDP and its farthest part is about 100 miles. Most of the Shawnee National Forest is more than 25 miles from PGDP, with no water pathway between it and PGDP. Because of the absence of a water pathway and the Shawnee being distant from PGDP via the air pathway, it is not in the PGDP ecological resources ROI.

4.1 Environmental Resources and Conditions

The Land Between the Lakes is 30 miles from PGDP, is upwind when the prevailing winds blow, and is upstream from any surface-water connection. In the PGDP Annual Environmental Reports, exposure of deer in The Land Between the Lakes is considered to be a background standard. DOE does not consider The Land Between the Lakes part of the PGDP ROI for ecological resources. As stated in Table 4.2-1 in Volume I, Section 4.2.2, of the Final WM PEIS, the ROI for ecological resources includes the site, adjacent resource areas, and the transportation corridors between the sites.

Comment (3399)
NEPA requires that the public be fully informed of the proposed actions and that the agency fully disclose the impacts. This cannot be done if the affected environment is not sufficiently or accurately described.

Response
DOE believes that the affected environments at the sites are adequately described in the WM PEIS and has fully disclosed the potential impacts of the waste management alternatives. The affected environment descriptions in Chapter 4 in Volume I provide a brief summary of environmental conditions at the sites. The WM PEIS affected environmental technical report contains more detailed descriptions of the sites. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3400)
As to the figures in Table 4.3-6 and Table 4.3-7, it is obvious from adding and subtracting the various figures from the three facilities shipping by rail that PGDP is shipping to Portsmouth, and that ORR and Portsmouth are shipping back to PGDP. In Volume I, Table 4.3-7, "Rail Shipments During Fiscal Year 1993," Portsmouth and PGDP received 117 and 106 incoming rail shipments of radioactive materials, respectively. Other listed major sites received none. From the same chart, Portsmouth and PGDP had 98 and 117 rail shipments, respectively. Where were these shipments sent? No other sites report incoming rail shipments. Were these shipments sent back and forth between PGDP and Portsmouth exclusively? What is the material that is being shipped to PGDP from ORR and Portsmouth? If this is waste, it might represent further evidence that DOE is implementing a decision regarding waste movement prior to completion of the WM PEIS. What materials are being shipped out of PGDP, either by truck or rail? The amount going in is much greater than the amount going out.

Response
Shipments coming into PGDP are uranium hexafluoride; those going out are enriched uranium hexafluoride. Neither of these materials is considered waste. The data provided in Table 4.3-6 and Table 4.3-7 are for the purposes of establishing a transportation baseline for the current rail and truck shipments to and from DOE sites. Source data are derived from the 1993 Shipment Mobility/Accountability Collection and the Waste Manifest System FY 1993. Data are presented for each site without reference to source or destination of shipments. This database includes all radioactive materials shipments, not just waste shipments. The database does not specifically characterize the components that make up the site shipments beyond a division into radioactive and other hazardous materials categories. Because the table is intended as a summary of transportation-related activity in general, it is not useful as a source for waste volume, or other materials volume information.

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Comment (3404)
The New Madrid fault is perhaps the most dangerous earthquake fault in the Nation. Scientists predict a 90% chance of a major earthquake in the New Madrid fault within 10 to 20 years. PGDP is on the edge of the highest intensity zone for a New Madrid event, and is possibly located in liquefaction soils. This is the worst possible place for a long-term nuclear storage and treatment facility. An earthquake could cause a release of radiation. The consequences from pollution by stored nuclear waste will be catastrophic.

Response
As described in Section 2.9.2 of the WM PEIS Affected Environment Technical Report, PGDP is near the northeastern end of the New Madrid fault zone. Within a 322-kilometer (200-mile) radius, six additional fault zones have been recognized, including the Rough Creek, Saint Genevieve, Cottage Grove, Shawnetown, Wabash Valley, and Illinois-Kentucky Mineral District. There is no evidence to support faulting of post-Paleocene surface strata in the PGDP region of influence; however, faults found in the Paleocene strata have been proposed to be capable. A capable fault (active fault) is one that has had movement at or near the ground surface at least once within the past 35,000 years or movement of a recurring nature within the last 500,000 years.

Section 2.9.2 also states that the site is near two active seismic zones--the New Madrid fault zone is located immediately to the south-southwest and the Wabash Valley fault zone is located immediately northeast. The largest earthquake in the region occurred in 1812 and was centered in the New Madrid fault zone. The earthquake had a magnitude of 7.3 on the Richter scale, with an epicenter 96 kilometers (60 miles) southwest of the site. The intensity of the earthquake in the region near PGDP was estimated to be Modified Mercalli Intensity X. An earthquake of this magnitude destroys most masonry and frame structures; destroys some well-built wooden structures and bridges; causes serious damage to dams, dikes, and embankments; and causes slope failures. An earthquake with a maximum horizontal acceleration of 0.45g has an annual probability of occurrence of 1 in 1,000 at PGDP.

Accidents initiated by earthquakes at treatment facilities were included in the WM PEIS, assuming generic facility characteristics, and were shown to produce minimal risks at PGDP. See Sections 6.4.3 and 7.4.3 in Volume I for analysis results. Additional information on accident scenarios and health risks from accidents initiated by earthquakes is provided in Appendix F (Volume IV) and Appendix D (Volume III), respectively.

Any waste management facility constructed at PGDP would be built to conform to Federal criteria that take into account the higher seismic risk at PGDP relative to some of DOE's other sites.

Comment (3544)
The Hanford ecological resources description should state that there are 24 (as opposed to 10) major plant communities on the site.

Response
DOE revised Volume I, Section 4.4.4, to indicate that there are 24 major plant communities on the Hanford Site.

4.1 Environmental Resources and Conditions

Comment (3727)
The public is concerned about the apparent disproportionate number of cancer deaths and the high incidence of pediatric cancer in DuPage County, Illinois.

Response
The WM PEIS health risk analysis estimates that there would be no significant health impacts in the offsite population surrounding ANL-E resulting from the proposed waste management actions. The analysis addresses only the potential future incremental risk of new waste management actions. This risk would be additive to the baseline cancer risk in the region, some of which might be related to past and current ANL-E actions. The WM PEIS does not attempt to characterize the existing baseline health risk through the use of regional epidemiological or health statistics information.

At the public hearing held at ANL-E on January 24, 1996, Dr. Holly Howe, Chief of the Epidemiology Department of the Illinois Department of Public Health was asked by DOE to speak about the results of a recent local cancer study. The residents of Lemont, Illinois, requested that the Illinois Department of Public Health initiate a study of the pediatric cancer incidence. The Division of Epidemiologic Studies performed a study based on hospital reports found in the Illinois State Cancer Registry for the years 1986 through 1993. Seventeen cases of childhood cancer were observed in the study area, while 13 cases were expected; this difference was determined in the study to be not statistically significant. The most frequently reported childhood cancer type was leukemia, with six cases observed and three cases expected; this difference also is not statistically significant (Illinois Department of Public Health, 1995).

Comment (3754)
In one place the WM PEIS indicates that the size of ANL-E is 266 square miles. In another, it says 1,700 acres.

Response
The most recent survey of the ANL-E site shows an area of approximately 1,500 acres, which is the size identified in Section 4.4.1 in Volume I of the WM PEIS. Table 4.3-4 in Volume I of the PEIS has been revised to show the correct size of ANL-E.

Comment (3763)
DOE needs to include the groundwater flow direction for ANL-E in the PEIS.

Response
Section 4.4.1 in Volume I is a summary of information contained in a technical report. More detailed information is contained in Section 2.14.2.2 of the WM PEIS Affected Environment Technical Report, which states that at ANL-E, water flows through the upper aquifer (Niagara and the Alexandria dolomite aquifer) in a southern direction. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3949)
DOE assumes that sites where cultural resource studies have not been done have no cultural resources. DOE cannot assume that no cultural resources exist until cultural resources studies have been conducted, with appropriate input from the public and directly affected populations.

Response
Although the WM PEIS could not evaluate cultural resources impacts in detail, it does identify the sites with known cultural resources based on the extent to which each site has already been surveyed for those resources. This analysis does not, however, contain any assumption with respect to the presence or absence of resources from the areas that have not been surveyed. Information on the status of cultural resources surveys and registered cultural resources at the sites was compiled from environmental reports provided by the sites. Details of status, listings, and sources are provided in the WM PEIS Affected Environment Technical Report (available in the DOE reading rooms listed in Volume I, Section 1.9, of the Final PEIS).

Volume I, Table 4.3-8, lists the 17 major sites considered in the PEIS and the extent to which these sites have been surveyed for cultural resources. DOE revised the table and its related text to emphasize the percentage of each site's total area that has not been inventoried for resources.

Based on the WM PEIS land-use analysis, which indicates that only a small fraction of available land would be required for waste management facilities, DOE believes it will have sufficient flexibility in locating waste management facilities to be able to avoid or mitigate cultural resources impacts. Sitewide or project-level analyses would include a more detailed examination of existing and newly identified cultural resources at the sites. Before beginning construction of any new facilities, sites are required to conduct specific cultural resources surveys of any potentially affected land.

Comment (3950)
Great Serpent Mound in Adams County of Ohio is a sacred site to many Native American peoples. It is not identified in DOE's WM PEIS as a cultural resource, even though it qualifies by agency standards as a site eligible for inclusion as a national landmark.

Response
The affected environment for the assessment of cultural resources includes the total area within the site boundary and the areas near the site that might experience some physical effect associated with site actions. (See Volume I, Table 4.2-1.) The Great Serpent Mound and the entire area of Adams County are outside this defined region for the FEMP and the Portsmouth Plant. Therefore, although the Great Serpent Mound is a major cultural resource, it is not included in the cultural resources analysis for the WM PEIS.

Comment (3960)
Cultural resources inside or outside the property boundaries must first be identified by a credible cultural resource study. No such study exists for Portsmouth, although a study is presently being funded by Meade Paper, Lockheed-Martin, Dow Chemical, and Ashland Oil for the Ohio River Corridor.

Response
Cultural resources impacts are not directly evaluated in the WM PEIS because the specific locations for proposed waste management facilities are not identified. However, the analysis performed indicates that sufficient land is available at sites to locate waste management facilities to avoid adverse impacts to cultural resources. A site cultural resources survey would be required prior to any final siting decision and the start of any new construction.

4.1 Environmental Resources and Conditions

The PEIS recognizes the importance of a credible cultural resources survey in determining the nature and extent of potential impacts at individual sites. The status of cultural resources surveys at each of the 17 major sites considered in the PEIS is presented in Table 4.3-8 in Volume I of the WM PEIS. As noted in the table, no cultural resources survey has been conducted for the Portsmouth Plant.

Comment (3961)
Volume I, Section 4.3.2: What criteria were used to determine which "large sites" receive air quality monitoring of a radius of only 6.2 miles and which receive air quality monitoring of a radius of 50 miles?

Response
Section 4.3.2 of the Draft WM PEIS describes how monitoring data for the WM PEIS were collected. How and where air quality monitoring stations are established is outside the scope of the WM PEIS.

In accordance with EPA-recommended modeling techniques, the region of influence includes a circular area with a radius of at least 6.2 miles. For some large sites, a radius of as much as 50 miles was considered, to include information on the existing air quality environment from monitoring stations located on the site, or as close to the site as possible. Section 4.3.2 in Volume I of the Final WM PEIS was revised to clarify the air quality region of influence concept.

Comment (3972)
Table 4-8 identifies 4,003 acres of Federal land at the Portsmouth Plant, with 3,203 available for waste management facilities. Do these figures include lands now in use and/or under United States Enrichment Corporation management? Does privatization transfer ownership of the Portsmouth Plant lands to USEC and, thereby, impact lands available for DOE waste management uses? Do the 3,203 acres identified as available for waste management activities include the two solid waste management units currently under U.S. EPA and Ohio EPA remediation activities?

Response
The data presented for the Portsmouth Plant in Table 4.3-4 (formerly Table 4-8) (Volume I) include the total site acreage and the acreage available for waste management facilities. The total acreage includes land under USEC management.

A "privatized" facility is considered (only for the purposes of the WM PEIS analysis) to be a former DOE facility (typically located on a DOE site) that is operated, maintained, and eventually decontaminated and decommissioned by a private entity. Under this definition, the transfer of ownership from DOE to USEC would constitute privatization. However, should USEC operate as a private entity, it would operate for the exclusive use of DOE. This would include the construction and subsequent operation of any new waste management facilities. Therefore, lands available for DOE wastes management uses at the Portsmouth Plant would not be affected by privatization. Currently, the facilities at the Portsmouth Plant are leased to USEC to conduct ongoing enrichment operations as provided in the Energy Policy Act of 1992. The USEC Privatization Act provides that this lease be transferred to the privatized corporation and that it have an exclusive option to extend this lease. DOE remains the owner of the Portsmouth Plant. This lease agreement between DOE and USEC does not limit any of DOE's options for waste management or environmental restoration. Further explanation of privatization and how it relates to the WM PEIS can be found in Section 1.7.4 in Volume I of the PEIS.

The 3,203 acres excludes the land leased to the United States Enrichment Corporation in the developed core area, but includes all lands outside the core area, including a number of areas being investigated for suspected contamination.

Comment (3977)
In Volume I, Section 4.3.9, please clarify whether the Breeder Reactor at the Portsmouth Plant is used for onsite operational needs or whether it is a backup source of power. What does DOE list as the major provider of electrical service to the Portsmouth Plant? Could the Tennessee Valley Authority be the major provider? I feel this is a significant question for DOE response given the considerable use of electricity by the Portsmouth Plant (roughly the equivalent of the City of Los Angeles) and the probable transfer of the Tennessee Valley Authority's vast resources and power-generating facilities to the private sector. The Ohio Valley Electric Corporation is listed as supplying electrical power, current site load of 1,537 megawatts requiring 4,500 tons of coal per month. Could DOE please clarify and explain where power for this site is generated and how? Table 4-9 lists total capacity power at the Portsmouth Plant as 1,929 megawatts. Is this from onsite generation of electric power?

Response
Issues surrounding the future source of the power for the Portsmouth Plant are outside the scope of the WM PEIS, but can be addressed by local DOE officials as part of site planning. As indicated in Section 2.11.6 of the WM PEIS Affected Environment Technical Report (available in the DOE reading rooms listed in Volume I, Section 1.9, of the Final WM PEIS), electric power to the Portsmouth Plant is currently provided by the Ohio Valley Electric Corporation using a coal-fired system. As the commentor has noted, the current site load of 1,537 megawatts is well within the current site capacity of 1,929 megawatts.

4.2 Existing Contamination/Historic Releases/Past DOE Practices

Comment (395)
At Hanford, the Columbia Reach and the native shrub-type habitat must be protected from degradation as a result of waste management actions. Existing groundwater contamination plumes under the Hanford Site are already reaching the Columbia river. We cannot afford further sacrifices at Hanford or to the surrounding natural environment.

Response
About 6 percent of the Hanford Site has been used for defense production and waste management purposes. Because much of the Hanford Site has been undisturbed for nearly 50 years, the Site contains one of the largest remaining relatively undisturbed shrub-steppe habitat areas in Washington State. Shrub-steppe habitat is vegetation that flourishes on arid lands in areas with extreme temperature ranges. Shrub-steppe is considered a priority habitat by Washington State because of its importance to sensitive wildlife. About one-half of the land located on the Hanford Site has been designated as an ecological study area or wildlife refuge. These areas include the Fitzner Eberhardt Arid Lands Ecology Reserve located south and west of the 200 Areas and areas north of the Columbia River.

Much of the defense production activity occurred in the 200 Areas and, therefore, much of the land in the 200 Areas is disturbed. The 200 Areas also are the location of large low-level waste burial grounds. The 200 Areas and the surrounding Central Plateau have been identified as potential exclusive-use waste management areas to support the Hanford Site's waste management and environmental restoration programs. Because of past disturbances in the 200 Areas, the shrub-steppe habitat, wildlife typically found in the shrub-steppe habitat, and archaeological sites are limited.

Based on projected land requirements, DOE analyzed the potential for proposed waste management activities to affect sensitive habitats and species. The analysis indicated that the land required for the construction of waste management facilities would be a small fraction of available nonsensitive lands, which would enable DOE to avoid direct impacts to sensitive lands. Further, DOE would have enough flexibility in locating facilities on sites to avoid indirect impacts, such as those that could result from building access roads.

DOE has not included environmental restoration in the scope of this PEIS. The Hanford Remedial Action EIS and Comprehensive Land Use Plan are addressing issues of environmental restoration.

Comment (451)
DOE is allowing BNL to destroy the Carmans River by dumping gallons of contaminated wastewater.

Response
DOE is unaware of any such dumping of contaminated wastewater into the Carmans River. BNL has five National Pollutant Discharge Elimination System (NPDES) permitted outfalls to recharge basins, and one NPDES permitted outfall to the Peconic River. Wastewater is discharged at an average rate of 3.8 million liters (1.0 million gallons) per day *(Brookhaven National Laboratory 1993 Technical Site Information Document)*. Permit compliance for all NPDES outfalls was 99.9% percent in 1991. Discharges to the Peconic River met all radioactive discharge limits. Only iron, pH, and 1,1,1-trichloroethane exceeded permit limits on limited occasions (Brookhaven National Laboratory, *Site Environmental Report for Calendar Year 1991* [BNL-52347]).

4.2 Existing Contamination/Historic Releases/Past DOE Practices

In addition to NPDES outfall monitoring, the Peconic River is monitored for radioactive and nonradioactive parameters at three onsite and four offsite locations. In addition, the Carmans River is sampled as a background location. In 1991, all radionuclide concentrations were within applicable limits and did not exceed 10 percent of the State and Federal Drinking Water Standards. All nonradioactive analyses were consistent with the offsite control location and with historical data except for toluene, 1,1,1-trichloroethane, and xylene. In 5 out of 100 samples, 1,1,1-trichloroethane was present at concentrations ranging from 3 to 6 micrograms per liter. The exceedances for toluene and xylene concentrations just above the analytical detection limit of 3 micrograms per liter occurred once at a sampling point 25 kilometers (16 miles) downstream from the sewage treatment plant discharge. This occurrence is probably associated with a non-BNL source. Table 2.15-3 in Volume I of the WM PEIS summarizes results of surface water quality monitoring for 1991 (Brookhaven National Laboratory, *Site Environmental Report for Calendar Year 1991* [BNL-52347]). The maximum concentration of trichloroethylene was above its comparison criteria at least once in 1991. Any information relating to the allegation that the Carmans River is being contaminated by BNL should be forwarded to DOE. The commentor is also welcome to attend any of the DOE-sponsored public forums at BNL to express concerns. BNL is in the process of helping the community establish a community forum. This group will be open to the public and will provide an opportunity for people to voice their concerns and issues regarding BNL.

Comment (483)
What, if any, studies have been conducted to assure those of us who live near LLNL that we are safe from radioactive contamination? The WM PEIS must include a complete report on the full impacts to the Livermore community.

Response
The WM PEIS is a national and programmatic study to assist DOE in formulating and implementing a strategy to manage its radioactive and hazardous wastes. The PEIS includes estimates of health risks for the proposed waste management alternatives. DOE considered LLNL for management of low-level mixed waste, low-level waste, and transuranic waste, and describes the potential health risks associated with managing these wastes in Volume I, in Sections 6.4, 7.4, and 8.4, respectively. The PEIS also estimates the cumulative health risk from adding proposed waste management actions to other past, present, and reasonably foreseeable future actions and presents the cumulative impacts for LLNL in Section 11.8. If DOE selects LLNL for a new waste management operation, additional studies might be required.

The LLNL and SNL-CA Sitewide EIS prepared by DOE in 1992 contains additional detail on the health risks from radionuclides released from the sites. In addition, DOE prepares annual Site Environmental Reports that describe the results of site monitoring and summarize each site's compliance with applicable regulations. These reports also provide estimates of doses received by the public from releases of radionuclides. The EIS and annual reports are available to the public for review in the LLNL and SNL-CA public reading rooms.

Comment (1558)
The WM PEIS should include a detailed map of plutonium-239 concentrations left on the ground by the explosions at NTS.

4.2 Existing Contamination/Historic Releases/Past DOE Practices

Response
Contamination from weapons testing at NTS and the cleanup of any existing contamination are outside the scope of the WM PEIS. This information is presented in the NTS Sitewide EIS, which is discussed in Volume I, Section 1.8.1, of the WM PEIS. A copy of that EIS is available at the DOE Nevada Operations Office public reading room located at 2621 Losee Road, Building B-3, Las Vegas, Nevada.

Comment (1574)
Commentors are concerned that the recently discovered deep aquifer system at Los Alamos National Laboratory (LANL) has been contaminated by site activities. Some state that the hydrogeology of the site is not well understood and site-specific water quality impacts should be addressed in the WM PEIS.

Response
While the WM PEIS considers the potential impacts of waste storage and disposal at the programmatic level, DOE will consider site-specific control measures when it develops project-level plans for specific sites. These control measures could include modifying the design of generic disposal facilities (used in the PEIS analysis) to fit site-specific conditions; modifying waste form requirements; optimizing the location of a facility on a site; and imposing waste acceptance criteria.

Any eventual waste storage or disposal facility located at LANL would be built with sufficient containment and would be carefully monitored. Furthermore, the site would be equipped with sufficient safety and emergency response measures to minimize the potential for leaks to contaminate surface water or groundwater.

The WM PEIS Affected Environment Technical Report contains additional information on hydrogeologic conditions at LANL. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. The LANL Sitewide EIS currently in preparation will contain a more detailed description of the water contamination referred to in this comment.

Comment (1604)
A commentor stated that he is a landowner adjacent to Site 300, has experienced major health problems, and does not know if they can be attributed to Site 300 activities.

Response
The WM PEIS evaluates the potential health impacts from postulated future activities to determine the degree to which human health and the environment could be impacted and the best course of action to follow to minimize these impacts. Although the WM PEIS contains information on existing public health risk near LLNL, the Site Environmental Reports and the 1992 LLNL Sitewide EIS are the primary sources that should be consulted to obtain information relevant to determining potential health effects that might result from operations at Site 300. These reports are available in the LLNL public reading room. Local health agencies could also be consulted for possible epidemiological information on health effects.

Comment (1626)
NTS already has extensive contamination and it should be cleaned up, especially the groundwater.

Response
Environmental restoration activities are not within the scope of the WM PEIS. NTS has entered into a Federal Facility Agreement/Consent Order with the State of Nevada to characterize the groundwater and surface contamination to determine the required amount of remediation, if any.

Comment (1707)
More research needs to be done on the long-term effects of plutonium exposure on people living in communities near RFETS. For example, a study should be done on the long-term effects of the 1969 fire.

Response
The WM PEIS examines potential radiation exposure, including exposure to plutonium isotopes, to the offsite population from the implementation of the WM PEIS alternatives. In addition, the evaluation of cumulative impacts considers estimates of annual radiation doses from existing activities and other ongoing actions at the sites (see Volume I, Chapter II). A dose reconstruction study investigating historical exposure data is underway at RFETS. DOE funded this project, the final phase of which should be complete by Spring 1997.

Comment (1710)
Uranium should be listed in Volume I, Section 4.3.3, sediment section, as a sediment contaminant at ORR. Technetium should be listed in Section 4.3.3, groundwater section, as a groundwater contaminant at ORR.

Response
DOE made the requested changes in 4.3.3.

Comment (1724)
The WM PEIS should identify the 17 contaminants that exceeded comparison criteria for 1992 at ORR.

Response
Table 2.8-7 in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS, lists the following 17 groundwater contaminants that exceeded comparison criteria at ORR in 1992: 1,2 dichloroethane, 1,1-dichloroethylene, benzene, cadmium, carbon tetrachloride, chromium, cobalt-60, fluoride, gross alpha, gross beta, manganese, nitrate, pH, tetrachloroethylene, trichloroethylene, tritium, and vinyl chloride.

Comment (1780)
DOE should address containment activities at RFETS immediately, rather than waiting for a detailed study.

Response
The WM PEIS addresses the treatment and disposal of low-level mixed and low-level wastes and the treatment and storage of transuranic waste at RFETS. It does not address the containment or remediation of existing contamination at the site, which DOE will handle under its Environmental Restoration Program. Site-specific environmental analyses will address remediation of existing contamination at sites.

4.2 Existing Contamination/Historic Releases/Past DOE Practices

Comment (2101)
A commentor stated that DOE needs to take responsibility for offsite contamination in areas around the Portsmouth Plant where children play and swim. Health is being compromised by lack of communication with the public.

Response
The affected environment section in Volume I (Chapter 4), and the WM PEIS Affected Environment Technical Report (which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS) describe existing conditions at the Portsmouth Plant. These descriptions include the results of environmental monitoring of media affected by past practices.

DOE has a policy of full disclosure of information regarding releases to the environment. Each DOE site prepares annual environmental monitoring reports that provide information about releases and environmental monitoring activities. These reports are readily available to the public. The 1992 Portsmouth Plant Environmental Report states that discharges from the site appear to have no noticeable effect on radioactivity levels in the Scioto River.

Although of great concern to DOE and the Nation, cleanup of contamination caused by past practices is outside the scope of the WM PEIS.

Comment (2145)
The holding ponds overflow at the Portsmouth Plant during a rain event. DOE needs to consider that contamination is flowing into the Scioto River.

Response
Section 4.4.12 in Volume I of the WM PEIS describes existing conditions at the Portsmouth Plant. Additional information is presented in Section 2.11.2.1 of the WM PEIS Affected Environment Technical Report, which states that the Portsmouth Plant National Pollutant Discharge Elimination System (NPDES) outfalls are monitored for radioactive and nonradioactive parameters. In 1992, permit compliance for all NPDES outfalls was 99.1%.

In 1992, discharges from the Portsmouth Plant affected the receiving streams minimally and were comparable to past discharges. Little Beaver Creek was the only surface-water body that appeared to show slightly elevated radionuclide levels downstream versus upstream levels. Portsmouth Plant discharges appear to have no noticeable effect on radioactivity levels in Big Run Creek or in the Scioto River. No sediment contamination was found in the Scioto River.

The WM PEIS Affected Environment Technical Report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2192)
DOE should not use the old cooling tower at PGDP for stream stripping contaminated groundwater. It is unsafe and NEPA documentation is poor.

Response
The WM PEIS does not analyze specific waste management technologies because it will not be used to select such technologies. Moreover, the activity described in the comment would be considered an

environmental restoration activity. Environmental restoration activities are not analyzed in the WM PEIS, other than to examine the extent to which some environmental restoration waste volumes could affect the comparison among waste management alternatives (see Appendix B in Volume III). The impacts of specific environmental restoration activities will be analyzed through the RCRA or CERCLA process, or other site-specific environmental analyses.

Comment (2212)
A commentor expressed concern that Little Bayou Creek is contaminated by waste from activities carried out at PGDP.

Response
Section 4.4.10 in Volume I of the WM PEIS, and the WM PEIS Affected Environment Technical Report, which can be found in the DOE reading rooms listed in Volume I, Section 1.9, of the PEIS, describe existing conditions at PGDP. These descriptions include results of environmental monitoring of media affected by past practices.

As described in Section 2.9.2.1 of the WM PEIS Affected Environment Technical Report, in 1992, downstream sediments on Big Bayou Creek contained uranium levels 3.5 times higher than sediments from the upstream monitoring location (4.6 versus 1.3 micrograms per gram). Downstream sediments on Little Bayou Creek contained uranium levels 36 times higher than upstream sediments (107 versus 2.8 micrograms per gram). None of the locations contained levels of neptunium-237, plutonium-239, technetium-99, or thorium-230 above the detection limit. In addition, polychlorinated biphenyls were detected in Little Bayou Creek at a maximum concentration of 0.7 microgram per gram.

As described in Section 2.9.9.1 of the WM PEIS Affected Environment Technical Report, in 1992, DOE estimated a maximum multimedia radiation dose of 2.8-millirem per year from ingestion of contaminated sediment and exposure to radiation from spending one-half hour per day, every day, fishing in the most contaminated area of Little Bayou Creek. This exposure is well below the DOE 100-millirem per year standard for multimedia exposure.

Comment (2450)
The WM PEIS should state whether groundwater quality at INEL has improved or deteriorated since 1992. In 1992, elevated levels of 14 contaminants were found in site wells.

Response
DOE revised Section 4.4.5 in Volume I to state that groundwater monitoring at INEL in 1992 showed levels above comparison criteria for four contaminants at onsite wells and for only one contaminant at onsite wells in 1994.

Comment (2485)
Detailed information on the known groundwater and soil contaminants at INEL would be useful in determining the magnitude of existing problems. For example, is the plutonium soil contamination a concern for future groundwater contamination?

Also, Volume I, Section 4.3.3, lists groundwater contaminants that have been detected at INEL. This list is inconsistent with the Spent Nuclear Fuel EIS in that it fails to mention iodine-129, cobalt-60,

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cesium-137, plutonium-238, -239, and -240, americium-241, chromium, lead, mercury, chloride, sulfate, and nitrate.

Response
Section 4.3.3 in Volume I of the WM PEIS is a summary of the known water resource contamination. The list provided is not meant to be all inclusive. The detailed information requested in the comment is provided in Section 2.3.2.2 of the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. Even more detailed information on this subject is available in the technical reference documents cited in Section 2.3.2.2 of the Affected Environmental Technical Report.

Comment (2494)
Volume I, Section 4.4.5 identifies uranium recovery from highly enriched spent fuels as a major source of air pollution at INEL. This process has not been performed at INEL since sometime before the decision in April 1992 to cease fuel reprocessing in the DOE complex.

Response
The commentor is correct and DOE has deleted the incorrect statement from the WM PEIS.

Comment (2873)
Sediment contamination is also present at BNL and should be included in Volume I, Section 4.3.4. This is particularly significant due to BNL's presence over a sole-source aquifer and the presence of highly permeable soils throughout the site.

Response
DOE assumes that the commentor is referring to soils contamination described in Section 4.3.4 in Volume I of the WM PEIS and not sediment contamination described in Section 4.3.3. The list of soils contaminated provided in Section 4.3.4 in Volume I was not meant to be comprehensive. Additional information on the affected environments at the sites is provided in the WM Affected Environment Technical Report, which is available in the DOE reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. Section 2.15.1.2 of the WM PEIS Affected Environment Technical Report states that offsite soil samples are routinely analyzed for radionuclides. In 1991, no radionuclides attributable to BNL operations were detected in any of the soil samples.

Existing contamination, and the cleanup of any contaminated areas at the sites, are part of environmental restoration activities at the site, which are outside the scope of the WM PEIS. Furthermore, because waste management activities are not expected to add to existing levels of soil contamination, they are not addressed in the cumulative impacts analysis.

Comment (2911)
Volume I, Section 4.3.3, of the Draft WM PEIS stated that contamination is usually limited to onsite areas at DOE facilities. This is not the case at BNL, which has pervasively contaminated the surrounding region with a variety of compounds. Tritium is known to have contaminated surface water and groundwater at BNL. BNL is also the cause of dissolved metals occurring above State drinking water standards, both on and off the site. These omissions should be corrected.

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In addition, the statement in Volume I, Section 4.4.2, that BNL offsite concentrations do not exceed drinking water standards is incorrect. Offsite concentrations for several organic compounds and metals in plumes from contaminated areas within the site exceed drinking water standards. Some of these plumes have become the focal point of significant public concern. The nature and extent of these plumes and all exceedances should be listed.

Response
Section 4.3.3 in Volume I of the WM PEIS was revised to indicate that tritium is a groundwater contaminant at BNL. This section is a partial summary of the known water resource contamination and was not meant to be all inclusive. The WM PEIS Affected Environment Technical Report contains more detailed information on current contamination at BNL. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

In addition, DOE revised Section 4.4.2 in Volume I of the WM PEIS to state that offsite concentrations of certain contaminants at BNL *do* exceed drinking water standards. Section 4.4.2 is also a summary of information contained in the WM PEIS Affected Environment Technical Report.

Section 2.15.2.2 of the technical report states that in 1991, groundwater at BNL was monitored at 81 wells, including 17 offsite private wells, for radioactive parameters and at 71 wells for nonradioactive parameters. Some groundwater contamination has migrated off the site at concentrations exceeding New York State Drinking Water Standards. The full extent of offsite contamination is currently being evaluated under an Interagency Agreement between the New York State Department of Environmental Conservation, EPA, and DOE.

Comment (3005)
Tables 6.7-2 and 7.7-2 indicate the numbers of Federal and State endangered and threatened species at low-level mixed waste and low-level waste sites under each of the alternatives. The numbers in these tables do not coincide with the information on threatened and endangered species contained in Section 4.4 for FEMP or Portsmouth.

Response
DOE revised Section 4.4.12 in Volume I to state that one candidate species (listed as State threatened), four State endangered species, five State threatened species, four State potentially threatened species, and seven State special-interest species occur near the Portsmouth Plant. Section 4.4.3 in Volume I was also revised to reflect the correct number of threatened and endangered species at FEMP. No Federally listed threatened or endangered plant or animal species are known at FEMP. However, potential habitat exists for the Indiana bat (Federal and State endangered). Running buffalo clover, a Federally listed endangered plant species, occurs near FEMP. Seven state-listed endangered species (including the Indiana bat) and three state-listed threatened species occur or potentially occur at FEMP.

Comment (3007)
Section 4.4 (for all sites) should contain information on what contaminants exceed comparison criteria.

Response
Section 4.4 in Volume I of the WM PEIS is intended to provide a broad overview of the affected environment for the DOE sites and, therefore, does not include information on specific contaminants.

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The WM PEIS Affected Environment Technical Report listed in Volume I of the Final PEIS provides more detailed site-specific information.

As stated in Section 4.4, more precise information on site environmental parameters would be provided in site environmental monitoring reports and sitewide or project-level NEPA documents.

Comment (3039)
Table 4-5 does not include important contaminants, such as chromium and nitrates, that are major contaminants in sediments and groundwater, respectively, at Hanford.

Response
Table 4-5 in Volume I of the Draft WM PEIS lists the criteria pollutant attainment status at the 17 major sites. DOE assumes that the commentor is instead referring to the text of Section 4.3.3 on the pages adjacent to Table 4-5.

Section 4.3.3 in Volume I of the Draft WM PEIS is a partial summary of the known water resource contamination and is not meant to be comprehensive. The WM PEIS Affected Environment Technical Report contains more information on current sediment and groundwater contamination at Hanford. Section 2.2.2.2 of the technical report states that maximum concentrations of chromium nitrate and tritium in the groundwater were above their comparison criteria at least once in 1992. This document further states that tritium and nitrate groundwater contaminant plumes occur over 316 square kilometers (122 square miles) of Hanford. Other contaminants, for example, chromium cyanide, have been detected in groundwater in areas surrounding disposal sites. The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3050)
The statement in Volume I, Section 4.4.4, that four major plumes enter the Columbia River in at least three locations is an extreme simplification. The carbon tetrachloride plume, which is one of the most extensive at the Hanford Site, could enter the river in high concentrations in approximately 100 years. Thus, referencing only plumes currently entering the Columbia River minimizes potential problems stemming from waste management activities.

Response
The description of existing contamination in Section 4.4.4 in Volume I of the WM PEIS and Section 2.2.2.2 of the WM PEIS Affected Environment Technical Report (which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the WM PEIS) is provided only to give the reader background information about conditions at the site. The technical report does list carbon tetrachloride among the Hanford Site's groundwater contaminants and Section 4.3.3 in Volume I notes that solvents are known groundwater contaminants at Hanford. No attempt was made in the WM PEIS to predict future plume movement, since future remediation activities could change the extent of groundwater contamination. For more detailed information on the Hanford Site, please consult the Tank Waste Remediation System, Hanford Site Final EIS, 1996, and the Hanford Remedial Action EIS.

To the extent information is available, impacts from other programs and actions are considered in the cumulative impacts analysis in Volume I, Chapter 11, of the Final WM PEIS.

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Comment (3193)
Volume I, Chapter 4, does not identify the two major groundwater plumes that extend beyond the facility boundaries at PGDP.

Response
DOE revised Section 4.4.10 in Volume I to note that two plumes of groundwater contamination extend into an offsite area. Section 4.4.10 is a summary of information contained in Section 2.9.2.2 of the WM PEIS Affected Environment Technical Report. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3194)
See Volume I, Section 4.3.3. Known groundwater contaminants at Hanford also include uranium, iodine-129, carbon tetrachloride, chromium, cobalt-60 and nitrate.

Response
The commentor is correct about the contaminants at Hanford. Section 4.3.3 in Volume I of the WM PEIS is not intended to provide a comprehensive list of contaminants. However, the WM PEIS Affected Environment Technical Report notes that groundwater contamination at Hanford includes uranium, iodine-129, carbon tetrachloride, chromium, cobalt-60, and nitrate as known groundwater contaminants. The technical report is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final WM PEIS.

Comment (3197)
Volume I, 4.3.4: High-level, low-level, uranic, transuranic, and mixed waste were disposed of directly to the ground at Hanford. Many of the high-level waste tanks have leaked large quantities of high-level mixed and transuranic waste to the soil. Every fission product and actinide with a sufficiently long half-life to remain is present at various locations around the site.

Response
Since environmental remediation was removed from the scope of the PEIS, DOE does not focus on contamination at the sites. Environmental remediation activities are undertaken pursuant to CERCLA and the Hanford Site Tri-Party Agreement.

Volume I, Sections 4.3.3 and 4.3.4, of the WM PEIS provide a summary of known water, soil, and sediment contamination at the sites. These sections were not intended to be comprehensive listings of the contaminants. Additional information on contaminants at the Hanford Site is provided in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3225)
See Section 4.4.4. Many of the wetlands at Hanford are contaminated with radioactive materials from the operations of the reactors along the Columbia River.

Response
Cleanup actions at the DOE sites are not within the scope of the WM PEIS. However, Chapter 11 does address potential impacts from environmental restoration operations that could contribute to the overall environmental impacts resulting from DOE waste management and other activities. DOE recognizes

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and is addressing cleanup of contaminated sites, including situations such as contaminated shoreline seeps at Hanford. Section 2.2.2.1 of the WM PEIS Affected Environment Technical Report contains a detailed description of the surface water and sediment quality data for the Hanford Site, including descriptions of existing radionuclide contamination. The Affected Environment Technical Report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3403)
The WM PEIS discloses that there is a serious risk from neptunium-237 contamination at PGDP. Where did the neptunium come from? How long has it been there, and how is it being stored? Neptunium-237 is a very long-lived, toxic isotope. Has DOE been testing for neptunium-237 in the groundwater up until now?

Response
Neptunium-237 is an alpha-emitting radionuclide with a half-life of 2.2 million years. It was introduced into the enrichment cascades at PGDP in the early 1970's when reprocessed fuel was blended with other feedstocks. Some low-level waste at PGDP contains neptunium-237.

Neptunium-237 was identified in the 1992 version of the waste management information system database that provided the low-level waste site-specific waste information used in the WM PEIS. This information is presented in the WM PEIS Low-Level Waste Technical Report referenced at the end of Chapter 7 in Volume I.

As described in Section 2.9.2 of the WM PEIS Affected Environment Technical Report, analyses for neptunium-237 are routinely performed for environmental media at PGDP. However, it is not routinely detected because it is present in such low concentrations.

Comment (3531)
In the affected environment description of NTS, DOE should explain the statement, "Groundwater monitoring in 1991 indicated that eight contaminant comparison criteria were exceeded at onsite wells" and use more recent groundwater monitoring data than 1991.

Response
In general, DOE elected not to update or supplement the data in the WM PEIS with more recently published data because conditions rarely change drastically from year to year. Exceptions were made in instances where DOE determined that the updated data might affect the comparisons of alternatives. DOE believes that the water quality information provided gives an adequate characterization of the conditions at the sites, especially for a programmatic EIS that will not select locations for waste management facilities on the sites. More up-to-date site-specific information would be included in sitewide or project-level NEPA analyses.

The WM PEIS Affected Environment Technical Report contains more detailed information on environmental conditions at the sites. Section 2.7.2.2 of the report states that water supply wells at NTS are routinely monitored for radioactive and nonradioactive parameters, as required by the Safe Drinking Water Act, State of Nevada regulations, and DOE Orders. Table 2.7-4 of the report summarizes the monitoring results for 1991. Maximum concentrations of bismuth-214, gross alpha, lead-212, lead-214, nitrate, pH, plutonium-239 and -240, and total dissolved solids were above their comparison criteria at least once in 1991. The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3757)
Past waste storage and handling activities were unsafe and dangerous to the environment. In the year 2020, let us hope that we will not hear how stupid we were in the 1990s.

Response
The WM PEIS will help DOE develop a comprehensive national strategy to manage its radioactive and hazardous wastes in a safe and efficient manner. By careful study and planning of waste management at the national and site levels, DOE hopes to correct past waste management practices to ensure protection of the public, workers, and the environment in the future.

Comment (3781)
For 50 years, airborne contamination has occurred at ANL-E, and gardening and construction recirculated the contamination in the air. Air quality is currently affected by treatment of waste onsite. Inhalation of isotopes is even more risky than isotopes found in drinking water.

Response
As described in Section 4.4.1 in Volume I of the WM PEIS, in 1992 the radiation dose from airborne radionuclides to a maximally exposed individual at ANL-E was 0.0085 mrem. This is well below the 10 mrem per year National Emission Standards for Hazardous Air Pollutants limit. The collective radiological dose from airborne radionuclide emissions to the ANL-E region of influence health risk population was 16.8 person-rem.

As detailed in Section 5.4.1 in Volume I, the WM PEIS human health risk analysis assesses the atmospheric pathway (including inhalation) as a major exposure pathway for a variety of potentially exposed populations and individuals. Section 5.4.2 addresses the methodology for air quality impacts, which were assessed for the construction of new treatment, storage, and disposal facilities, for the operation and maintenance of the facilities, and for shipment of wastes between sites. For the waste management alternatives relating to ANL-E, the analysis found that human health risks and air quality impacts would be low. Sections 6.4, 6.5, 7.4, 7.5, 8.4, and 8.5 contain more detail related to these issues.

Comment (3787)
DOE needs to better inform the public about the potential for existing contamination in the area around ANL-E. Radionuclides in the Illinois River water is a problem.

Response
Additional information on surface water resources at ANL-E is presented in Section 2.14.2.1 of the WM PEIS Affected Environment Technical Report. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Approximately 0.5 miles from ANL-E, Sawmill Creek, which is joined by two ANL-E onsite streams, enters the Des Plaines River. According to 1993 monitoring data, concentrations of radionuclides in Sawmill Creek were low and only a small fraction of the DOE-derived concentration guides for water. Dilution in the Des Plaines River reduced the concentration of the measured radionuclides below their

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respective detection limits. The Illinois River is approximately 30 miles southwest of ANL-E where it is formed by the Des Plaines River and the Kankakee River. DOE is not aware of any radioactive contamination in the Illinois River.

Comment (3859)
Handling of past contamination does not instill public confidence.

Response
DOE is committed to operating its facilities in a safe and efficient manner. This includes selecting facility locations and waste management technologies that result in a minimum of health risk and environmental impact. The WM PEIS is part of the process to ensure that the potential impacts to the public and environment are accounted for when DOE makes programmatic decisions on waste management activities.

Most health risk concerns at DOE sites are from former operations that occurred when accepted waste management practices were less rigorous than those in force today. Health risks from current DOE waste management operations are generally low. DOE is committed to reducing radiation exposure to levels as low as reasonably achievable.

Comment (3876)
The people around ANL-E are familiar with waste dumping. Remember the Red Gate Woods area? Most of the radioactively contaminated wells had to be capped or disabled.

Response
Wells in the Red Gate Woods area were contaminated with tritium from dumping of radioactive waste during the late 1940s and early 1950s. These wells are now being monitored by environmental surveillance personnel at ANL-E. DOE is committed to disposing of radioactive waste in a way that is safe to humans and the environment. DOE's Order 5820.2A requires that such waste be disposed of in disposal facilities. The combination of disposal waste form and facility design must ensure that the standards of the Safe Drinking Water Act and other standards to protect human health and the environment are met.

Comment (3913)
DOE needs to explain what waste is presently onsite at ANL-E and what the plans are for this temporary storage. DOE needs to explain who is going to watch over the currently stored low-level waste.

Response
Storage, which plays a role in all waste management activities, consists of the collection and containment of waste to await treatment or disposal. DOE is responsible for its Department-wide waste, including the low-level waste at ANL-E.

The Final WM PEIS reports the following quantities of waste material at ANL-E as the current inventory: 34 cubic meters of low-level mixed waste (Table 6.1-1), 880 cubic meters of low-level waste (Table 7.1-1), and 15 cubic meters of transuranic waste (Table 8.1-1). ANL-E does not store high-level waste, and DOE did not consider the site for future high-level waste management. The PEIS does not present an inventory of hazardous waste because this waste type is stored on the site for a limited time only to accumulate sufficient quantities for treatment.

Chapters 6, 7, 8, 9, and 10 of the PEIS describe the waste management activities and siting options for each waste type. Appendix I contains newly available data on low-level waste inventories at ANL-E and DOE has incorporated these data into the analysis of alternatives in the Final PEIS.

Comment (3962)
Does uranium contamination exist in sediment offsite or onsite at PGDP and the Portsmouth Plant? The Little Beaver, Big Beaver, Big Run, and Scioto Rivers have been documented by Ohio EPA and the U.S. EPA as having contaminated sediment offsite at Portsmouth.

Response
Chapter 4 in Volume I of the WM PEIS summarizes environmental conditions at the sites. The WM PEIS Affected Environment Technical Report contains more detailed descriptions of the sites. For PGDP, Section 2.9.2.1 of the technical report states that stream sediments are routinely monitored at site locations for radioactive and nonradioactive parameters. In 1992, downstream sediments on Big Bayou Creek indicated uranium levels of 4.6 micrograms per gram. Downstream sediments on Little Bayou Creek indicated uranium levels of 107 micrograms per gram. For the Portsmouth Plant, Section 2.11.2.1 of the technical report states that stream sediments are routinely monitored for radioactive parameters at 4 onsite and 13 offsite locations. In 1992, minor sediment contamination was found in the east drainage ditch, Little Beaver Creek, and Big Beaver Creek. In addition, some contamination was found in two onsite locations in Big Run Creek. No sediment contamination was found in the Scioto River. The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3963)
Section 4.4.12 in Volume I states that groundwater monitoring at the Portsmouth Plant in 1992 showed eight parameters above comparison data. Does this mean that groundwater contamination has been documented on the site, off the site, or both?

Response
Chapter 4 in Volume I of the WM PEIS summarizes detailed descriptions of the affected environments found in the WM PEIS Affected Environment Technical Report. Section 2.11.2.2 of the WM PEIS Affected Environment Technical Report states that onsite groundwater at Portsmouth is monitored for radioactive and nonradioactive parameters and water levels at more than 245 wells. Maximum concentrations of 1,1,1-trichloroethane, 1,2-dichloroethane, 1,1-dichloroethylene, chloroform, chromium, gross alpha, gross beta, and trichloroethylene were above their comparison criteria at least once in 1992. Offsite groundwater is monitored for radioactive parameters at 11 locations. None of the results were above their comparison criteria. The WM PEIS Affected Environment Technical Report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

DOE has revised Section 4.4.12 in Volume I of the WM PEIS to state that for the Portsmouth Plant, no contaminants exceeded comparison criteria in measurements of offsite groundwater.

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Comment (4017)
DOE should add the following sites with known groundwater contaminants to Volume I, Section 4.3.8: (1) BNL, because of tritium (see Baseline Environmental Management Report, Volume II, DOE-EM-232); and (2) WVDP, because of strontium contamination (see Doc ID WVDP-220).

Response
DOE assumes that the commentor is referring to Section 4.3.3 and not 4.3.8 in Volume I of the WM PEIS.

As stated in the PEIS, the list provided in Section 4.3.3 in Volume I was not meant to be all-inclusive. Additional information on the affected environments at the sites is provided in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. Section 2.15.2.2 of the technical report states that, at BNL, the only average radionuclide concentrations that exceeded concentration limits were gross beta and strontium-90. The high radionuclide concentrations occurred onsite near the landfill areas and the hazardous waste management facility. The maximum offsite tritium concentration in drinking water wells in 1991 was 3,780 picocuries per liter compared to the 20,000 picocuries per liter drinking water standard. The information in the WM PEIS Affected Environment Technical Report was obtained from individual site data reports. Volume II of the 1995 Baseline Environmental Management Report does identify tritium in groundwater at BNL. However, this contaminant is found in specific locations in groundwater onsite at BNL, and the extent of contamination is not yet known. Moreover, some of the contamination is the result of environmental restoration activities.

In Section 4.3.3, WVDP is identified as a site that has surface water contaminated with strontium.

Comment (4019)
In Volume I, Section 4.3.4, DOE should add BNL and WVDP to the list of sites with known soil contaminants because of cesium contamination at those sites (see the Baseline Environmental Management Report, Volume II, DOE-EM-232). Known contaminants at BNL also include petroleum products, metals, solvents, and other radionuclides.

Response
The affected environment descriptions in Chapter 4 in Volume I of the WM PEIS summarize the information in technical reports. As stated in Section 4.3.4, the list provided contains examples and, therefore, was not meant to be comprehensive. Additional information on the affected environments at the sites is provided in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. Section 2.15.1.2 of the report, which pertains to BNL, states, "Offsite soil samples are routinely analyzed for radionuclides. In 1991, no radionuclides attributable to site operations were detected in any of the soil samples." Table 2.19-3 of the report lists the maximum concentrations of radionuclides in soils at WVDP, including cesium.

The WM PEIS Affected Environment Technical Report also indicates that the maximum concentration of cesium-137 in drinking water wells at BNL is significantly less than the comparison criteria of 120 picocuries per liter established by EPA in its Primary Drinking Water Regulation. WVDP does not use groundwater as a source of drinking water, and Section 2.19.2.2 of the technical report indicates that groundwater monitored at 10 offsite residential wells shows no evidence of contamination by WVDP activities.

The information in the WM PEIS Affected Environment Technical Report was obtained from individual site data reports. Volume II of the 1996 Baseline Environmental Management Report does identify cesium-137 and other contaminants in soils at BNL. However, these soils are in specific locations onsite at BNL, and the extent of contamination is not yet known. The 1996 Baseline Environmental Management Report does not indicate the presence of soil contaminated by cesium-137, nor other specific substances at WVDP.

Comment (4433)
Much radionuclide exposure data in the Draft WM PEIS was taken from the *Summary of Radionuclide Air Emissions from Department of Energy Facilities for CY 1992*, which apparently fails to cover major sources of radionuclide exposure at the sites covered in the WM PEIS. Taxpayer dollars were wasted using this source of information, especially if the summary report fails to cover radionuclide exposures as comprehensively as Site Environmental Reports. No detailed justification for basing the characterization of site impacts on the air emissions report rather than on Site Environmental Reports was given, nor was the significance of the missing information revealed.

Response
The WM PEIS Affected Environment Technical Report contains radionuclide exposure information from site Annual Environmental Reports. The report indicates that some sites have exposure data estimates for different years (1991 through 1993), for different pathways (airborne exposure and/or multimedia exposure), and different treatments of background radiation exposure, including radon. To provide some consistency among the sites, DOE used the report, *Summary of Radionuclide Air Emissions from Department of Energy Facilities for CY 1992*, which provided estimates of offsite maximally exposed individual exposures to radionuclides in 1992 for all major sites considered in the PEIS. These values are presented in Chapters 4 and 11 in Volume I and in the WM PEIS Affected Environment Technical Report. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. Because the air pathway was considered to be the only important pathway for exposures to the public, other pathways were not evaluated in the PEIS. Existing contamination that might contribute to exposures through other pathways were not included in the analysis.

Comment (4490)
Section 4.3.1 of the Draft WM PEIS should include summarized data on radon exposure from waste at DOE sites and on exposure from other pathways. As shown below, the result is a misleading characterization in the Draft PEIS of radiation and radionuclide exposure to the general public and associated human health impacts at DOE sites.

1992 RADIATION EXPOSURE TO THE MOST EXPOSED INDIVIDUAL (mrem)

Site	WM PEIS	1992 Site Environmental Report		Ratio
ANL-E	0.0085	0.34	air including radon	40
		0.41	air, ingestion, radiation	48
BNL	0.11	0.92	including fish	8.4
ETEC	-	0.0001		-
FEMP	0.0021	51	from Radon	24,000
Hanford	0.0037	0.02	from Columbia River	5.4
		0.07	per kg duck	19
INEL	0.0015	4	from max. duck	2,700
LBL	0.060	2.1	accelerator	35
LLNL	0.069 or 0.69	0.28	air, food, water	0.29 to 2.9
LANL	7.9	4.4	Accelerator only	-

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1992 RADIATION EXPOSURE TO THE MOST EXPOSED INDIVIDUAL (mrem)
(Cont'd)

Site	WM PEIS	1992 Site Environmental Report		Ratio
Middlesex	0.009	0.3	gamma radiation	33
NTS	0.012	0.007	air, milk, veg., beef liver	3.5
ORR	1.4	4 to 17	air, water, fish, rad.	2.9 to 12
Pantex	<0.0001	0.000027		-
PGDP	0.0045	3.8	food, water, sediment, rad.	840
Portsmouth	0.26	0.03		0.12 typo?
RFETS	0.0002 or 0.000028	0.46	Plutonium monitoring	2,300 to 16,000
Sandia-NM	0.0034	0.0034		1.0
SRS	0.140	49	for hunter	350
		3.1	from fish	22
WVDP	0.0003	0.046	Fish	150

Failing to include data on exposure from other exposure pathways (including surface-water contamination, exposure to direct radiation, the ingestion of contaminated fish and game, etc.) results in a very misleading characterization of radiation and radionuclide exposure to the general public and associated human health impacts at DOE sites.

The summary table in Chapter 4 and Chapter 11 of the Draft PEIS shows different values for the exposure to the maximally exposed individual for LLNL and for RFETS. DOE needs to check the values in the WM PEIS.

The data in Site Environmental Reports clearly showed radiation and radionuclide exposures that were usually much higher (and, for many sites, more than 100 times higher) than the exposures reported in the Draft WM PEIS.

Risks to the most exposed individual above one in ten thousand are generally considered to be unacceptable under EPA CERCLA guidelines (which usually assume a maximum 30-year exposure) and EPA RCRA permit writer's guidelines (which usually assumes a 70-year exposure), unless they are due to pollutants complying with specific regulatory limits for the route of exposure causing the risk. Most of the actual exposures above 1 mrem are not covered by such route-of-exposure or source-specific EPA regulations.

Risks above one in one million indicate a need to evaluate better pollution control under CERCLA guidelines and the Clear Air Act of 1990 (which assumes a 70-year exposure), when applicable, along with some State regulations.

As described in 1992 Site Environmental Reports, the combined direct and indirect exposures associated with airborne radionuclides from DOE installations (excluding radon) to the hypothetical or actual most exposed members of the general public were well below the 10-mrem EPA standard (that also excludes radon). However, radon exposure was 24,000 times higher than the non-radon radionuclide exposure at FEMP and 40 times higher than non-radon exposure at ANL-E reported in the Draft WM PEIS. Radon was either not detected above background levels, not monitored at the site boundary, not modeled, or not discussed in the Site Environmental Reports for many of the other installations.

Based on available data on radionuclide levels measured in onsite animals (and background animal monitoring), potential exposure to the hypothetical maximally exposed individual from the ingestion of contaminated game could be much higher than the modeled direct and indirect exposure to airborne and liquid radionuclide releases because such game could conceivably be caught on or off the site.

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The general public has access to locations at the boundary of and within several DOE sites. At some of these locations, exposures exceeding 100 mrem from direct external exposure to radiation would have been possible in less than a year in the highly unlikely event that a person were to remain at such a location continuously. However, under plausible exposure assumptions (considering the land use) that were identified in Site Environmental Reports, exposure exceeding the 100 mrem limit did not occur.

Response
DOE has revised Table 4.2-2 to include radon doses related to site actions at FEMP and ANL-E. These estimates are also included in the cumulative impacts analysis presented in Chapter 11 in Volume I of the WM PEIS in the description of existing site conditions for those sites.

The commentor is correct in noting that many of the exposures listed in the Site Environmental Reports are higher than the exposures used in the PEIS analysis. All of the exposure information described in the comment is presented in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. However, this information was not listed in Chapter 4 (Affected Environment) or used in Chapter 11 (Cumulative Impacts) because the routes of exposure for these higher exposure estimates are not as relevant for most members of the offsite public as airborne exposure.

Consumption of contaminated wildlife and other multimedia exposure scenarios are best addressed as parts of site-specific analyses. These pathways would require additional information or assumptions about the dietary habits of these individuals who consume fish and wildlife. The WM PEIS attempted to estimate risks to the offsite population through pathways that are relevant for the general population (i.e., airborne releases from facilities, leading to inhalation exposure, and deposition of contaminants to soil, followed by uptake in crops and livestock and ingestion by receptors). The maximally exposed individual exposure and risk estimates for these pathways are more likely to be potentially applicable to most members of the general public. Consideration of hot-spot or contaminated wildlife exposures involves the use of site-specific characteristics that are better addressed in sitewide and project-level NEPA reviews.

The WM PEIS evaluates potential health risk impacts to offsite populations from waste treatment operations that are assumed to occur over a 10-year period. Exceptions to this assumption would include a full 20-year operations phase (i.e., construction phase not applicable) for the No Action Alternative, and the site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS. Impacts to offsite populations during the operations period are assumed to result mainly from airborne releases of radionuclides and hazardous chemicals from waste treatment facilities. During this 10-year operations period, institutional control of the sites is assumed to be maintained by DOE. Consequently, the offsite population should not come into contact with hot spots of contamination located inside the site boundary. The WM PEIS does not attempt to estimate future land-use scenarios at the sites. These decisions are better made on the basis of a sitewide analysis. Therefore, the airborne pathway is the only exposure route analyzed in the cumulative impacts section of the WM PEIS.

DOE has revised the Chapter 11 tables to list the correct maximally exposed individual doses for LLNL (6.9×10^{-1} mrem) and RFETS (2×10^{-4} mrem) for an offsite individual.

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Comment (4492)
The statement in Section 4.3.1 of the Draft WM PEIS that airborne radionuclide exposure is readily measured and that its potential impact can be immediately determined is highly misleading. Airborne radionuclide exposure is extremely difficult to measure directly and separate from background at the levels reported in the Draft WM PEIS, and the exposures included in the Draft WM PEIS were not, in fact, measured. Air pollution exposures (and associated exposure from ingestion of biota contaminated by the air pollution) in the Draft WM PEIS were determined by modeling, mostly using the CAP-88 model (which used the results of emission monitoring and modeling as data input). This is not measurement of exposure, but modeling of exposure.

The only potential airborne exposures that were directly measured in Site Environmental Reports were for radon, for radiation and for fugitive plutonium dust at RFETS, none of which was covered in the Draft WM PEIS.

The results of monitoring were used in Site Environmental Reports to determine potential radon exposure to the maximally exposed individual at FEMP, potential radiation exposure at the boundary of several sites, the amount of potential exposure to a hunter at SRS (from game that he caught), potential exposure from the ingestion of contaminated ducks at INEL, and potential exposure to plutonium at RFETS. The WM PEIS should include this information.

Response
DOE has revised the discussion in Section 4.3.1 of the WM PEIS to indicate that exposures of individuals in offsite populations would occur primarily through inhalation of airborne contaminants released from new waste treatment facilities. Except for the airborne exposures based on direct measurements at RFETS the commentor notes, estimates of these releases, as well as estimates of airborne releases from existing site activities, were developed using air dispersion models rather than measurements.

Comment (4494)
The statement in Section 4.3.1 of the Draft WM PEIS that, at DOE sites, the maximally exposed individual received a dose considerably less than 1 mrem per year does not agree with the following impacts reported in 1992 DOE Site Environmental Reports:

- The potential exposure in the game caught by a hunter at SRS was 49 mrem;
- The potential exposure from eating the most contaminated duck at INEL was 4 mrem;
- The exposure to a residence near the target of an accelerator at LBL was 2.1 mrem;
- The exposure to a residence near the target of an accelerator was estimated to be 4.4 mrem at LANL;
- Radon exposure at FEMP was estimated to be 51 mrem for the maximally exposed individual;
- PGDP had a potential multimedia exposure of 3.8 to 4 mrem to the maximally exposed individual;
- ORR had a potential multimedia exposure of 1.4 mrem from airborne radionuclides and 4 to 17 mrem from multimedia exposure.

Response
DOE has revised Section 4.3.1 of the WM PEIS to indicate that the estimated airborne maximally exposed individual dose at most sites is considerably less than 10 mrem per year, since the estimates for LANL and ORR exceed 1 mrem per year. Note that these are estimates of maximally exposed

individual exposure via the airborne pathway only. The source of these estimates is not the annual Site Environmental Reports, but rather the DOE report, *Summary of Radionuclide Air Emissions from Department of Energy Facilities for CY 1992.*

The WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final WM PEIS, contains all the exposure information described in the comment. However, DOE did not carry this information into Chapters 4 (Affected Environment) and 11 (Cumulative Impacts) because those routes of exposure are not as relevant for most members of the offsite public as airborne exposures.

The consumption of contaminated wildlife and other multimedia exposure scenarios are best addressed in site-specific analyses. These pathways would require additional information or assumptions about the dietary habits of those populations who consume fish and wildlife. In addition, wildlife contamination data vary widely from year to year in site monitoring reports. The WM PEIS estimated risks to the offsite population through pathways that are relevant for the general population (i.e., airborne releases from facilities, leading to inhalation exposure, and deposition of contaminants to soil, followed by uptake in crops and livestock and ingestion by receptors). The maximally exposed individual exposure and risk estimates for these pathways are more likely to be applicable to most members of the general public. The consideration of hot-spot or contaminated wildlife exposures involves the use of site-specific characteristics that are better addressed in sitewide or project-level NEPA analyses.

The PEIS evaluates potential health risk impacts to offsite populations from waste treatment operations that would occur over an assumed 10-year period. Exceptions to this assumption would include a full 20-year operations phase (i.e., construction phase not applicable) for the No Action Alternative, and the site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS. Impacts to offsite populations during the operations period would result primarily from airborne releases of radionuclides and hazardous chemicals from waste treatment facilities. DOE would maintain institutional control of the sites during this period. As a consequence, the offsite population should not come in contact with hot spots of contamination inside the site boundary.

The PEIS does not attempt to estimate future land-use scenarios at the sites. DOE will make these decisions based on sitewide or project-level analyses. Therefore, the airborne pathway is the only exposure route analyzed in the cumulative impacts section of the WM PEIS.

Comment (4495)
The Draft WM PEIS misrepresents impacts of existing DOE sites during the baseline year and makes impacts of planned and alternative actions look much smaller than Site Environmental Reports and previous modeling.

Potential or actual radionuclide and radiation exposure to maximally exposed individuals in the general public from DOE sites in 1992 includes exposures that are at least 100 times higher than reported in the Draft WM PEIS because of contaminated wildlife at SRS, INEL, and WVDP, plausible multimedia exposure at PGDP, radioactivity at hot spots at the boundaries of ANL-E, LBL, ORR, and PGDP, and at the shoreline of the Columbia River at Hanford, plutonium impacts are RFETS, and radon from materials onsite at FEMP.

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The Draft PEIS did not include exposures to populations that were much higher than the exposures reported in the Draft WM PEIS at many sites due to routes of exposure whose impacts were quantified in DOE Site Environmental Reports and other internal documents.

Section 4.4.1 and Table 11-3 in the Draft WM PEIS reported that the radiation dose from airborne radionuclides from ANL-E to a maximally exposed individual was 0.0085 mrem. However, the 1992 ANL-E Site Environmental Report said that the exposure to airborne radionuclides excluding radon was 0.0091 mrem, and that, including radon, it was 0.34 mrem at an actual receptor 800 meters north of the site (40 times higher than the 0.0085 mrem reported in the Draft WM PEIS). Furthermore, the maximum reported potential multimedia exposure was 0.41 mrem from ingestion, inhalation, and radiation (48 times higher than the value in the WM PEIS). In addition, the Site Environmental Report provided data on a location at the ANL-E fenceline, near some transuranic waste where the maximum potential exposure from penetrating radiation was 82 mrem (and 0.01 mrem under more realistic exposure assumptions).

Section 4.4.2 of the Draft WM PEIS reports that the dose to the maximally exposed individual at BNL is 0.11 mrem from air emissions. However, the Site Environmental Report indicates that the dose to the maximally exposed individual from contaminated fish in the Peconic River is 0.64 mrem; the dose from contaminated water is 0.11 mrem; and the dose from airborne radionuclides is 0.17 mrem. This would make the maximum dose 0.92 mrem. The Draft WM PEIS reports that the collective radiological dose from airborne radionuclide emissions is 2.7 rem per year. However, the Site Environmental Report indicated that the dose is 3.6 rem per year, including 0.40 rem per year from fish, 0.07 rem per year from water, and 3.1 rem per year from airborne radionuclides.

The reported radiation dose in Section 4.4.3 and Table 11-7 of the Draft WM PEIS from airborne radionuclides to a maximally exposed individual of 0.0021 mrem impacted by FEMP is grossly misleading. It fails to include the 51 mrem potential exposure to airborne radon in the 1992 FEMP Site Environmental Report. This exposure is 24,285 times (24,000 to two significant figures) higher than that reported in the Draft WM PEIS, and represents a significant risk to public health. No analysis of the significance of deleting the radon data when characterizing human health impacts was provided in the WM PEIS. The fact that NESHAPS standards exclude radon is stated in the PEIS, but this is irrelevant to human health impact assessment, as such, in an EIS, under NEPA regulations. To try to use NESHAPS standards to justify excluding the radon data from the PEIS is to inappropriately mix regulatory compliance issues with human health impact issues.

Radon exposures from FEMP to the maximally exposed individual were reduced from 93 mrem per year (in 1991) to 51 mrem per year due to better containment of the radon from the uranium in a silo and waste pits on the site. DOE should be proud of this achievement, and it should be recognized in the Draft WM PEIS. However, more needs to be done, and plans existed in 1994 to do more at FEMP. Any plans for further mitigation of the impacts of the radon from this uranium and waste at FEMP and other sites (such as ANL-E) should be mentioned, and the most recent available information on radon exposure should be covered in the affected environment section of this WM PEIS. The impact of future reductions in radon impacts should be covered in the cumulative impacts section. Because radon exposure contributes to human health impacts from DOE sites and dominates those impacts at sites such as ANL-E and FEMP during the baseline year, it cannot be ignored just because there is no specific exposure limit for those impacts.

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The Draft WM PEIS provides a misleading characterization of radionuclide exposure to the general public from existing sites by basing the characterization on air emissions from stacks with exposure limits under NESHAPS, which do not include radon. This misses the most important routes of exposure at many sites (water pollution, bioaccumulation in fish and game, radiation, fugitive plutonium dust, etc.), as well as radon exposure. Exposure from the onsite waste at FEMP was reported in the Site Environmental Report to be substantial (51 mrem per year based on radon monitored at the fenceline in 1992). Mitigating measures for such radon exposure should also be covered, along with the latest information at FEMP (where dramatic reductions in radon impacts were reported).

The 1992 Site Environmental Report for Hanford reported an exposure of 0.0004 mrem at the Ringold Site near Hanford (consistent with the 0.0037 mrem reported in the Draft WM PEIS). However, this was based on the GENII model, and modeling using CAP-88 (the model specified in applicable regulations) showed the exposure to be 0.005 mrem. Monitoring at the Ringold Site showed a somewhat questionable value of 0.09 mrem.

Radionuclide exposure associated with contamination at the Columbia River (at Riverview) was reported to cause an estimated exposure of 0.02 mrem for the maximally exposed individual, according to the 1992 Site Environmental Report.

A location at the Columbia River near the 100N area has a potential exposure of 175 mrem in the unlikely event a member of the general public were to remain there for a year. Exposure was estimated to be 0.07 mrem per kilogram of contaminated duck on the site, 0.002 mrem per kilogram of contaminated pheasant, and 0.001 mrem per kilogram of contaminated deer, according to the 1992 Site Environmental Report.

The reported doses to the maximally exposed individual in the general public from airborne radionuclides at INEL are 0.0015 mrem for 1992 in Section 4.4.5, and 0.0029 mrem for 1994 in Table 11-11. DOE should explain how the dose changed so drastically.

Based on the 1992 INEL Site Environmental Report, the dose to the maximally exposed individual is 0.0018 mrem, based on modeling using CAP-88; and it was 0.0042 mrem at Atomic City, based on the MESODIF model.

However, a much more severe potential exposure from radionuclides is possible. The 1992 INEL Site Environmental Report showed that the most contaminated duck tested in 1992 could cause a dose of 4 mrem if eaten, and the most contaminated measured antelope, 0.2 mrem. The INEL Site Environmental Report estimated that two contaminated ducks from INEL are eaten annually (based on a rather detailed analysis of hunting and duck migration). The potential impact of ingestion of contaminated animals should be covered in the WM PEIS because contaminated ducks can travel far from the site, be shot and then eaten, and the INEL Site Environmental Report confirms that this is likely.

The reported airborne dose to the maximally exposed individual of 0.690 mrem and the collective dose of 1.7 mrem per year at LLNL in Section 4.4.6 of the Draft WM PEIS were higher than the doses reported in the 1992 Site Environmental Report (0.28 mrem to the maximally exposed individual and 0.28 rem per year to the population). However, the dose to the maximally exposed individual is

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reported to be 0.069 mrem in Table 11-13 of the Draft PEIS, a value that is less than the 0.28 mrem summarized from the Site Environmental Report. The discrepancy indicates an error somewhere in the Draft WM PEIS.

The dose to the maximally exposed individual from radionuclides from the accelerator at LANL should be specifically delineated. It is unclear from the affected environment section of the Draft WM PEIS where the reported 7.9 mrem exposure comes from (it was reported to be 4.4 mrem in the 1992 Site Environmental Report). Mitigating measures for accelerator impacts should be covered in the WM PEIS.

Section 4.4.8 and Table 11-17 of the Draft WM PEIS reported airborne dose to the maximally exposed individual of 0.012 mrem for NTS is less than the 0.07 mrem exposure reported in the Site Environmental Report (which included exposure from air, milk, vegetables and beef liver). The most contaminated deer monitored onsite in 1992 would have caused a dose of 0.027 mrem (assuming 100 pounds of meat and 3 pounds of liver were eaten). The collective dose of 0.029 mrem per year for NTS was less than the 0.042 mrem exposure reported in the Site Environmental Report.

In addition to the 1.4 mrem exposure from airborne radionuclides at ORR, the 1992 Site Environmental Report showed a plausible multimedia exposure of 4 to 17 mrem from airborne radionuclides, drinking water from Gallagher Creek, eating contaminated fish from the Clinch River, and spending 250 hours at the radioactive areas of either the Clinch River (2 mrem) or Poplar Creek (15 mrem). In the unlikely event that someone were to spend all year in the contaminated area of Poplar Creek, potential exposure was reported to be 526 mrem in the Site Environmental Report. DOE should have included this information in the WM PEIS.

In addition to the 0.0045 mrem exposure from airborne radionuclides, the 1992 Site Environmental Report for PGDP showed a maximum multimedia exposure to the maximally exposed individual of 3.8 mrem from sediment, radiation from 30 minutes per day at the Little Bayou Creek, contaminated well water, and contaminated crops.

A hot spot was reported at the confluence of the K011 ditch and Little Bayou Creek, where the potential exposure was 187 mrem. This information should have been included in the Draft WM PEIS.

Table 11-23 in the Draft WM PEIS gives specific values for exposure for Pantex; these values should have been included in Section 4.4.11. A slight discrepancy exists between the exposure to the maximally exposed individual on Table 11-23 of 0.000036 mrem, and the 0.000027 mrem in the Site Environmental Report.

Exposure from airborne radionuclides reported in the 1992 Portsmouth Site Environmental Report (0.03) is an order of magnitude less than that in the Draft WM PEIS (0.26 mrem). The correct values for exposure should be verified and included in the WM PEIS.

Section 4.4.13 of the Draft WM PEIS shows a dose to the maximally exposed individual of 0.0002 mrem for RFETS in Chapter 4, and of 0.000028 mrem in Table 11-27, suggesting a typographical error somewhere. The Site Environmental Report also indicated a dose to the maximally exposed individual of 0.46 mrem based on plutonium monitoring between the source and the nearest actual housing and CAP-88 modeling. This plutonium exposure should be covered in the WM PEIS.

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The doses in Section 4.4.14 of the Draft WM PEIS match those in the Site Environmental Report for SNL.

Section 4.4.15 and Table 11-31 of the Draft WM PEIS state the use of doses from airborne radionuclides to characterize exposure to the maximally exposed individual at SRS as 0.14 mrem; this is grossly misleading because it did not include exposure to hunters or fishermen. The maximally exposed individual at SRS is a hunter who eats contaminated game that he caught on the site (49 mrem). Potential exposure from the ingestion of contaminated fish was reported to be 3.1 mrem in 1992. The figures for the hunter were based on radiation monitoring for the game the hunter actually caught, and the only hypothetical issue was whether he would eat it himself, if others would eat it, or if he would discard it. In addition, fish were contaminated from the site. Ingestion of 42 pounds of bass were reported to result in a potential exposure of 3.1 mrem in the 1992 Site Environmental Report.

The 1992 SRS Site Environmental Report shows exposure data higher than the 6.40 person-rem for airborne exposure reported in Section 4.4.15 and Table 11-31 of the Draft WM PEIS. The collective radiological dose from all routes of exposure combined, based on the 1992 SRS Site Environmental Report was 17.5 person-rem per year, based on the CAP-88 (an EPA-approved airborne radionuclide model) and LAPTAPII. The 1992 Site Environmental Report also showed the collective radiological dose from all routes of exposure combined to be 8.9 person-rem per year, based on the POPGASP and LAPTAPII models (POPGASP was not approved by EPA at last report).

The Draft WM PEIS reports that the exposure to the maximally exposed individual from airborne radionuclides for WVDP was 0.0003 mrem in Section 4.4.17 and 0.00029 mrem in Table 11-35. However, the Site Environmental Report shows an exposure of 0.046 mrem from liquid effluents, assuming that the maximally exposed individual consumes 46 pounds of fish. This dose is 160 times higher than the dose in the Draft WM PEIS.

Response
With respect to the discrepancies noted by the commentor between the WM PEIS airborne doses and doses reported in Site Environmental Reports, the airborne radiation doses presented in Sections 4.4.1 through 4.4.17 in Volume I were taken from a DOE report entitled, *Summary of Radionuclide Air Emissions from Department of Energy Facilities for CY 1992.* DOE used this report rather than Site Environmental Reports to provide consistent information for the 17 major sites. The report includes the same information for the same year for all major sites considered in the PEIS. Site environmental reports differ considerably in the information they include and the year on which they are based. However, radionuclide information from site reports is included in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

With respect to use of estimates of the dose from combined routes rather than airborne exposures at any of the sites, because they include more exposure pathways, multimedia maximally exposed individual e stimates will generally exceed airborne maximally exposed individual estimates. However, the WM PEIS health risk analysis considers airborne exposure to contaminants released from waste treatment facilities the most important exposure pathway for most members of the public living offsite in the vicinity of potential waste management sites. This assumption was also used in characterizing existing site conditions. The basis for this assumption is the 10-year treatment period analyzed, during which institutional controls would be maintained to limit access of the offsite population to many of the areas

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considered in the multimedia pathway maximally exposed individual estimates. Therefore, only airborne maximally exposed individual estimates were used in Chapter 4 to characterize existing site conditions and in Chapter 11 to estimate cumulative impacts.

The maximally exposed individual multimedia dose estimates presented in the annual Site Environmental Reports are estimates that do not appear to be relevant to the potential exposure of most members of the offsite population living in the region of influence of the sites. These pathways would be relevant only for certain specialized populations (e.g., hunters and fishermen), and would require additional information or assumptions about the dietary habits of those populations. To be comprehensive, multimedia exposure is included in the WM PEIS Affected Environment Technical Report.

With respect to radon exposures at ANL-E and FEMP, Chapter 4 in Volume I of the WM PEIS summarizes the affected environments of the proposed waste management sites with information presented on potential exposure from existing site activities to offsite maximally exposed individuals from the airborne pathway, as well as from multimedia pathways, where available. The airborne pathway exposure estimates do not include background radiation. Radon accounts for about 200 mrem of the estimated 300 mrem average annual background radiation dose received in the U.S. These exposures are not associated with site activities. At certain DOE sites, storage of wastes containing uranium, thorium, and radium could serve as additional, diffuse sources of radon exposure, since radon is formed when these radionuclides decay. Estimates of this type of radionuclide exposure, which, for example, totaled 51 mrem at the fenceline at FEMP in 1992 and 0.3 mrem at ANL-E in 1993, are provided in the WM PEIS Affected Environment Technical Report supporting the WM PEIS. Airborne maximally exposed individual exposure estimates that include radon exposure, including that at ANL-E in 1993, are also presented in this technical report. The main radon emission at FEMP came from radium-bearing materials stored in the K-65 silos. Radon released from Building 200 at ANL-E was chiefly due to radioactive contamination from the "proof-of-breeding" program. These contaminated areas are undergoing remedial actions. Reduction or elimination of radon release is expected. DOE revised Table 4.2-2 to include radon doses related to site actions at FEMP and ANL-E. These estimates are also included in the cumulative impacts analysis presented in Chapter 11 under the description of existing conditions at these sites.

With respect to risks from exposures at site hot spots, the PEIS does not attempt to estimate future land-use scenarios and the potential for exposure at hot spots at the sites. DOE will make these decisions on the basis of site-level analyses. Therefore, the airborne pathway is the only exposure route analyzed in the cumulative impacts section of the PEIS. However, the WM PEIS Affected Environment Technical Report describes existing hot-spot contamination at the sites.

With respect to the accelerator at LANL, the WM PEIS includes the estimated effects of all existing activities, including the accelerator in the cumulative impacts analysis. LANL is currently preparing a sitewide EIS, which will evaluate the accelerator effects in greater detail and would address mitigation of those operations.

With respect to the maximally exposed individual dose at RFETS, DOE has revised Section 11.15.2 of the WM PEIS to incorporate the correct estimate of airborne maximally exposed individual exposure (0.0002 mrem), as presented in Section 4.4.13 in Volume I. Multimedia maximally exposed individual and hot-spot exposures are not applicable to most members of the offsite populations living in the vicinity of the sites. However, this information is included in the WM PEIS Affected Environment Technical Report.

Comment (4506)
Exposure from airborne radionuclides reported in the 1992 Portsmouth Site Environmental Report (0.03) is an order of magnitude less than that in the Draft WM PEIS (0.26 mrem). The correct values for exposure should be verified and included in the WM PEIS.

Response
Sections 4.4.12 and 11.12 in Volume I present airborne maximally exposed individual dose estimates obtained from the DOE report, *Summary of Radionuclide Air Emissions from Department of Energy Facilities for CY 1992*, rather than the Portsmouth Site Environmental Report. DOE used this report rather than Site Environmental Reports to provide consistent information among the sites. The report includes the same information for the same year for all major sites considered in the PEIS. Site Environmental Reports differ considerably in the information they include and the year on which they are based. However, radionuclide information from site reports is included in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (4512)
According to the 1992 Site Environmental Report for LBL, the exposure at a residence was 2.1 mrem from an accelerator. The 1992 Site Environmental Report also showed that a cobalt irradiator is estimated to cause a potential exposure of 17 mrem at the fencepost. The collective dose was reported to be less than 5 rem per year, including both the accelerator and conventional airborne radionuclide releases. Why was this information not included in the Draft WM PEIS?

Response
DOE summarized site doses only for the 17 major sites in Volume I, Chapter 4, of the Final WM PEIS and used the doses to estimate cumulative impacts at the 17 major sites in Volume I, Chapter 11. LBL is not one of the 17 sites, therefore, LBL data are not provided in Volume I of the PEIS. However, this information for LBL is included in the WM PEIS Affected Environmental Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (4513)
The gamma ray exposure reported in Section 4.5 of the Draft WM PEIS of 0.3 mrem to the nearest resident from pitchblende-contaminated soil should be mentioned for Middlesex Sampling Plant, along with the fact that the radon impact from the pitchblende has not been quantified.

Response
DOE summarized site doses only for the 17 major sites in Volume I, Chapter 4, of the Final WM PEIS and used the doses to estimate cumulative impacts at the 17 major sites in Volume I, Chapter 11. Middlesex is not one of the 17 sites, therefore, data on Middlesex were not provided in Volume I of the PEIS.

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Comment (28)
Plan to use staff at LLNL to develop management and cleanup methods and plans.

Response
The mission of LLNL currently includes waste management and environmental restoration activities appropriate to the wastes and issues at the site. The WM PEIS analysis is based on information provided by the site, and is being closely coordinated with the site, including reviews by LLNL personnel before the Draft WM PEIS was released and before the Final WM PEIS was released. As the national decisions on waste management are made, they will be implemented at the individual sites based on additional environmental impact reviews. Implementation will include studies to identify the location, design and operating parameters of any necessary waste management facilities. DOE has programs in place to help retrain employees that had previously focused on the production of nuclear weapons to support the waste management mission.

Comment (40)
INEL is not considered as a Regionalized Alternative site for high-level waste storage because it has no existing or approved storage facilities. Aren't naval and commercial fuel rods high-level waste?

Response
No, they are spent nuclear fuel. The definition of spent nuclear fuel is nuclear reactor fuel elements (e.g., Naval and commercial fuel rods) and targets that have been irradiated in a nuclear reactor. A target is material that is placed in a nuclear reactor to be bombarded with neutrons to produce new, man-made materials, such as plutonium and tritium.

High-level waste is the highly reactive waste material that results from the chemical processing of spent nuclear fuel and irradiated targets, and includes liquid waste produced directly from reprocessing and any solid material derived from the liquid that contains fission products in concentrations sufficient to require permanent isolation. High-level waste might also contain toxic metals, organic materials, and corrosive characteristics that are considered hazardous under the Resource Conservation and Recovery Act. Therefore, high-level waste is sometimes considered mixed waste.

Although INEL has facilities for wet storage of spent nuclear fuel, it has no facilities capable of or approved for storing the immobilized high-level waste glass logs. The current and final physical form (calcine and glass-ceramic, respectively) of INEL's high-level waste is also different from the other three high-level waste storage sites (liquid high-level waste and vitrified borosilicate glass). Therefore, DOE does not consider INEL a reasonable regional site for high-level waste management.

Volume I, Section 9.3.6, describes the rationale for selecting high-level waste storage sites. The SNF/INEL EIS addresses programmatic decisions for the management of spent-nuclear fuel.

Comment (1177)
ANL-E currently stores its low-level nuclear waste until it can be transferred to long-term storage locations. Even this short-term storage concerns area residents.

Response
ANL-E currently stores low-level nuclear waste safely onsite. One of the reasons DOE prepared the WM PEIS was its concern about storage of waste in the DOE complex. Although storage is generally

a safe activity, DOE recognizes the need to work toward final disposition of its wastes. The PEIS impact assessment examined potential Waste Management Program effects on humans and the environment from the treatment, storage, and disposal of low-level waste at ANL-E. DOE found that risks to public health and the environment from low-level waste treatment, storage, and disposal would be low at ANL-E under all WM PEIS alternatives.

Comment (1560)
Impacts to cultural resources are site specific and DOE needs to understand that the presence of the existing facilities already impacts cultural resources.

Response
DOE agrees that a credible analysis of impacts to cultural resources cannot be conducted in the WM PEIS because the impacts would depend on the choice of specific locations for new waste management facilities on each site, which are not part of the PEIS decisionmaking and has revised the PEIS accordingly. Detailed examinations of site-specific cultural resources impacts that would include any effects from existing facilities would be conducted as part of sitewide or project-level NEPA reviews for sites selected for new waste management facilities.

Comment (1731)
Safety, the environment, and cleanup are very important considerations. The proper people are working at RFETS that care about these things.

Response
Thank you for your comment.

Comment (2029)
Any release of toxic or radioactive materials into the environment at LLNL is absolutely unacceptable.

Response
DOE strives to minimize or prevent releases of toxic or radioactive materials to the environment at all of its sites. DOE is strongly committed to pollution prevention. See Volume IV, Appendix G, of the WM PEIS for a description of DOE's Pollution Prevention Program, which applies to all activities at all DOE sites. Any release of toxic or radioactive materials into the environment would be in strict compliance with applicable regulatory requirements, for example, National Pollutant Discharge Elimination System (NPDES) permit limits for facility surface water effluents, and would pose low risk to the environment.

Comment (2129)
DOE should explain how often BNL low-level mixed waste is shipped offsite and whether storing it has been detrimental.

Response
BNL has the capacity to store 14 cubic meters of low-level mixed waste. At present, it stores approximately 9 cubic meters. BNL generally ships low-level mixed waste twice each year.

BNL currently manages its low-level mixed waste in a manner that prevents detrimental effects to the environment. BNL was founded in 1947 as a nondefense research laboratory. During these early

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decades, environmental laws were much less stringent than they are today. Although BNL managed its wastes in accordance with these laws, some releases of contaminants to the environment did occur. The WM PEIS Affected Environment Technical Report, available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS, lists the contamination situations currently existing at BNL.

Comment (2201)
The PEIS used an assumption that there is no risk from waste in storage and ignored the issue of hydrogen in the high-level waste tanks.

Response
The WM PEIS analyzes the impacts of storage accidents in Appendix F in Volume IV. A review of recent DOE NEPA and safety documentation is provided in the sections on storage accidents for low-level waste, low-level mixed waste, and transuranic waste. The storage of vitrified high-level waste is discussed in Section F.3. Storage facility accidents for hazardous waste, which would vary by alternative, are discussed in Section D.3.3.5.2 in Volume III.

The WM PEIS is a national and programmatic study to assist DOE in formulating and implementing a strategy to manage its radioactive and hazardous wastes. The PEIS addresses only the storage of treated high-level waste prior to its ultimate disposal in a geologic repository. The issue of hydrogen storage in high-level waste tanks is addressed in sitewide or project-level NEPA documents and safety assessments, including the Hanford Tank Waste Remediation EIS.

Comment (2435)
INEL mixed waste container storage capacity is listed as 226,240 cubic meters in WM PEIS Volume I, Table 6.1-2. This capacity will be used to store transuranic waste currently on earth-covered pads at the Radioactive Waste Management Complex. This space will not be available until that waste is treated and shipped to WIPP. According to the recent settlement agreement between DOE and the State of Idaho, that activity will not be completed until 2018, 3 years beyond the scope of the WM PEIS.

Response
As explained in Section 6.1.3 in Volume I of the WM PEIS, DOE used existing storage capacity for all categories of waste as a starting point for analyzing facility requirements. The WM PEIS analysis compares this capacity with existing waste inventories and requirements for storing newly generated waste or waste that is transported from elsewhere. The analysis then estimates needed additional capacity, after which it estimates costs and impacts for the required new construction. If the need for additional capacity was projected, the use of new facilities was assumed.

Comment (2539)
Section 7.4.1.5 states that the plumes from the various disposal units are assumed to not intermingle? Why? At INEL's low-level waste disposal site, active disposal units cannot be distinguished from inactive units by the environmental monitoring system currently in place.

Response
Sections 5.4.1.2.2, 6.4.1.8, and 7.4.1.7 in Volume I of the WM PEIS have been revised to clarify this assumption. The hypothetical farm family risks represent individual receptors assumed to be exposed

through location of a drinking water well 300 meters (984 feet) from the center of a single disposal unit. Concentrations of groundwater contaminants at this location are assumed to be higher than those that could be expected at greater distances from the unit due to dispersion of contaminants. Construction of multiple units is expected to be required at certain sites under the various low-level mixed waste and low-level waste alternatives to dispose of the projected waste volumes. Although, the farm family scenario evaluates only a single receptor 300 meters from an individual unit, DOE assumes that each of these close-in receptors will be affected primarily by the contaminant plume from the facility closest to him/her. However, DOE recognizes that commingling of contaminant plumes from multiple disposal units could occur as distance from the units increases, but anticipates that at 300 meters the highest concentration of contaminants is likely to result from the single closest plume. At greater distances from the disposal units, where overlap of the plumes is more likely, the concentrations in any given plume should be lower as a result of dispersion and dilution than those estimated at the 300 meter well.

Comment (2541)
Why are there only five disposal units under low-level waste Regionalized Alternative 5 for INEL? This is the alternative that brings the most waste to INEL for disposal.

Response
Regionalized Alternative 5 for low-level waste involves treatment to reduce waste volumes, as described in Section 7.2.2 and illustrated in Figure 7.2-1 of the WM PEIS. Therefore, although this alternative involves shipment of the most offsite waste to INEL for treatment and disposal, waste-reduction treatment produces a smaller volume of low-level waste for disposal at INEL than do the alternatives that only involve minimum treatment of low-level waste. DOE calculated the number of disposal units that would be required at a site by dividing the volume of waste to be disposed of by the capacity of the disposal unit.

Comment (2889)
Land use at INEL will have to be in accordance with the INEL Land Use Plan.

Response
The WM PEIS used the INEL Land Use Plan to ascertain how much land was available for waste management activities. However, the WM PEIS did not attempt to address any of the other land-use issues.

Comment (2893)
Volume I, Table 4-10. The number of shipments of "other hazardous material" seems unbelievably small (much smaller than the number of radioactive material shipments). What is included in this category and, perhaps more important, what is left out?

Response
The term "other hazardous" refers to all hazardous material except radioactive materials and radioactive waste. The reason the number is small is that DOE sites ship very little other hazardous material from site to site. The Shipment Mobility/Accountability Collection data base, which was used in the WM PEIS analysis, only includes site-to-site shipment. Most, if not all DOE sites, ship their non-radioactive hazardous waste (referred to in the WM PEIS as "other hazardous") to offsite commercial disposal sites. These shipments are not reflected in the WM PEIS.

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Comment (2896)
Volume I, Table 4-11. The table shows that the number of rail shipments coming in and going out was 0 for INEL, and for another 18 sites in FY 1993. But the data used in the table "represent most, but not all, of the DOE transportation activities related to the shipment of radioactive material." Are there additional unlisted shipments?

Response
The data reported in Table 4-11 of the Draft WM PEIS in the Draft WM PEIS were the data that were in the Shipment Mobility/Accountability Collection database for 1993. These data were the best data available at the time the Draft WM PEIS was prepared, although some sites did not report all shipments. In addition, the database only includes site-to-site shipments. Shipments to and from commercial facilities are not included. The truck and rail shipment data in Section 4.3.10 in Volume I were included to give some perspective regarding recent shipments of radioactive and hazardous wastes. These data were not used in the impacts analyses. Table 4-11 is now Table 4.3-7 in the Final WM PEIS.

Comment (3158)
The State of Washington and the U.S. EPA should not allow DOE or the U.S. Department of Defense to transfer to the Hanford Site any hazardous or radioactive waste unless the following criteria are met:

- Acceptance of offsite waste is contingent on existing facility capacity and on availability of funding to handle processing and storage needs, while having a neutral or positive impact on Hanford cleanup.

- A general condition of permit and plan approval and subsequent offsite waste acceptance in Washington State should be on-going substantive compliance with the Washington Dangerous Waste Law and the terms, conditions, and schedules of permits, consent orders and cleanup agreements (e.g., the Tri-Party Agreement) between DOE and the State.

- In all instances where DOE proposes to treat offsite wastes at Hanford, a written reciprocal agreement should be required between the State of Washington, the State of origin of the offsite waste and DOE.

- No pretreatment storage should be allowed at the receiving site unless it has been approved in the written reciprocal agreement between the shipping and receiving States.

- Plans and schedules to treat offsite wastes should be approved only in instances where there is a binding legal obligation on the part of DOE for primary and secondary offsite storage facilities designed to receive post-treatment residual before wastes are allowed to be shipped to Hanford. Plans and schedules should specify that, generally, no residuals will be stored or disposed of at Hanford. In the event of substantial noncompliance with Washington Dangerous Waste Law requirements, or failure to have offsite facilities available for return of post-treatment residuals, offsite waste will not be accepted at Hanford. Lacking specific agreement between the State, DOE, and the State of origin, waste residuals should be returned to the site of origin or other compliant facilities to be specified in plans and schedules.

- When reviewing requests from other sites/States to accept wastes for treatment at Hanford, the sending site's treatment plan should be scrutinized to determine whether there has been thorough consideration of onsite treatment and pre-shipment storage. Offsite wastes should not be accepted for treatment where such analysis is lacking or not compelling, unless it is otherwise approved in the reciprocal agreement between the sending and receiving States.

- Receipt of any offsite wastes for treatment should require submission by the shipping State of a schedule for shipment, treatment, and post-treatment residuals management, and prior written approval by the State of Washington.

- Hanford offsite waste acceptance criteria must include provisions for inspection and payment of appropriate permit fees to cover all State costs, including inspection of pre-treatment shipping procedures. Existing waste facilities at Hanford must be in substantial compliance with the Tri-Party Agreement milestone, other orders or agreements, and RCRA or State law requirements in order for permits to be issued or amended to allow offsite wastes to be treated, stored, or disposed of at Hanford.

Response
DOE acknowledges the principles advocated in this comment and will consider them in its decisionmaking process. These principles are the subject of continuing discussions between DOE and stakeholders and regulatory authorities, as well as within the broader National Dialogue initiative described in Section 1.8.2 in Volume I of the WM PEIS.

Comment (3533)
The affected environment description of NTS does not mention the five offsite plutonium dispersal sites and 10 underground nuclear explosion sites (e.g., the Faultless Site at the Central Nevada Test Area), all of which require extensive remediation work that would result in large quantities of hazardous waste.

The affected environment description of NTS does not mention other sites associated with the Nevada Operations Office, which include the Amador Valley Operations, Pleasanton, California; Kirtland Operations that include the Craddock Facility and facilities at Kirtland Air Force Base, Albuquerque, New Mexico; Las Vegas Area Operations that include the Remote Sensing Laboratory at Nellis Air Force Base and North Las Vegas Complex in North Las Vegas, Nevada; Los Alamos Operations, Los Alamos, New Mexico; Santa Barbara Operations that include the Robin Hill Road and Francis Botello Road Facilities, Goleta, California; Special Technologies Laboratory, Santa Barbara, California; Washington Aerial Measurement Department, Andrews Air Force Base, Maryland; and Woburn Cathode Ray Tube Operations, Woburn, Massachusetts.

Response
The summary description of the NTS affected environment in Volume I, Chapter 4, of the WM PEIS does not provide detail about contamination situations at NTS requiring remediation because environmental restoration has been removed from the scope of the PEIS. Sections 4.3.3 and 4.3.4 in Chapter 4 summarize contamination situations at the major DOE sites including NTS. The WM PEIS Affected Environment Technical Report section on NTS provides more detailed descriptions of contamination situations at NTS. The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

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The summary description of NTS's affected environment does not describe other sites associated with NTS because the PEIS focuses on the environmental characteristics of NTS, where waste management activities are proposed to occur under a number of alternatives. It is this physical location and the immediate vicinity that would experience impacts from waste management activities such as construction of treatment facilities or disposal of low-level waste. No such activities are proposed at the other sites mentioned.

Comment (3535)
The affected environment description of SNL-NM does not mention facilities such as the Tonopah Test Range, which is contaminated with dispersed plutonium, and the Kauai Test Facility.

Response
Section 1.6 in Volume I states that there are 54 sites for which DOE has some waste management responsibility and that are within the scope of the WM PEIS. There are additional sites for which DOE has some waste management responsibility. However, these sites generate little waste and are often affiliated or collocated with one of the 54 sites (with waste being co-managed). Regardless, waste from these sites is not expected to prejudice the analysis or programmatic decisions. Of the 54 sites, 17 have been designated "major" sites in this PEIS. See Volume I, Section 4.2.1, for a full explanation of how DOE determined the sites to be analyzed in the WM PEIS. For purposes of the WM PEIS analysis, SNL-NM is considered to be a major DOE site. The Tonopah Test Range and Kauai Test Facility are managed by SNL-NM, but are not considered to be major sites, and are not located close enough to SNL-NM to be considered part of the SNL-NM environment.

Comment (3603)
The dual purpose of waste management and environmental restoration is not addressed in Table 8.1-2; assumptions are made as to the capacity and viability of the facilities to serve the dual purpose. For INEL, what does it mean for the Stored Waste Examination Pilot Plant capabilities to include drum venting? For LANL, why is the controlled air incinerator listed? Realistically, this incinerator will not operate. Why is the Transuranic Storage Area Retrieval Enclosure not applicable to the WM PEIS analysis?

Response
The WM PEIS does not analyze environmental restoration alternatives. DOE has revised Table 8.1-2 to reflect the existing capacity at DOE sites. More specific information regarding existing facilities can be found in the references cited in the WM PEIS. The PEIS includes consideration of environmental restoration transuranic wastes (TRUW) in Appendix B (Volume III) and Section 8.15 (Volume I). The excess capacity of the waste management facilities would be available to the environmental restoration wastes that require processing. However, the Environmental Restoration Program is independently establishing cleanup plans, and might not use any waste management facilities.

"Drum venting" refers to the release of particulates during drum characterization. A number of TRUW drums have corroded during storage, with the potential for releases to occur during characterization activities.

The Stored Examination Pilot Plant (SWEPP) is designed to certify stored TRUW in preparation for its final disposition. Activities at the SWEPP include examination, characterization, sorting, reclassifying, and repackaging (as necessary) retrieved stored TRUW. The SWEPP is currently on operational standby, and was not considered in the WM PEIS analysis. The treatment capacity at the INEL considered in the WM PEIS, however, includes the 200 cubic meters per year capacity of the Waste Characterization Facility, which would sort, reclassify, and repackage (as necessary) retrieved stored TRUW.

The Transuranic Storage Area Retrieval Enclosure provides capabilities to retrieve and restore wastes in new permitted storage buildings designed to meet requirements of RCRA, TSCA, and the Idaho Hazardous Waste Management Act. Its storage capacity of approximately 20,000 cubic meters of TRUW has been included in the WM PEIS analysis.

Further information on the above INEL facilities is provided in Appendix C in Volume 2, Part B, of the "Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement" (DOE/EIS-0203-F, April 1995).

The Controlled Air Incinerator at LANL is currently shut down and is being dismantled. Its thermal treatment capacity is not considered in the WM PEIS analysis.

DOE has added a footnote to Table 8.1-2 to indicate that the thermal treatment unit at LANL is currently unfunded and in shutdown mode.

4.3 Existing or Planned Facilities and Activities

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5. Environmental Impacts

Comment (499)
The WM PEIS needs to clarify the relationship between the 10-year exposure time frame and the 20-year implementation time frame for the alternatives.

Response
Potential risks of public exposure to radioactivity from waste treatment and storage activities were assumed to occur during the 10-year period of facility operations, which follows the 10-year facility construction period. Therefore, exposure was calculated for 10 years of operations with project implementation occurring over a 20-year period. Exceptions to this assumption would include a full 20-year operations phase (i.e., construction phase not applicable) for the No Action Alternative, and the site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS. The WM PEIS Summary document (Section 3.2.1) was clarified to reflect this relationship between time frames. Section 5.2.3 in Volume I describes the time frame of analysis assumptions in more detail.

Comment (3785)
DOE needs to consider criteria impact assessment such as socioeconomics, risk management, and environmental justice.

Response
The WM PEIS analyzes the impact parameters referenced by the commentor for all five waste types (Chapters 6, 7, 8, 9 and 10 in Volume I). Human health risk assessment plays a major role in this analysis.

5.1 Impact Analysis Assumptions, Methodologies, Uncertainties

Comment (543)
In the Final WM PEIS, discuss and detail the assumptions that could affect the outcomes of the evaluation.

Response
The WM PEIS describes in detail the assumptions used in the models in discussions that can be found in the appendices and in the supporting technical reports cited in Volume I or the appendices. The major assumptions are summarized in Chapter 5 in Volume I of the WM PEIS, which address the WM PEIS impact analysis methodologies.

Comment (724)
The WM PEIS must include the amount of radioactive leakage to the air, water, and land based on leakage rates from other facilities such as Hanford.

Response
Treatment, storage, and disposal are analyzed in the WM PEIS by routing the waste through a series of facilities that execute each of the major operations needed to fully treat and dispose of the waste. There are over 30 different facilities that are employed, considering the five waste types. Each facility operates to design specifications that allows computation of resources consumed, risks that are incurred during operation, and the resulting residuals that leave the facility enroute to the next facility and phase of waste management. For each facility, the input waste is fractioned into residuals (air release, waster release, and/or by-product solids) and product--the output waste stream. The analysis of impacts then takes into account the sum of all the releases from each facility.

The design specifications and assumed fractions for releases use historic emissions data for known and available technologies; fugitive emissions are based upon established EPA methods for similar processes. Thus, "leakage" to the air, water, and land--termed "releases" in this discussion--is based on release rates from other facilities and processes, as advocated in the comment. A complete discussion of the assumed release rates can be found in the technical reports listed in Section 15.2 in Volume I. These technical reports are available in the DOE reading rooms, listed in Section 1.9 in Volume I.

Comment (1159)
A commentor questioned the DOE characterization of potential releases of toxic substances into streams, soil, air and groundwater, and the size of the potentially affected population around the Paducah Gaseous Diffusion Plant (PGDP).

Response
DOE used generic treatment and disposal technologies and a number of conservative assumptions to develop its programmatic evaluations of the relative impacts of different waste management alternatives. The results of these impact analyses are screening-level estimates; more precise estimates of potential impacts would need to be developed.

For example, the WM PEIS analysis indicates that DOE should carefully control the disposal of low-level waste at PGDP to prevent potential groundwater contamination (Section 7.6.2, Volume I). DOE Order 5820.2A requires DOE to conduct a detailed performance assessment before it can develop a low-level waste facility. This assessment would require more detailed site-specific information to identify the precise location and design of any proposed facility. The facility design, in turn, would require a number of mitigating factors to help limit potential groundwater contamination.

DOE used data from the 1990 U.S. Census to estimate that about 500,000 people live within 50 miles from the center of PGDP. The risk analyses in the PEIS suggest that adverse health effects, if any, from the operation of waste treatment facilities at PGDP would be small (Section 4.4.10, Volume 1).

Comment (2056)
In general, the choice of cut-points for detailed analysis of effects seems arbitrary. These range between 1% of a standard to 10% or 25%, depending on the impact being measured. A more comprehensive explanation would add clarity, since this apparent arbitrariness could be construed as making choices based on what the subsequent analysis shows, an inappropriate procedure.

Response
DOE has revised Section 5.4 in Volume I of the WM PEIS to more clearly explain the method DOE used to select these percentages. In summary, DOE used a three-step process to evaluate environmental impacts. First, DOE estimated environmental impacts at major DOE sites for each alternative and each waste type. The Site Data Tables in Volume II of the PEIS list the results of this comprehensive analysis without any screening for significance. Second, a screening level was selected for each impact area in order to focus the analysis on impacts with a greater potential to be significant. For example, air quality impacts used a screening level of 10% of standards. The screening levels are described by resource area in Section 5.4 in Volume I of the WM PEIS. Third, a summary listing and description of the impacts that exceed the screening level was prepared for each waste-type chapter (Chapters 6 through 10). Impacts that exceed 100% of the comparison criteria are described in more detail.

In assessing impacts on resources for which regulatory standards exist, specifically air quality, DOE evaluated the significance of estimated waste management facility pollutant emissions or ambient air concentrations by comparing these estimates to relevant Federal and State regulatory limits. For impacts on the environmental and socioeconomic resources that have no such comparable regulatory standards, DOE based its evaluations on significance criteria defined in CEQ regulations at 40 CFR 1508.26 and on the experience and judgment of the WM PEIS interdisciplinary team members in their fields of expertise.

The air quality impacts presentation first focused on sites and alternatives where air quality standards could be exceeded (that is, where air quality impacts could be significant). Thus, all cases where emissions or ambient air concentrations would be 100% of a standard or greater are included in the waste-type chapters. In addition, to allow for the cumulative air impacts analysis that includes emissions from other sources, and to show instances where concentrations might be approaching the comparison criteria, DOE chose a 10%-of-standard threshold. This threshold is used to highlight the sites where criteria air pollutant emissions from proposed waste management activities would not exceed standards, but where they could substantially contribute to overall criteria pollutant concentrations from all sources in the area, which could result in adverse cumulative air quality impacts.

For the water quality impacts analyses for low-level mixed waste and low-level waste, estimates of pollutant concentrations in downgradient well water caused by disposal facility leachate were compared

5.1 Impact Analysis Assumptions, Methodologies, Uncertainties

to relevant water quality comparison criteria, as described in Section 5.4.3.2 in Volume I. As was the case for air quality, all sites/alternatives where the comparison criteria would be met or exceeded are included in the waste type chapters because they represented a potential for significant impacts to persons consuming the groundwater. In addition, to account for some level of uncertainty in the modeling results for the disposal analysis, and to show instances where concentrations might be approaching the comparison criteria, water pollutant concentrations that would meet or exceed 25% of the comparison criteria are also included in the waste type chapters for discussion, even though they would be less likely to indicate instances where impacts would be significant.

For economic and population impacts, DOE used a 1% significance screening level because regional economic or population changes of 1% or more in the communities around DOE sites are likely to be considered by those communities as substantial; that is, economic benefits are likely to be important and population growth could substantially affect social and medical services, housing, and educational systems. This is particularly true if the economic or population changes occur only in one or a few specific localities within an affected region rather than uniformly across the region.

For ecological resources and land-use impacts, DOE used a screening level of 1%, principally to screen out sites under an alternative where DOE can reasonably conclude there would be no significant impacts. DOE based this percentage on the fact that it has not yet proposed facility locations and detailed impact evaluation would require location-specific information, and that, at sites where less than 1% of the available land would be required for waste management facility construction, DOE would have sufficient flexibility to locate the facility in a manner that would avoid significant impacts to critical habitats and site land use.

The analysis of infrastructure impacts was somewhat more complex. For the impacts analysis of the onsite water, power, and wastewater treatment infrastructure, DOE brought requirements that would exceed 5% of current capacities forward from Volume II to Chapters 6 through 10. DOE believes that, in general, infrastructure requirements below 5% could be accommodated by existing infrastructure because estimates of capacity would have some built-in margin for substantial peak loads. Capacities for onsite transportation infrastructure impacts were not known, so DOE keyed significance to estimated increases in site employment as an index of the potential increased stress to existing site transportation infrastructure. DOE brought potential site employment increases of 5% or more forward for discussions of instances in which transportation infrastructure impacts could be significant. Similarly, offsite infrastructure impacts were keyed to regional population growth, with potential growth greater than 5% considered to have the potential to cause substantial stress to the regional transportation infrastructure.

Comment (2197)
DOE should not use statements that conclude no impact without the benefit of up-to-date scientific knowledge.

Response
Best available data at the time of the analysis and accepted scientific methods were used to conduct the impact analyses. Chapter 5 in Volume I of the WM PEIS provides a summary of the underlying methodology. The WM PEIS has been peer reviewed and subjected to a 150-day public comment period. DOE incorporated appropriate changes recommended by the public and internal agency reviews to make this study the best document possible.

5.1 Impact Analysis Assumptions, Methodologies, Uncertainties

Comment (2645)
Volume III, Table D.3.3-2: It would be helpful to know the percent composition ("relative proportions") of the hazardous waste source term. Why was analytical data (relative chemical proportion) not presented for all hazardous waste source term constituents?

Response
The chemical compositions of the hazardous waste streams evaluated in the WM PEIS are in the WM PEIS Hazardous Waste Technical Report. This report is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final PEIS.

Comment (2914)
DOE must develop an inventory of processing and storage technologies that includes, at least, the admissible waste streams and estimated unit processing and development costs, as applicable. The inventory should include existing capabilities (DOE and private sector) and facilities to be developed.

Response
Because the WM PEIS compares the impacts of alternatives for waste management across sites, DOE used generic treatment, storage, and disposal technologies for the analysis. In this way, DOE can compare alternatives consistently, allowing only site environmental factors to be discriminators.

The WM PEIS evaluates the impacts of using offsite commercial facilities for nonwastewater hazardous waste that is treated and disposed of offsite at commercial facilities. The impacts associated with managing hazardous waste are provided in Chapter 10 in Volume I of the WM PEIS. DOE revised the Draft WM PEIS to add a discussion of the issue of privatization using commercial facilities to manage the other waste types. See Volume I, Section 1.7.4.

Section 1.8.1 in Volume I discusses the various levels of NEPA documentation. Sitewide or project-level NEPA reviews would provide more detailed analyses of specific treatment, storage, and disposal technologies including analysis, as appropriate, of commercial facilities.

DOE has developed a number of technical studies not related to the WM PEIS NEPA process that it can use to compare the costs and effectiveness of various treatment, storage, and disposal technologies. These studies are available to the public through the Office of Environmental Management, Office of Research and Development.

Comment (2929)
The WM PEIS does not emphasize sorting by applicable technologies.

Response
The WM PEIS does include significant sorting by waste stream and technology. To conduct the PEIS evaluation, DOE (1) identified existing and projected waste volumes, as discussed in Section 5.2 in Volume I; (2) sorted volumes according to treatment groups, as discussed in Section 5.2; and (3) generically routed wastes through treatment trains, as discussed for each waste type in Sections 6.2, 7.2, 8.2, 9.2, and 10.2 in Volume I. The resulting conceptual impacts are identified in Chapters 6 through 10.

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Because the WM PEIS provides a means to compare impacts across sites, the treatment, storage, and disposal technologies were, for the most part, held constant. In this way, DOE could compare "apples to apples," allowing only site environmental factors to be discriminators.

Comment (3027)
Air quality, as well as risks, can be treated with better procedures, enhanced designs, and/or more cost. This philosophy is not mentioned in the WM PEIS. It is better to compare costs for proposed alternatives based on equal risk. When both costs and risks are being compared, results are often inconclusive and subject to interpretation.

Response
The main purpose of an EIS is the evaluation of environmental impacts from the proposed action. NEPA does not require that costs be evaluated in an EIS. Costs are based to a large degree on the technology used. Since technologies will not be selected in the Record of Decision for the WM PEIS, it is not appropriate to base the PEIS decisions on cost alone. Cost and risk, in addition to other factors, will be considered by the decisionmakers in selecting alternatives. The decision factors and criteria are listed in Section 1.7.3 in Volume I of the WM PEIS. More detailed sitewide or project-level NEPA reviews would consider alternative technologies for waste management.

Comment (3033)
In Volume I, Section 1.7.3, of the Draft WM PEIS, the discussion of relocating facilities within a site is so general that it obscures several issues. First, the paragraph seems to imply that impacts on geology and soils, noise and visual/aesthetic impacts, habitat impacts, environmental justice, offsite land use, and cultural resources can be understood without specific information about specific sites. Second, the statement appears to imply that such impacts can be mitigated merely by moving a facility around within the perimeter of a (presumably large) site. The conclusion seems simplistic for several reasons. First, such factors as visual openness, distribution of populations on the perimeter of a site, and groundwater formations are likely to confound the simplistic linear notion stated here. Second, the assumption ignores existing commitments for future uses. For example, the Hanford Future Site Uses Working Group's scenarios would restrict all but the Central Plateau from new waste disposal facilities. Finally, it is not clear that this statement is consistent with the environmental impact criterion given in Section 1.8 of the Draft PEIS. The statement in Section 1.7.3 appears to say that these impacts can be mitigated, so they will not be used as a basis for decisions.

Response
Because some impacts are location-specific, they cannot be analyzed until a specific location is chosen. On the commentor's second point, DOE maintains that because the sites that would support major waste management facilities have extensive areas for such construction, selecting an appropriate location or locations within that area would serve to mitigate impacts. This is true for example, when the location selected for a waste management facility is on or near a cultural resource. Relocating the facility only a short distance could avoid or minimize its potential impact. This is not true for all such impacts at all sites, but in general, effects on adjacent land uses, auditory and aesthetic impacts, impacts to habitat, and environmental justice effects are substantially location-specific and could be dealt with by project location. The PEIS does not address impacts on soils or geology, noise or visual impacts, or effects on cultural resources because such analyses would require knowing the locations of the various waste management facilities. Again, DOE agrees that these impacts cannot be effectively analyzed using "simplistic linear notions." They can only be analyzed credibly at the site level when

locations are proposed. They PEIS does address habitat, land use, and environmental justice impacts to the extent possible without location-specific information. For all these impact parameters, detailed analyses at the site or project level would be conducted, if warranted, during sitewide or project-level NEPA reviews.

The PEIS land-use analysis does make use of information on areas, such as the Central Plateau at Hanford, that have been designated as waste management areas; however, the PEIS does not address any future uses issues at the sites so as not to preempt the sites' own planning activities with stakeholders.

On the commentor's final point, DOE maintains that the impacts can be mitigated. However, DOE recognizes that the type and severity of impact will dictate the effort and expense involved in mitigation. Thus, impacts will serve as an indicator of program costs for mitigation and, therefore, as a basis for decisionmaking.

Comment (3060)
Section 5.1.2 illustrates DOE's heavy reliance on assumptions, generic cases, and conceptual models, which leaves the reader wondering whether anything in this PEIS is real.

Response
For the WM PEIS, DOE evaluated the potential impact of 36 alternatives across five waste types at 17 "major" sites for air quality, water resources, ecological resources, human health risks, land use, infrastructure, economic, social, and environmental justice effects. Potential impacts to human health stemming from the requirement for transportation of wastes across a nationwide truck and rail network were also considered.

Any analysis covering such a broad scope as the WM PEIS must, of necessity, be very general in nature. To ensure a consistent analysis across alternatives and to present the analytical approach and corresponding results to the concerned public and decisionmakers in a succinct and direct manner, certain simplifying assumptions were required. As with any such general predictive analysis, certain assumptions had to be made regarding timing, context, duration, and level of waste management activity under consideration for each alternative. These assumptions and their limitations are noted as part of the methodology discussion for each impact parameter. Information about the generic design phase is provided in Section 5.2 in Volume I. Section 5.3 in Volume I describes the methodology and assumptions used to determine discharges, resources required or consumed, and costs. Section 5.4 in Volume I describes the methodologies and assumptions used for evaluating the environmental impacts.

The WM PEIS details the assumptions used in the analysis in discussions that can be found in the individual appendices and in the supporting technical reports that are cited in Volume I. Data for the analysis are derived from multiple sources, such as site development plans and environmental reports, DOE and national laboratory technical reports, and national databases such as that from the Bureau of the Census. Whenever possible, existing data were used in conducting the analysis; however, when addressing so many sites and corresponding regions of influence, some limitations on data availability and uniformity can be anticipated.

The WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets, schedules, and national priorities, as well as other DOE studies, will be considered in making

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decisions. As part of implementing nationwide waste management strategy, additional studies will be necessary to analyze the impacts of the precise location, capacity, and design of facilities at the individual DOE sites.

Comment (3102)
Referring to Figure C.1-1, a commentor asked why facility discharges (outputs) were not analyzed against environmental justice, land use, and cultural resources.

Response
DOE did consider airborne facility discharges in the environmental justice analysis and found that only in a few cases (certain sites for specific waste type alternatives) would there be a potential for disproportionately high and adverse impacts to minority and low-income communities. There is an environmental justice discussion in each waste-type chapter describing the results of each waste-type analysis, Sections 6.10, 7.10, 8.10, 9.10, and 10.10. The land-use analysis did not consider facility discharges directly, but did evaluate the degree of flexibility DOE would have in locating waste management facilities to avoid such impacts. Discussions of land-use impacts are contained in each waste-type chapter in Sections 6.11, 7.11, 8.11, 9.11, and 10.11 in Volume I of the WM PEIS. DOE did not analyze cultural resources impacts in the PEIS, because the specific locations of proposed waste treatment, storage, or disposal facilities at any of the DOE sites are not yet selected.

Comment (3108)
At the Hanford Site, existing wastewater treatment facilities do not have the capacity to treat sanitary waste. Due to the large plumes of contaminated groundwater, the treatment of choice is evaporation lagoons, which are large (tens to hundreds of acres) and lead to the destruction of much habitat. These are impacts which should be considered.

Response
Sanitary wastewater treatment capability was not included in the waste management facilities that could be constructed at each site. Therefore, it was assumed that sanitary wastes would be discharged to existing treatment facilities. Impacts to sanitary wastewater treatment plants at the sites are evaluated in Sections 6.12, 7.12, 8.12, and 9.12 in Volume I of the WM PEIS. These sections note that Hanford has little excess wastewater treatment capacity. The secondary impacts of constructing additional sanitary wastewater treatment capacity are more appropriately evaluated in sitewide or project-level NEPA reviews.

Comment (3369)
Volume III, Section D.2.7.2. Where did DOE get the 10% of immediately dangerous to life and health (IDLH) values used in the absence of a threshold limit value?

Response
In the absence of threshold limit values, professional judgment was used to select surrogate values. The rationale for the recommended use of 10% of the IDLH values as a surrogate for threshold limit values was as follows. Threshold limit values (TLVs) address worker exposure to relatively low concentrations of hazardous chemicals under routine operation conditions over an 8-hour per day, 40 hour per week time period. In the absence of TLVs, the National Institutes of Occupational Safety and Health Recommended Exposure Limits (RELs) or Permissible Exposure Limits (PELs) were used. If more of these values were available for a hazardous chemical, DOE used 10% of the IDLH value.

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IDLH values address short-term (30-minute) exposures to relatively high concentrations of hazardous chemicals during workplace accidents. Based on professional judgment, 10% of IDLH values was considered to provide concentrations that would be similar to threshold limit value concentrations, given the differences in the exposure times.

Note that both threshold limit values and IDLH values pertain to worker exposure. The worker population is generally acknowledged to consist of healthy, relatively young people. Emergency Response Planning Guideline values also address accident conditions. They pertain to the general public, which includes children, senior citizens, pregnant women, and ill people. Therefore, modification of IDLH values was thought to be more appropriate than modification of Emergency Response Planning Guideline values.

Comment (3406)
There is an error in Volume I, Table 5.1-1. ISC2 was developed by EPA and/or EPA contractors, not by Oak Ridge National Laboratory.

Response
DOE corrected the table.

Comment (3618)
Under the transuranic waste No Action Alternative in Section 8.3.1, has any aspect of packaging or repackaging been assessed as to the health risks, environmental impacts, costs, etc.? If not, why? If so, what document(s) gives this analysis?

Response
Section 8.3.1 in Volume I of the WM PEIS describes the impacts that are included under the No Action Alternative analysis and those that are not (impacts associated with newly generated transuranic waste are included and impacts associated with handling retrievable transuranic waste are not). Because there is no disposal of transuranic waste under the No Action Alternative, there is no need to retrieve the waste. Under the No Action Alternative, it is assumed that stored transuranic waste would continue to be stored indefinitely and DOE would continue to characterize and package newly generated transuranic waste to meet the Waste Isolation Pilot Plant (WIPP) waste acceptance criteria.

The results of the analysis for the transuranic waste alternatives are given in Chapter 8 of the WM PEIS. Further information is available in the WM PEIS Transuranic Waste Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3650)
Why was it assumed that the shipments would occur uniformly over a 10-year period, assuming a 10-year period to build treatment and storage facilities, when the operation and maintenance at WIPP is 25 years?

Response
DOE manages numerous different waste streams within the five major waste types. Each waste stream requires a unique management system. Recognizing the complexity of reporting construction and shipping and operations schedules for each waste-type stream, a generalization was made for the

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WM PEIS that would facilitate the estimation of impacts across sites and waste types and allow for the calculation of combined waste management impacts from all waste types. This type of generalization is not expected to impact the programmatic decisions that will result from the WM PEIS. A 10-year operations period was selected as an optimistic, but reasonable, assumption for waste shipments and associated treatment and disposal of all waste types. Exceptions to this assumption would include a full 20-year operations phase (i.e., construction phase not applicable).

The WM PEIS considers current inventory plus 20 years of waste generation. It does not conclude that no further waste will be generated or that waste management facilities will be retired subsequent to the 20-year period. Proposed operations at WIPP are analyzed in the WIPP SEIS-II.

Comment (3804)
The public is concerned that without site-specific data incorporated into the WM PEIS, DOE could make decisions with incomplete data.

Response
Site-specific data are used in the WM PEIS impact analyses .or the cumulative impacts analyses to inform the decisionmakers and public about potentially affected resources. Representative data points include site size, amount of land designated for waste management activities, population living within 50 miles of the site, site wind conditions, county of residence of site employees, 1990 Census data on counties near the site, sensitive plants and animals that occur at the site, distribution of minority and low-income populations in census tracts within 50 miles of the site, and cultural resources listed on the National Register of Historic Places. Before implementing WM PEIS decisions, DOE will perform additional analyses, as necessary, using site-specific and waste management facility location-specific data.

Comment (3956)
Table 4-3 in Volume I assumes that socioeconomic conditions and environmental justice only apply to counties in which 90% of the site's workforce resides or where the site is located. What is the basis for the DOE assumption that the presence of a major nuclear facility does not directly impact surrounding counties and populations by exposure to risk from normal site operations, accidents, and waste transports?

Response
Table 4.2-1 has been corrected to indicate that both the socioeconomic and human health regions of influence are encompassed in the analysis of environmental justice impacts.

Comment (4425)
DOE should provide in the WM PEIS quantitative estimates of uncertainties in key numbers and evaluate alternative research and monitoring programs to reduce these uncertainties to acceptable levels for making programmatic and final decisions. Criteria for defining and/or modifying decisions should be based on uncertainty considerations including:

- The costs and potential impacts of near-term decisions versus costs and potential impacts of making decisions later, and costs and impacts if early decisions turn out to have been wrong and corrective action is or is not taken;

- The potential interference of the alternatives selected on potential future recycling and waste treatment, storage, and disposal actions;

- How the impacts would compare if one assumes plausible values at estimated 95% confidence intervals that would imply maximum impacts at a site, versus plausible 95% confidence values that would imply minimum impacts at a site (considering uncertainties in the models and assumptions versus all uncertainties), and how that would change the relative and absolute impacts of alternatives;

- Criteria for triggering new decisions, reexamination of decisions already made, creating supplemental NEPA documents, or even writing a new PEIS as new and better information and methods of impact assessment become available. Timetables for such activities should also be provided. At a minimum, routine reevaluation of the need for new PEISs should be conducted every 5 years.

Response
Because of the programmatic nature of the document and the fact that waste management facility locations have not been selected, DOE did not conduct a detailed analysis of uncertainties and their potential effects on impacts estimates for the WM PEIS. DOE also did not attempt to factor estimates of uncertainty into the analysis to establish ranges of effects. DOE did conduct a qualitative analysis of uncertainties for the human health risk assessment (see Volume III, Section D.4). More importantly however, DOE structured the PEIS analyses of human health risks and environmental impacts to ensure both that the effects would not be underestimated and that they would be estimated consistently from alternative to alternative.

DOE accomplished this goal in three areas--use of site data, impacts estimation, and risk assessment--with a variety of techniques. Consistency and accuracy of site data were ensured by:

- Relying on more recent DOE databases for important variables, such as waste volumes at sites where the more recent data affected the comparison of alternatives;

- Relying on DOE summary reports and individual site reports for environmental data and operational information;

- Ensuring that individual sites reviewed these data to double-check their accuracy.

Consistency and conservatism in environmental impacts estimates were ensured by:

- Applying the same impacts estimation method across all sites and alternatives;

- Using conservative estimators of the potential for effects to highlight impacts estimates for review by the decisionmakers and public;

- Deferring to site-level analysis those impacts assessments that could not be reliably conducted in the PEIS.

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In particular, DOE established percentage change levels for impacts such as population, land use, and infrastructure, and included in the PEIS text all effects that met minimal criteria; e.g., at sites where 1% or more of available land area would be required for construction of waste management facilities, the site and alternative were highlighted as a potential concern for land-use impacts even though 1% is a minimal use requirement. DOE also checked site development plans for any potential conflicts with the type of proposed use.

Consistency and conservatism in the human health risk assessment were ensured by:

- Using the best available data on toxicity, accident frequencies, contaminant-specific environmental characteristics, and other important parameters;

- Using environmental-setting data on site meteorology and geohydrology developed by Pacific Northwest Laboratories specifically for risk assessment purposes;

- Using conservatively structured risk scenarios to estimate maximally exposed individual and population doses.

Section D.2.15 in Volume III summarizes the uncertainties in the PEIS health risk analysis. Risk estimate uncertainty is also qualitatively differentiated in Section 5.4.1 in Volume I.

In the notice entitled "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," the CEQ indicates that, as a rule of thumb, if the proposal has not yet been implemented or if the EIS concerns an ongoing program, an EIS that is more than 5 years old should be carefully reexamined to determine if the criteria in Section 1502.9 compels preparation of an EIS supplement (46 Fed. Reg. 18026 (1981)).

In accordance with the CEQ regulations and DOE's NEPA regulations, DOE would prepare a supplemental NEPA analysis for the WM PEIS where appropriate. DOE cannot determine at this time whether a supplemental analysis would be necessary for the WM PEIS.

Comment (4514)
The Draft WM PEIS lacks adequate information on biases in modeling, uncertainties, water pollution and other nonairborne routes of exposure, and cumulative impacts; therefore, the results of the modeling are inadequate to meet NEPA requirements or to be taken seriously for deciding the placement of waste management facilities. The WM PEIS should address how the GENII model (used to calculate radioactive unit doses for atmospheric releases) compares to CAP-88, the model used to characterize radionuclide transport and exposure for the reported impacts of airborne radionuclides in the affected environment and cumulative impacts sections of the WM PEIS, in most Site Environmental Reports, and in EPA regulations. The conservatism of these models should also be compared to that of ISC-2, ALOHA, RADTRAN4, RISKIND, MEPAS and other models used for human health impact assessment in the WM PEIS, along with the models and assumptions used to estimate impacts to workers.

It is not uncommon for air pollution models to differ in conservatism by a factor of 2 or more, since some models target most likely impacts, and others target 90% upper limits to risks.

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Without adequate information on the relative biases in the models and assumptions used to compute impacts, associated uncertainties, and the results of this on the modeled results, it is not possible to:

- Combine the estimated human health impacts from different models to determine overall cumulative impacts in a scientifically defensible manner;
- Adequately evaluate the limitations of available information and modeling for making programmatic decisions;
- Know how seriously to take the modeled impacts when using such results for decisionmaking;
- Objectively evaluate which waste management siting decisions can be made with confidence concerning their relative impacts on human health now, which should be reevaluated when better information becomes available, and which should be deferred until adequate information on impacts becomes available;
- Evaluate the need for existing and alternative future monitoring, modeling, and impact assessment work to improve the decisionmaking process and to avoid unnecessary adverse impacts on human health and the environment.

In addition, the assessment of human health impacts of the alternatives (except for waste disposal) and of existing sites in the Draft WM PEIS focuses exclusively on the effects of airborne pollution and, in some cases (mainly CAP-88 modeling of site impacts in Chapter 4 and 11), associated deposition on soil and biota. Other pathways of exposure dominate the impacts of many DOE sites. Furthermore, most waste storage and treatment systems and associated activities result in some discharges to surface water, if only from sludge thickening, final cleaning of contaminated equipment and personnel, etc. DOE should consider the facts that aqueous emissions and associated contamination of surface water and fish are expected to dominate the impacts of the high-level waste treatment at West Valley Demonstration Project (WVDP), according to the site safety report.

The Draft WM PEIS fails to document that the waste treatment alternatives will *not* result in discharges to surface water and other pathways of exposure that would cause much higher impacts than the impacts modeled. Without such an analysis, or a commitment to true zero discharge to surface-water pathways from DOE sites (which would involve a lot of evaporators and associated air emissions not analyzed in the WM PEIS), the modeling in the WM PEIS is incomplete and the missing information could be very significant.

Response

Appendix D in Volume III, and Appendices E and F in Volume IV of the WM PEIS describe the models used in the assessment of stationary source and transportation risks, and the rationales for the selection of these models. For example, DOE used GENII to model airborne releases in the WM PEIS because it enables the assessment of both acute and chronic exposures. CAP-88 is used to model only chronic exposures.

The WM PEIS used different types of models to estimate potential risks from stationary sources, such as waste management facilities, versus those from wastes transported under the Regionalized and Centralized Alternatives. The risk analyses for waste management workers considered the effects of

5.1 Impact Analysis Assumptions, Methodologies, Uncertainties

shielding on limiting exposures to direct radiation from stationary sources. However, the transportation assessment could not use shielding as a factor in reducing exposures because of uncertainties about potential locations of the receptors (e.g., the offsite population) in relation to the shipments. As a result, the transportation radiological risk estimates are conservative, i.e., higher than would be likely to occur on the implementation of the alternatives. This difference in conservatism does not complicate the risk management decisionmaking process because transportation radiological risk estimates are routinely lower than transportation physical trauma risks. Therefore, the risk manager must balance potential risks associated with exposure to radionuclides and radiation released from waste management facilities under the various alternatives against potential transportation risks associated with physical trauma from accidents.

Given the variety of data sources, models, and assumptions used in the WM PEIS, detailed explanations of individual model code biases are not warranted. Uncertainties introduced by such biases were systematically applied across sites and waste management alternatives. Therefore, they are not likely to influence the comparison of risks among the alternatives. Additional information about uncertainties involved in the health risk and transportation assessments is presented in Appendix D (Volume III) and Appendix E (Volume IV).

DOE has added text to Section 5.4.3.3 in Volume I and Section C.4.3.4.10 in Volume III to discuss the vulnerability of the various sites, including WVDP, to surface water quality impacts. Since the WM PEIS does not propose specific locations for waste management facilities on sites, DOE believes that impacts to surface-water quality would be more appropriately analyzed in sitewide or project-level NEPA reviews.

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Comment (14)
Commentors are concerned about radiation exposure to the general public and workers, with and without accidents.

Response
DOE performed detailed analyses using conservative assumptions to estimate health risks to the general public and workers that could result from potential radiation exposures from both routine waste treatment and storage facility operations and facility accidents. The results of the detailed analysis for each waste type are presented in Chapters 6 through 10 in Volume I. Cumulative impacts are presented in Chapter 11. The WM PEIS Summary document provides an overview of the risks involved for all alternatives for each waste type, and for each site.

Comment (16)
Commentors are concerned about the health and safety impacts of waste treatment, storage, and disposal activities at Lawrence Livermore National Laboratory (LLNL) because of the proximity of homes and apartments to the site.

Response
The WM PEIS evaluates health risks to the maximally exposed individual at each site, including LLNL. The maximally exposed individual is a hypothetical person who would receive the largest dose from waste management activities. In addition, the PEIS evaluates risks to persons living within a 50-mile radius from the geographic center of the site (for smaller DOE sites and from an existing waste management location at each of the larger DOE sites). Section 5.4.1.2 in Volume I contains a discussion of the populations and individuals at risk.

For each candidate site, the WM PEIS evaluates the potential for environmental impacts resulting from programmatic waste management activities (see Volume I, Chapters 6 through 10). The evaluation considers potential impacts from routine treatment and storage facility operations, facility accidents, incident-free transportation, and transportation accidents. In addition, the PEIS estimates cumulative impacts from existing site conditions, the proposed waste management actions, and other reasonably foreseeable future actions (see Volume I, Chapter 11). In general, the environmental impacts associated with waste management activities under all alternatives considered in the PEIS would be small. For impacts that would not be small, DOE would implement mitigation measures to reduce or eliminate the impacts, and, where applicable, comply within regulatory requirements. Therefore, there is no reason to believe that waste management activities at LLNL would have a significant negative impact on public health and safety in the communities around the site.

Comment (17)
Commentors believe there is a need for national baseline health data to determine health effects.

Response
The WM PEIS does not attempt to establish the baseline health risks resulting from past and current exposures at each site or from non-DOE sources. Dose reconstruction estimates have been prepared for the Hanford Site and similar efforts are ongoing at a number of other DOE sites. However, information on historic site-specific radiation doses is limited and, at this time, DOE does not have sufficient data to address existing baseline health effects from activities at all sites across the complex.

5.2 Human Health Risk Assessment

The estimated health risks in the WM PEIS from the implementation of the proposed waste management actions are generally quite small. Therefore, they would present little additional incremental risk to the existing baseline risks at the various sites.

Comment (34)
A commentor questioned the usefulness of estimating impacts to the maximally exposed individual.

Response
The maximally exposed individual is the individual member of the receptor population who is estimated to receive the highest total chemical intake and/or radiation dose from the airborne pathway over the individual's lifetime. Estimates of maximally exposed individual exposure and risk are useful because they are assumed to include the potential risk for other members of the population; i.e., the risks for most members of the population should be less than those estimated for the maximally exposed individual. Chapter 5 in Volume I and Appendix D in Volume III of the WM PEIS contain more details on the risk analysis methodology and human health risk estimates.

Comment (156)
A commentor is opposed to toxic waste impacts on health and safety in any and all communities.

Response
Minimization of potential health and safety risks and impacts will be a critical consideration for the DOE decisionmakers when selecting the alternatives for implementing waste management activities. In the WM PEIS, DOE determined potential health risks by detailed analyses, including (1) the risk to local residents from ongoing activities at the site; (2) the risk to workers from chemical, radiological, and physical hazards on the site; (3) the risk associated with transportation off the site; and (4) the risk to future individual receptors from disposal. In general, the health and safety impacts for all sites under all alternatives would be small. For impacts that would not be small, DOE would implement mitigation measures to reduce or eliminate the impacts and, where applicable, comply with regulatory requirements. During further selection, design, and implementation stages of waste management projects, DOE would take steps to minimize any impacts for alternatives or sites that could have unacceptable health and safety impacts.

Comment (180)
The City of Tracy is downwind from LLNL and Site 300 for most of the year and would be impacted by escaping radioactive and hazardous waste. This raises questions about the safety of City residents. One commentor was specifically concerned about risks from nuclear weapons production at LLNL and its resulting waste.

Response
While the potential risks of weapons research activities are outside the scope of the WM PEIS, the *wastes* from LLNL activities are addressed. (It should be noted that LLNL is not a nuclear weapons production facility; it is a research facility, and in that facility, nuclear weapons design research, not production is conducted.) DOE determined potential health risks to the general public from both normal waste management facility operations and accidents by taking into account local meteorology, hydrogeology, and population distribution when assessing the potential impacts of managing low-level mixed waste, low-level waste, and transuranic waste at LLNL. Chapters 6, 7, and 8 in Volume I provide the results of the detailed analyses for each of these waste types, respectively. Chapter 11

discusses cumulative impacts. The analyses indicate that air quality and water quality impacts from waste management activities at LLNL would not exceed regulatory limits. If DOE decides to site a new waste management facility at LLNL, it would establish design and operational limitations to ensure that releases from the facility would be maintained below regulatory limits.

Comment (384)
Commentors are concerned about family safety and requested that DOE clarify whether ANL-E residents would face potentially negative health impacts as a result of the alternatives considered in the WM PEIS.

Response
The WM PEIS evaluated the potential health risks from the treatment and disposal of low-level mixed waste and low-level waste and the treatment of transuranic waste at ANL-E. The results of these analyses are presented in Sections 6.4, 7.4, and 8.4 in Volume I. The health of the offsite public at ANL-E is not expected to be adversely affected as a result of the proposed waste management actions.

Comment (481)
I am alarmed by the recent proposal to make LLNL a site for treating mixed wastes. The proposed thermal treatment seems risky and dangerous, and transportation risks seem worth a second analysis.

Response
The WM PEIS does not propose a specific waste treatment technology for LLNL or for any other DOE site. Rather, DOE analyzed treatment technologies at many candidate sites, including LLNL. Thermal treatment technologies were evaluated at each candidate site to enable a comparison of potential impacts between sites. Thermal treatment is a currently available technology that can be an effective treatment process. DOE is aggressively seeking to develop other technologies to treat its wastes. DOE will not select a treatment technology as a result of analyses conducted in this PEIS, i.e., further studies, and NEPA reviews, as appropriate, would be prepared before such a decision is made. Refer to Section 3.7 in Volume I of the WM PEIS for a discussion of DOE's preferred alternatives for low-level mixed-waste treatment.

Transportation risks due to the properties of the cargo would generally be low, and risks from vehicle accidents would result in a maximum of one potential fatality for all options considered. When a specific technology is proposed for a specific site, human health impacts will be among the factors considered.

Comment (494)
The toxicity standards data used to determine risks and hazards are under review and might be changed. If these input parameters change, the magnitude of the risk problem described in the WM PEIS results would also change.

Response
The inhalation dose conversion factors (DCFs) used in the WM PEIS for both the worker and public radiological risk estimates come from the International Commission on Radiological Protection's Report (ICRP) 30 (1979-1988). Since the completion of the PEIS, there have been revisions made to ICRP 30 concerning the tissue weighting factors, biokinetic models, and additional dosimetric data. The current publications include ICRP 68 for workers and ICRP 72 for the public. Comparisons of ICRP 30 and 68, and ICRP 30 and 72, were made to assess possible effects on the PEIS risk estimates

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for workers and the public, respectively. Since the GENII computer model used to assess risk to the public incorporates 250 radionuclides, only the radionuclides which typically drive risks were compared. These included isotopes of cesium, plutonium, technetium, thorium, and uranium. Since the differences between ICRP 68 (worker) and 72 (public) were negligible, the comparisons for the worker and public using current DCFs versus ICRP 30 are nearly identical. The DCFs for most of the plutonium isotopes changed by one-half to one order of magnitude. For thorium-229 and thorium-230 the DCFs changed by slightly more than one-half an order of magnitude; thorium-232 was the only radionuclide that changed by more than one order of magnitude. For uranium, only uranium-232 changed by slightly more than one-half an order of magnitude. Therefore, use of the updated DCFs might cause some risk estimates to change by, at most, a factor of ten. Any such changes would be systematically applied across all alternatives and to all sites, so the relative differences among the waste management alternatives would not be expected to change.

Comment (562)
Why were the models selected for the risk evaluation chosen, and how do they differ from other accepted codes such as RESRAD and PRESTO-EPA? How are the MEPAS/GENII codes different from DOE/ANL's RESRAD code?

Response
WM PEIS analysts selected the models for their ability to address specific situations (e.g., atmospheric emissions, radiological dose assessment, groundwater transport, etc.). No two models were used for the same purpose. The selected models were used to estimate future concentrations of contaminants and subsequent risks.

For example, DOE updated the PRESTO-EPA code to include the toxicity values needed to evaluate the cancer and noncancer effects of exposures to hazardous chemicals. The MEPAS/GENII codes were used rather than RESRAD to enable the evaluation of chemicals in groundwater scenarios and far-field transport scenarios. Additional descriptions of the models used to estimate health risks from waste management facilities and transportation can be found in Appendices D, E, and F in Volume III and IV and the technical reports that support these appendices.

Comment (583)
A commentor is concerned about the potential for disasters during the transport and storage process, and the environmental risks to life, water, and air for future generations.

Response
DOE used conservative assumptions to estimate the potential health risks to the maximally exposed individual and to general public within a 50-mile radius either from an existing waste management facility or the geographic center of the site for both normal operations and accidents. The results of the detailed analyses for each waste type are presented in Volume I, Chapters 6 through 10. Cumulative impacts are presented in Chapter 11. The analyses show that the health risks to the maximally exposed individual and the offsite public generally would be small. For impacts that would not be small, DOE would implement mitigation measures to reduce or eliminate the impacts and, where applicable, comply with regulatory requirements.

The WM PEIS includes a detailed assessment of the risks of a complete range of credible transportation accidents for both rail and truck transportation, including low-probability/high-consequence and high-probability/low-consequence accidents. Emergency plans and equipment are in place at DOE sites to respond to these types of accidents and other emergencies. Emergency response plans are required by State and local authorities to deal with any emergency situation. DOE, the U.S. Department of Transportation, and the Federal Emergency Management Agency assist in review and modification of these plans, if requested. In addition, DOE provides for Radiological Assistance Program Teams consisting of trained experts equipped and prepared to quickly respond to an accident and assist local emergency response personnel, if requested.

Comment (619)
Commentors are concerned about the health and safety impacts of importing wastes to LLNL.

Response
Under the Decentralized Alternative and some of the Regionalized Alternatives, LLNL is a candidate to receive wastes from other sites for treatment and disposal. In general, the WM PEIS analysis finds that human health and safety and environmental impacts under all alternatives for all sites would be small. For impacts that would not be small, DOE would implement mitigation measures to reduce or eliminate the impacts and, where applicable, to maintain compliance with regulatory requirements. There are no notable national trends for offsite population risks from treatment; however, some sites, such as LLNL, might require different technologies to minimize treatment risks. Before waste management decisions can be implemented, studies will be necessary to identify the precise location, capacity, and design of facilities at the individual DOE sites. As a part of that process, DOE will consider the results of existing relevant or required new sitewide or project-level NEPA reviews, which would consider the potential for health and safety impacts based on site-specific conditions.

Comment (727)
A commentor stated that the WM PEIS must include the increase in disease and death due to leakage.

Response
The commentor is concerned about "leakage," which DOE assumes refers to releases of hazardous materials during both routine operations and accidents at waste management facilities. Human health risks resulting from routine operations and accidents at conceptual waste management facilities are addressed in the WM PEIS. Volume I, Chapter 5, describes the approach and analytical methods used to evaluate human health impacts. Chapters 6 through 10 address the impacts of managing the five WM PEIS waste types, and Chapter 11 describes cumulative impacts. Additional details about the methodologies and assumptions used to assess health impacts can be found in Appendices D, E, and F.

Comment (881)
A commentor stated that cancer is already raging in western Kentucky (without Paducah being a waste management facility).

Response
Human health risks (e.g., cancer) constitute a site-specific impact parameter analyzed in the WM PEIS. Offsite population human health risks and offsite maximally exposed individual health risks are cumulative impact parameters addressed in the WM PEIS (See Volume I, Section 11.12). The health risk analysis suggests that adverse health effects from the operation of waste treatment facilities located at Paducah would be small. Public health impacts from disposal would similarly be small after implementation of mitigation measures necessary to ensure that DOE would not exceed radionuclide

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and/or chemical-specific limits. Volume III, Appendix D, describes in more detail waste management facility human health risk estimates.

The information on existing conditions addresses *only* exposures that currently can be attributed to site activities, and not baseline health risks from non-DOE sources. The WM PEIS does not attempt to establish the baseline health risks resulting from past and current exposures at each site or from non-DOE sources. Dose reconstruction estimates have been prepared for the Hanford Site and similar efforts are ongoing at a number of other sites. However, information on historic site-specific radiation doses is limited and, at this time, DOE does not have sufficient data to address existing baseline health effects from activities at all sites across the complex.

Comment (892)
A commentor stated that the WM PEIS sections dealing with potential adverse human health effects (Chapter 5 in Volume I and Appendix D in Volume III) appear to be well developed and comprehensive, and risks to public health from transportation and storage of DOE waste materials, as expressed in the WM PEIS, are reasonable.

Response
Thank you for your comment.

Comment (1168)
A commentor stated that the most important consideration in the decision to locate a waste management facility at PGDP is the potential adverse affects on future generations.

Response
A key objective of the WM PEIS is to help protect the health and safety of the current population and of future generations. Minimization of potential future health risks will be a primary consideration for the DOE decisionmakers when selecting the alternatives for implementing waste management activities.

Comment (1255)
If waste is not handled properly, cities within a 50-mile radius of PGDP could be affected by radiation.

Response
DOE performed a number of risk assessments during the preparation of the WM PEIS, among them an examination of potential effects on human health and the environment around PGDP. DOE chose a 50-mile radius to represent the offsite population which could be affected. Using this very conservative radius, these studies concluded that risks to public health and the environment at PGDP would be small under any of the alternatives described in the PEIS (see Section 11.12.2, Volume I.)

Comment (1505)
A commentor stated that under two of the Regionalized Alternatives, low-level wastes and low-level mixed wastes, would be brought to the LLNL Main Site first for treatment, and that there has been inadequate attention to what it would mean to put these very hazardous wastes in areas with earthquake faults and 6 million people within a 50-mile radius.

Response
Sixteen candidate disposal sites were selected for evaluation based on screening performed by DOE in coordination with the States under the Federal Facility Compliance Act. Three exclusionary criteria were applied, including that sites could not be located within 200 feet of a seismic fault.

DOE performed detailed analyses using conservative assumptions to determine the potential health risks to the general public living within a 50-mile radius from an existing waste management facility at LLNL, for both routine facility operations and accidents, including seismic events (earthquakes). The analyses were designed to include the potential impacts from all reasonably foreseeable conditions. In addition, the PEIS assumes the use of generic or conceptual facilities. Actual facility design would include safety and security measures. Waste management facilities constructed by DOE would be designed to the appropriate local seismic standard.

The results of the detailed analyses for each waste type are presented in WM PEIS Volume I, Chapters 6 through 10, and in the cumulative impacts discussion presented in Chapter 11. The analyses show that the health risks to the population from the proposed waste management actions generally would be low.

Comment (1514)
DOE has failed to present an adequate public health case for the proposal supported by the WM PEIS. DOE has not adequately characterized or assessed the risk of existing inventory and ongoing operations at the contaminated sites. We don't know why we are being asked to spend $40 billion to move wastes around.

Response
For each of the alternatives being considered, the impacts to the general public that could result from both normal operations and accidents were determined by detailed analyses of potential health risks, including (1) the risk to local residents from ongoing activities at the site; (2) the risk to workers from chemical, radiological, and physical hazards onsite; (3) the risk associated with transportation offsite; and (4) the risk to current and future generations associated with disposal. These analyses used conservative assumptions. The results of the detailed analyses for each alternative are presented in the WM PEIS Volume I, Chapters 6 through 10, and the cumulative impacts presented in Chapter 11. The analyses show that for all alternatives health risks would generally be small.

As required by NEPA, DOE has also evaluated a No Action Alternative, which represents the continuation of current operations. DOE also evaluated alternatives that minimize waste transportation (Decentralized Alternatives) and that maximize waste transportation (Centralized Alternatives). Thus, DOE believes that the impacts of transporting wastes were considered. Transportation costs would be highest for the Centralized Alternatives, but are still a small percentage of the total costs.

Comment (1613)
The risk numbers in the WM PEIS are disturbing and should be reevaluated, since they show significant health effects over 20 years, and appear to be much higher than any other study; for example, the percentage of fatalities due to radioactivity is much higher.

Response
The approach taken in the WM PEIS was first to identify the groups potentially at risk and then to compare the risks to these groups and individuals if the different alternatives were implemented. The risk

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assessments conducted for the WM PEIS used conservative assumptions and best estimates when data were only generally known or where processes have not been demonstrated fully.

A more conservative approach enables the WM PEIS to include a larger number of scenarios and causes the risk estimates to be higher. Mitigation measures such as tighter waste acceptance criteria, better air pollution control equipment and containment structures, safer packaging for transportation, etc., would be evaluated, as appropriate, when actual facilities are proposed for construction.

Comment (1728)
DOE needs to consider how close Rocky Flats Environmental Technology Site (RFETS) is to public residences and the uses of the potentially contaminated water in these communities.

Response
The health risk analyses conducted for the WM PEIS include assessment of potential risks to members of the offsite population from the proposed treatment of low-level mixed waste, low-level waste, and transuranic waste at RFETS. Members of the offsite population living within 80 kilometers (50 miles) from the center of RFETS are assumed to be exposed to radionuclide and hazardous chemical contaminants released from conceptual thermal treatment facilities. As explained in the description of the air dispersion modeling used to estimate risk (see Appendix D in Volume III of the WM PEIS) site-specific data were used as inputs to the environmental fate models. For RFETS, information on the distribution of the population living within 50 miles from the center of the site was used, along with data on prevailing meteorological conditions at the site. The results of the health risk analyses, presented in Chapters 6, 7, and 8, and in the Volume II Site Data Tables, suggest that adverse health effects in the offsite population living in the vicinity of RFETS resulting from the treatment of low-level mixed waste, low level waste, and transuranic waste should be small.

DOE also evaluated the potential health risks resulting from the proposed disposal of low-level mixed waste and low-level waste at RFETS. Risks from consumption of contaminated groundwater were evaluated using a very conservative analysis. The analysis assumed that a future hypothetical farm family living on the site established a well located 300 meters (984 feet) from the center of a disposal unit. The farm family is assumed to be located so that they receive the highest possible exposure to contaminants leached to groundwater from disposal units. A series of families is assumed to live at this location for 10,000 years. Each family is assumed to have a lifetime of 70 years; therefore, 143 lifetimes were evaluated.

The results of the analysis, presented in Sections 6.4.1.8 and 7.4.1.7 in Volume I, are risk estimates for an individual member of the farm family lifetime expected to receive the highest potential exposure. The chemical constituents of low-level mixed waste were estimated to result in higher groundwater contamination and potential health risk than the radionuclide constituents. However, these risks can be mitigated by the use of more effective waste treatment processes than those modeled for the WM PEIS.

Sections 6.4.1.9 and 7.4.1.8 of the Final WM PEIS also present the results of the risk vulnerability analysis for potential collective or population risk from waste disposal. The results of the analysis suggest that RFETS is intermediate among the 16 proposed DOE disposal sites in its potential for adverse risks to offsite populations from waste disposal.

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Comment (1735)
Although it is true that uncertainties resulting from assumptions concerning toxicological effects and exposure scenarios are systematic in nature, uncertainties resulting from inadequate estimates of exposure concentrations may vary by orders of magnitude from site to site. The application of generic fate and transport models to sites with very different geologic and hydrologic characteristics will yield very different degrees of uncertainty.

Response
Volume I, Section 5.4.1.1, of the WM PEIS discusses the uncertainty in the risk estimates. The environmental fate and transport models used in the risk assessment are described in Appendix D in Volume III. These models were applied consistently to all sites in order to have comparable results. Where possible, actual site-specific hydrogeological and meteorological data were used as inputs to these models to develop the exposure and risk estimates. Generic data were substituted if site-specific data were not unavailable.

The WM PEIS risk assessment assumptions were intended to yield reasonably conservative risk estimates (i.e., estimates that tend to overestimate rather than underestimate risk) using the best available data at the time of the analysis and state-of-the-art models. Additional site-specific and facility-specific analyses might be needed prior to site-specific project implementation.

Comment (1752)
DOE needs to include additional discussion about the long-term health impacts from low levels of radiation exposure. DOE needs to consider exposure and impacts over several decades.

Response
DOE analyzed the potential chronic or long-term health effects in offsite populations resulting from airborne releases of radionuclides and hazardous chemicals during waste treatment and storage operations, as described in Volume I, Chapter 5, of the WM PEIS. The waste management operations are generally assumed to occur over a 10-year period. Exceptions to this assumption would include a full 20-year operations phase (i.e., construction phase not applicable) for the No Action Alternative, and the site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS. The resulting health impacts are evaluated over the assumed 70-year lifetime of the offsite populations potentially exposed.

In addition, the potential risks to future individuals resulting from the disposal of low-level mixed waste and low-level waste are assessed for a 10,000-year period. The results of these analyses are presented in Sections 6.4.1.8 and 7.4.1.7 in Volume I.

Comment (2072)
Section 5.4 states that no calculation of secondary pollution resulting from disposal was made because the effects would be small compared to treatment, storage, and disposal. This is a misplaced comparison. Relevant here are the effects of this secondary pollution compared to the overall effects of DOE's waste management effort. Since the WM PEIS shows zero offsite impacts on the population, even a small secondary effect could significantly change this picture.

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Response
Section 5.4 of the WM PEIS states that "secondary pollutant" discharges resulting from the burning of fuel for waste treatment are analyzed in the air quality sections of the waste-type chapters. The air quality impacts analysis considered emissions of criteria pollutants from waste incineration and from combustion processes used to provide heat for buildings. Emissions of these pollutants were compared to applicable standards to determine compliance. The standards are set, in part, through consideration of adverse health effects. Therefore, the health impacts of "secondary pollutants" were indirectly considered in the air quality impact analysis. Secondary pollutants discharged from waste treatment facilities were not considered in the health risk assessments conducted for most waste types because the potential impacts from exposure to these contaminants are expected to be minor in comparison to impacts from releases of radionuclides and hazardous chemicals. However, emissions of dioxin from hazardous waste treatment facilities were considered in the health risk analysis conducted for that waste type, the results of which are presented in Section 10.4 in Volume I of the WM PEIS. The estimated population risks from the routine operation of treatment facilities were generally small for most sites and most waste types, but not zero.

The health risk analysis also included evaluation of potential impacts of waste transportation. Impacts from transportation included estimation of excess latent cancer fatalities resulting from exposure to diesel exhaust (see Appendix E in Volume IV for additional details). DOE has revised Section 5.4 in Volume I to include these clarifications.

Comment (2095)
A commentor from the Brookhaven National Laboratory (BNL) area stated that DOE should avoid the possible incidence of cancer due to hosting a disposal site or acceptance of offsite DOE waste, since long-term low-dose exposure to radiation has *not* been shown to be safe.

Response
DOE assumes the commentor is referring to BNL hosting a disposal facility. As explained in the alternatives, BNL would manage only its own low-level mixed waste and low-level waste. BNL would dispose of such wastes only under the Decentralized Alternative. It would not dispose of any offsite wastes. The results of the health risk analyses for BNL-relevant waste streams of low-level mixed waste and low-level waste are presented in Volume I, Sections 6.4 and 7.4, respectively, of the WM PEIS. The WM PEIS health risk analysis includes consideration of adverse health effects potentially resulting from long-term exposures to low doses of radiation, including both cancer and non-cancer effects. The PEIS estimates that the health risks associated with the proposed future waste management activities at BNL may, in general, be considered small. The WM PEIS assesses potential health risk impacts on a programmatic scale. Locations for actual disposal facilities will be selected based on sitewide or project-level NEPA reviews. Prior to disposal, DOE would conduct performance assessments to ensure protection of human health and the environment.

Comment (2135)
The risk assessment analysis considered radioactive exposure. There is also volatile organic compound exposure, and often one multiplies the effect of the other. DOE needs to consider the additional risk to the population.

Response
Risks from exposure to hazardous chemicals, including volatile organic compounds, are considered in the WM PEIS for the waste types that contain these compounds (i.e., low-level mixed waste, transuranic

waste, and hazardous waste). Appendix D in Volume III of the PEIS contains a detailed description of the methodology used to evaluate health risks from radiation and hazardous chemicals. Section D.2.6.3 describes the differences in radionuclide and chemicals exposures. DOE added this information to Section 5.4.1.4 in Volume I. As described in Section D.2.5.1, the methodology did not address the potential interaction of exposure to radiation and hazardous chemicals, since little is known about synergistic and antagonistic effects.

Comment (2161)
The WM PEIS health risk estimates are way too low and undermine the credibility of the PEIS.

Response
The WM PEIS health risk estimates are based on the use of various assumptions, the best available data at the time of the analysis, and state-of-the-art models. A summary description of the environmental fate and dose conversion models used in the analysis is presented in Volume I, Table 5.1-1. The assumptions made in performing the program-level screening analyses were intended to yield reasonably conservative risk estimates (i.e., estimates that tend to overestimate rather than underestimate risk). The methods used to estimate health risk, described in summary form in Section 5.4.1 in Volume I and in detail in Appendix D in Volume III, have been found to be reasonable by a peer review panel, EPA, and the Centers for Disease Control. Note that the WM PEIS health risk estimates address only the risks resulting from exposure to contaminants released from waste treatment, storage, and disposal facilities. Sitewide or project-level NEPA analyses would contain more detailed assessments of worker and public health risks.

Comment (2163)
DOE needs to look at the epidemiology associated with sites such as RFETS and the Oak Ridge Reservation (ORR), including the Piketon Site, that had a high incidence of stomach cancers, to help them better understand the risk of cancer at this site.

Response
The WM PEIS examines the potential exposure of offsite populations to radionuclides and hazardous chemicals released from waste treatment facilities. In addition, in the evaluation of cumulative impacts, modeling estimates of annual radiation doses are considered from existing site activities and other potential future actions. Historical site-specific radiation doses have not been addressed because the availability of this information is limited. The estimated offsite population risks from the proposed waste management actions generally would be small; therefore, they would present little additional incremental risk to whatever the historical radiation exposures from natural background and previous practices might be at the various sites.

Comment (2168)
Workers need to be informed when they have been exposed.

Response
DOE maintains a comprehensive safety program for controlling, monitoring, and recording the exposure of workers to radiation and radioactive materials in accordance with Federally mandated standards and regulations. These standards are established in DOE Order 5480.11, which addresses worker radiation protection. As part of this monitoring program, workers are provided information on the exposures that they could receive on the job, as well as reports on any previous exposure that they might have received. Details of the safety programs are available from DOE officials at each site. DOE must also comply with

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the DOE occupational radiation protection regulations (10 CFR 835). Subpart I of these regulations contains reporting requirements to individuals.

Comment (2191)
DOE dose calculations are based on current site boundaries and land uses and ignore the fact that more and more people will be on the sites. For example, the WM PEIS ignores the fact that people using the Columbia River are far closer and receive more radiation than the hypothetical maximally exposed individual at the boundary of the Hanford Site.

Response
The health risk analysis in the WM PEIS assumed that current site boundaries will remain the same throughout the 20-year period of analysis of the proposed waste management actions. As described in Section 5.4.1.2 in Volume I of the PEIS, three potential groups of receptors were evaluated: (1) the offsite public, (2) waste management workers, and (3) onsite workers not involved in waste management actions. The health risks estimated for the latter group can be indicative of those that could be expected for individuals located inside existing site boundaries. As noted in Section 4.3.8, future land-use issues will be considered in sitewide and project-level NEPA analyses.

Comment (2290)
I don't think that the exposure risks that you put forth in this PEIS, which come to about 70 years, are enough when you consider the long half lives of many of the elements and radionuclides that you are talking about. I think we have to look ahead to seven generations.

Response
As described in Section 5.4.1.2.2 in Volume I of the WM PEIS, the hypothetical farm family is assumed to move directly onto a site 300 meters (984 feet) downgradient from the center of an underground disposal facility. A series of families is assumed to live there for 10,000 years. Each family lifetime is assumed to be of 70 years duration; therefore, 143 lifetimes were evaluated, which is much more than seven generations. This hypothetical farm family was assumed to be exposed to radiation at a time when there had been a leak from the disposal facility and when institutional controls (fences, warning signs, land records, etc.) no longer existed. This hypothetical farm family is assumed to be located so that they receive the highest possible exposure to contaminants in groundwater.

Comment (2293)
I don't hear anything about autoimmune systems health risks, which is something that is coming out more and more in a lot of studies, and is devastating the health of the community.

Response
The health effects endpoints evaluated in the WM PEIS health risk analyses included cancer incidence, cancer fatality, and genetic effects resulting from radiation exposure, and cancer incidence and noncancer effects resulting from exposure to hazardous chemicals. Immunotoxic effects were included in the evaluation of noncancer effects for chemical contaminants that have reference doses or reference concentrations based on immune system effects, as described in Section D.2.5 in Volume III.

Comment (2300)
DOE must protect worker and public health and safety, first and foremost.

Response
Worker and public health and safety are important concerns for DOE. The WM PEIS estimates potential health risks for workers and the public for the proposed waste treatment, storage, and disposal actions. As stated in Volume I, Section 2.2, DOE will manage its current and anticipated volumes of the five WM PEIS waste types in compliance with all applicable Federal and State laws, to protect public health and safety, and to enhance protection of the environment.

Comment (2315)
The WM PEIS cancer rate assumptions leave out pregnant women, fetal exposure risks, and genetic resistance or susceptibility to cancer and exposures.

Response
Section D.2.2.1 in Volume III of the WM PEIS states that while the human health risk analysis did not explicitly include risks to sensitive subpopulations (e.g., pregnant women), sensitive subpopulations were considered in the development of the toxicity values used in the analysis.

For radiological exposures, the risk factors used to estimate the risk of cancer and adverse genetic effects were taken from International Commission on Radiological Protection Publication 60. These factors differ for workers and the general population. The general population includes the more sensitive younger age groups and pregnant women not included in the worker population.

For chemical exposures, DOE used EPA slope factors and reference doses or reference concentrations. EPA used uncertainty factors to derive these toxicity benchmark values from animal toxicity tests. The uncertainty factors used to develop slope factors and reference doses and concentrations ensure that the values are valid for a wide range of potential receptor groups, including sensitive subpopulations such as children, pregnant women, and the elderly.

Comment (2327)
A commentor requested that the Illinois Department of Health conduct a study of pediatric cancer rates in the ANL-E area before any decision is made, because there is a higher than expected incidence of cancer.

Response
The WM PEIS health risk impact assessment examined potential Waste Management Program effects on workers and the public as a result of the proposed waste management actions at ANL-E. DOE estimated that worker and public health risks would be small at ANL-E under all waste management alternatives. Sitewide or project-level NEPA reviews would be better able to address site-level epidemiology or public health studies.

In response to requests from the residents of Lemont, Illinois, the Illinois Department of Public Health initiated a study of the cancer incidence among children in the Township. The Division of Epidemiologic Studies prepared a study based on hospital reports found in the Illinois State Cancer Registry for the years 1986 through 1993 (Illinois Department of Health, 1995). Seventeen cases of childhood cancer were observed in the study area, four cases more than the 13 that would be statistically expected. The most frequently reported childhood cancer type was leukemia, with six cases observed and three cases statistically expected. The report finds that those differences are not statistically significant. More details on the survey can be obtained from the study.

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Comment (2386)
DOE should present health effects in context, especially health effects below what is probably a *de minimis* level (not defined, but probably less than one excess health effect in number). DOE should provide data with a clear explanation of health effects so as to not mislead or create undue anxiety among members of the public.

It is essential that narratives be provided to give readers perspective on the risk data. It is essential that before indicating (by word or number) that there is a substantial increase in effect or risk, that the level of risk associated with past or background levels be very clearly explained and delineated. It is important that before developing any total risk estimate, that the WM PEIS provide an explanation of how that total might be associated with some actual or at least specified potential impact.

If, for example, an alternative considered by DOE would create additional exposures, but these exposures are some small fraction of either background or allowable exposures, it is misleading not to explain that fact. Similarly, if an alternative results in a small increment in exposure, but the resulting level does cross over into a known or suspected danger zone, that too needs to be highlighted. We believe all citizens will want to know when there are only *de minimis* health differences between alternatives (which could vary dramatically in cost) and when differences in projected exposures really do create significant differences in risk.

Response
The WM PEIS human health risk analysis provides estimates of risks to workers and the offsite population resulting from releases of radionuclides and hazardous chemicals from waste treatment and storage facilities. The health risk endpoints focused on in the analysis are numbers of radiation cancer fatalities for workers and the offsite population, and numbers of physical trauma fatalities for workers. For maximally exposed individuals, the health risk endpoint focus was the probability of cancer fatality.

There are no regulatory *de minimis* levels for the health risk endpoints described above. Evaluation of population impacts requires consideration of the overall size of the population. For example, an estimated single radiation cancer fatality in a population of millions of individuals could be considered to be less significant than the same effect in a population of hundreds of individuals. Cancer probability estimates for single individuals resulting from exposure to hazardous chemicals in DOE mixed wastes can be crudely compared to EPA Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) guidance of 1 in 1 million to 1 in 10,000 levels of acceptable risk.

Section 5.4.1 in Volume I of the WM PEIS contains a discussion intended to aid the reader in interpreting risk values. To assist the reader in understanding the risk values, DOE has modified the PEIS by adding a footnote to the tables containing risk data for the maximally exposed individual to direct the reader to Section 5.4.1 for an explanation and methods for interpreting the risk values.

Cumulative impacts due to exposure to radionuclides are described in Chapter 11 in Volume I. Potential impacts from proposed waste management activities are added to impacts from existing site conditions and impacts from other reasonably foreseeable activities to develop estimates of cumulative impacts. These cumulative impacts are compared to applicable limits and standards.

Comment (2388)
Provide more detail and a better discussion of worker risks for the different treatment alternatives. The WM PEIS lacks data about worker risks, an area in which DOE has invested significant resources in both real time monitoring and dose reconstruction. Members of affected communities, who often work at DOE sites, are concerned about exposures and risks on the site as well as at its borders.

Response
The WM PEIS attempts to estimate future risks to workers from exposure to radiation and hazardous chemicals and from physical trauma resulting from facility construction and operation accidents. The commentor stated that DOE has invested significant resources in worker exposure monitoring and dose reconstruction studies. These studies address past exposure, from which risk can be calculated. Therefore, they cannot be directly applied to estimate *future* risk at new facilities designed to meet stringent safety standards. However, to the extent that historical worker exposure information is available, it can be used to baseline the models used to estimate future worker risk.

Section 5.4.1 in Volume I of the WM PEIS summarizes the methodology DOE used to estimate future worker risk. The worker risk estimates created for the purpose of comparing alternatives are presented in detail in Chapters 6 through 11 in Volume I of the WM PEIS.

Comment (2398)
One of the issues important to understanding the impacts of the Nation's nuclear waste sites is the impact of stress--of concern to DOE sites because of the stress and anxiety created by radionuclides. Given the scientific community's consensus that stress is a real health danger and plays a role in both acute and chronic disease promotion, it is essential that it be included in the effects that are assessed in this PEIS.

Response
DOE has attempted to estimate reasonably foreseeable, quantifiable environmental impacts due to the actions analyzed in the WM PEIS, including operations and accident consequences. In the absence of a sufficient connection to a physical impact, other potential concerns such as moral, emotional, and psychological (including fear, dread, mental anguish, etc.) issues are beyond the scope of required NEPA evaluations. (*Metropolitan Edison v. People Against Nuclear Energy*, 103 S. Ct. 1556 (1983))

Comment (2400)
The current 365-page effort to explain the human health risks (Volume III, Appendix D) is one part of the WM PEIS that needs the most reworking. The reader encounters hundreds of page-length tables that focus inordinately on the cancer endpoint, using formulas that the average reader cannot begin to decipher, and which are based on risk models that are the subject of a strenuous debate within the scientific community. The PEIS does little to alert the reader to the nature of this debate. Hence, the use of numbers derived from these models obscure the uncertainty about them. The real problem is that these tables divert attention from what is really needed--an effective narrative to help the reader (particularly the lay reader) understand how the alternatives being considered by DOE will actually affect the health of anyone, but particularly how they will affect the reader and his or her neighbors.

Response
Appendix D contains a detailed description of the health risk analysis methodology and results, and was written for a technical audience. The summary narrative for the lay reader is presented in Volume I,

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Chapter 5, for the methodology, and Chapters 6 through 10 in Volume I for the results. Section 5.4.1.4 also contains a discussion intended to aid the reader in the interpretation of the results of the risk analyses.

The WM PEIS risk analysis used currently accepted state-of-the-art models and conservative assumptions to produce conservative risk estimates (i.e., the analysis tends to overestimate rather than underestimate risks). The health risk methods were subjected to peer review before being used in the WM PEIS.

Comment (2480)
Volume I, Section 4.3.1, states, "For DOE sites, the MEI [maximally exposed individual] received a dose considerably less than 1 mrem per year..." Obviously, this is not true, since the MEIs at LANL and ORR both receive more than 1 mrem.

Response
DOE revised the WM PEIS in response to this comment. The end of the last paragraph of Section 4.3.1 now reads: "More than 70% of the sites reported doses to the MEI that were less than 1% of the standard. Los Alamos National Laboratory reported the highest estimated dose, about 80% of the standard."

Comment (2503)
Volume I, Section 5.4.1, states that risks to onsite and offsite populations were estimated for 70 years. This statement needs to be revised to include the transportation risks, which were estimated for 50 years for accident conditions.

Response
The WM PEIS health risk analysis evaluated impacts to members of the public living within a 50-mile radius of DOE sites, to waste management workers, and to onsite workers not directly involved in the proposed waste management actions. For each of these groups of receptors, the standard risk assessment assumption of 70 years was used for the length of an average lifetime.

For offsite population receptors, health risks were primarily from exposure to contaminants released from waste treatment facilities. Both radionuclide and hazardous chemical contaminants are potentially released. Exposure to radionuclides and hazardous chemicals is assumed to occur over the 10-year period of facility operation. Exceptions to this assumption would include a full 20-year operations phase (i.e., construction phase not applicable) for the No Action Alternative, and the site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS. Exposure to radionuclides that are inhaled or ingested is expected to continue for up to 50 years, since these contaminants, once incorporated into the body, will irradiate tissues even after the 10-year operations period has ended. This 50-year exposure period (also known as a commitment period) is assumed for radionuclide releases from both treatment facilities and from trucks or railcars following transportation accidents.

Waste management workers are also subject to physical hazard injuries and fatalities resulting from industrial accidents occurring during the assumed 10-year facility construction period and 10-year facility operation period.

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Comment (2505)
Referring to the Volume I, Section 5.4.1, statement that offsite population and onsite uninvolved workers were assumed to be exposed to radionuclides through inhalation of airborne vapor and dust and ingestion of contaminated groundwater, a commentor asked, "What about the ingestion of contaminated food?"

Response
DOE has revised Section 5.4.1.3 in Volume I of the WM PEIS to state that exposure of the offsite population was analyzed to determine upper-bound exposures by ingestion of radioactively contaminated food and groundwater as well as inhalation of airborne vapor and dust. Section D.2.4.1 in Volume III provides additional information about the exposure pathways used to estimate health risks for the offsite population and noninvolved worker population.

Comment (2506)
Is the statement in Section 5.4.1 that workers are assumed to be wearing the proper industrial safety and health equipment representative of the worst case, or is this a conservative estimate?

Response
Section 5.4.1 in Volume I of the WM PEIS states that the WM PEIS health risk analysis assumes that workers wear the proper industrial safety and health protection equipment for the tasks being performed. This is not a conservative assumption, but, rather, indicates expected current practices. DOE believes that, on the bases of all of the assumptions used to model worker risk, these analyses, like the offsite population risk analyses, produce conservative estimates of exposure and risk.

Comment (2507)
Even if the skin is considered a much lower exposure pathway, skin and ingestion would still contribute to the cumulative impact of chemical exposure. The overall dose would increase if other routes of exposure were considered. The public could also be exposed to plumes from site releases of hazardous chemicals.

Response
The WM PEIS health risk transportation accident analysis assumes that, under accident conditions, exposure to hazardous chemicals occurs only by inhalation of vapors and dust. The analysis evaluates the potential release of gaseous or low-boiling liquid hazardous chemicals from trucks or railcars and their downwind dispersion in plumes. Individuals would be exposed to these contaminants for only a short period of time as the plume passes by. Given this scenario, dermal absorption is possible, but ingestion is not likely. Inhalation of gaseous contaminants in a passing plume is expected to produce much higher exposures than skin contact, especially under the short-term acute exposure scenario used for the transportation accident risk analysis.

The WM PEIS health risk analysis does consider some dermal exposure to contaminants. As noted in Figure 5.4-1 in Volume I of the WM PEIS for the routine operation of waste treatment and storage facilities, the offsite and noninvolved worker population exposure pathways include dermal absorption of tritium. The tritium is derived from tritiated water released to the atmosphere from the waste management facilities. Both absorption of tritium through the skin and in the lungs are taken into account. The combined rate of absorption is assumed to be 150% of the inhalation intake rate alone.

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Comment (2508)
DOE states that it did not calculate genetic toxicity from chemicals because it is more difficult to assess than radionuclides. Please explain.

Response
Genetic toxicity includes a number of different kinds of effects or endpoints, including gene mutations, which alter the makeup of genes, and gross chromosomal aberrations, which alter the structure or number of the chromosomes. The type of genetic toxicity resulting from exposure to hazardous chemicals depends on the mechanism of action by which the compound interacts with the genetic material of the cell. Since different compounds can produce different types of effects, chemical-derived genetic toxicity must be considered on a compound-specific basis. This kind of analysis is more difficult and requires more assumptions than are appropriate for a programmatic study.

By contrast, potential genetic effects resulting from radiation exposure are more easily analyzed, since the mechanism of radiation effects on genetic material is similar for all radionuclides. Potential exposure is estimated using the environmental fate models identified in Appendix D in Volume III of the WM PEIS. These models sum potential exposure from all different types of radionuclides as person-rem (population) or rem (individual) estimates. The estimated doses are converted to risks by applying International Commission on Radiological Protection (ICRP) risk factors. For example, the ICRP risk factor for genetic effects (which is treated as a single endpoint) for public receptors is 0.0001 genetic effects per rem-lifetime. This value is multiplied by the estimated population exposure (person-rems per lifetime) to obtain an estimate of the number of genetic effects that could occur in the population. Note that this analysis does not require tracking exposure to individual radionuclides.

Comment (2509)
Volume I, Section 5.4.1, states that assumptions about fatalities from chemically-induced cancers are not possible because of the diverse nature of chemically-induced cancer. Is this reasonable? It would seem that chemically-induced cancers would be just as easy to determine as radiation-induced cancers.

Response
A more detailed explanation is provided in Section D.2.6.3 in Volume III of the WM PEIS. In summary, research and epidemiological studies have provided enough information to develop risk factors for radionuclide-induced cancer incidence and cancer fatalities. However, the current practice in chemical cancer risk assessment is limited to estimating potential cancer incidence resulting from exposure to chemical carcinogens. Therefore, the WM PEIS presents total cancer incidence for both chemicals and radionuclides, but presents potential cancer fatalities only for radionuclides.

Comment (2510)
Volume I, Section 5.4.1, states that noncancer toxicity is the health impact discussed for hazardous waste. Chemical carcinogenesis would seem to be important also, since chemical carcinogenicity is not directly proportional to toxicity for all chemical species.

Response
DOE deleted the referenced statement from Section 5.4.1 in Volume I of the WM PEIS. Section 10.4 in Volume I states that both cancer incidence and non-cancer effects resulting from chemical exposure were evaluated for hazardous waste alternatives.

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Comment (2511)
If total cancer incidence includes nonradionuclide-induced cancers, how does one derive nonfatal cancer incidence *due to radionuclide exposure* by subtracting fatal from total? Wouldn't this instead represent nonfatal cancer incidence due to *radionuclide plus chemical* exposure? Is there an assumption missing from the WM PEIS text?

Response
The discussion under the heading of "Cancer Incidence" in Section 5.4.1.4 in Volume I of the WM PEIS mentions that total cancer incidence was calculated for both chemicals and radionuclides. However, as shown in the health risk sections of Chapters 6 and 8, radiation cancer incidence and chemical cancer incidence are evaluated and reported separately. DOE revised the PEIS to clarify this.

The discussion cited in the comment refers only to radiation-induced cancers. Nonfatal radiation cancers can be derived from estimates of total radiation cancer incidence by subtracting the estimated number of fatal radiation cancers. This discussion does not apply to chemically-induced cancers, because available methods allow only estimation of total chemical cancer incidence, but not chemical cancer fatalities. Therefore, DOE did not attempt to calculate chemically-induced cancer fatalities. See Volume III, Section D.2.6.3, for more on this subject.

Comment (2512)
Volume I, Section 5.4.1. DOE should provide better explanation of why the total cancer incidence and the nonfatal cancer incidence values lead to an overestimation of skin cancer incidence.

Response
DOE has revised Section 5.4.1.4 in Volume I of the WM PEIS to clarify this discussion. The ICRP dose conversion factors used in the PEIS to convert radiation exposure to estimates of total cancer incidences contain a relatively large component of skin cancers. Such cancers generally result from external exposures to radiation. However, the exposure pathways evaluated in the PEIS (e.g., inhalation or ingestion of radionuclides) are largely internal pathways. These internal exposures to radionuclides are not likely to induce large numbers of skin cancers.

Comment (2513)
The Hazard Quotient actually measures the risk of noncancer health effects (i.e., the NOEL/LOAEL effect measured), not chemical effects.

Response
DOE has revised Section 5.4.1.4 in Volume I of the WM PEIS to describe the Hazard Quotient as a measure of the risk of noncancer health effects.

Comment (2514)
A conservative estimate would use the worst accident year since records were available, not just one or two specific years, such as indicated in this document.

Response
The most recently available information from the Bureau of Labor Statistics was used because this information was thought to be representative of *current* industrial conditions and safety practices.

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Conservative values were used in the absence of better information. Current practices were assumed to be in place during the construction and operation of new waste management facilities.

The values used were conservative, although not necessarily the most conservative. Use of the worst accident year would not provide the most realistic estimates of future worker injuries and potential fatalities. Moreover, NEPA does not require analysis of a worst-case scenario, but rather, reasonably foreseeable consequences. Therefore, current Bureau of Labor Statistics information was considered to be the most appropriate for use in the WM PEIS.

Comment (2515)
Volume I, Section 5.4.1, states that each health risk endpoint should be considered independently; values for different endpoints should not be added to obtain overall estimates for a given group of receptors. This is a valid statement. However, this caveat could make it more difficult to compare risks between alternatives if different endpoints dominate different alternatives.

Response
Exposure-related impacts are evaluated as a number of different health effect endpoints (e.g., cancer fatality, cancer incidence, genetic effects, noncancer effects). However, the PEIS generally uses one endpoint, excess latent cancer fatalities from radiation exposure, to characterize public health risk in the comparison of alternatives summaries in Chapters 6 through 10 in Volume I. DOE used this endpoint as an indicator of the variability in exposure-related health effects among the waste management alternatives evaluated because it is a standard of measurement commonly used and recognized in radiation health effects assessments conducted by DOE and other organizations. In addition, the trends in the other exposure-related endpoints among the alternatives generally followed the trend in the cancer fatality estimates. For workers, DOE used both excess cancer fatality and potential physical hazard fatality to characterize the variability in the routine facility operation health risk impacts among the waste management alternatives evaluated.

Comment (2530)
Noise is not considered for workers.

Response
The WM PEIS health risk analysis did not analyze the impacts of noise on workers, since hearing protection would be provided to all waste management workers as required by Occupational Safety and Health Administration regulations, and because noise impacts would depend on the specific waste management technologies selected. Because the WM PEIS does not select technologies, noise impacts cannot be evaluated at this time.

Comment (2628)
Volume I, Section 12.2, under "Health Risk to Workers and the Public." The "risks" talked about on line 7 of this paragraph are individual risks and assume exposure. The key element missing from the statement is the size of the population being exposed. It would be helpful to present the total health risk for each of the alternatives and compare them.

Response
Section 12.2 of the WM PEIS discusses unavoidable adverse environmental effects, including health risks to workers and the public. The health risks evaluated in the WM PEIS include population as well

as individual risks for members of the offsite population, noninvolved workers, and waste management workers. The results of the health risk analyses are presented in Chapters 6 through 10. Alternative-by-alternative comparisons are presented by chapter in the "Health Risk Impacts" discussion of the "Comparison of Alternatives Summary" sections of each waste-type chapter. Population risks are presented as number of incidences of adverse health effects (e.g., excess latent cancer fatalities) in the population of receptors. Individual risks are presented as the probability of occurrence of an adverse health effect over the lifetime of an individual.

Comment (2630)
The actual chemical constituents analyzed in the various waste streams are not presented in Appendix D. Where are the chemicals of potential concern characterized and the source term defined for hazardous waste? Much of the detailed risk assessment methodology (e.g., the remote shielding scenario on Page D-63, Paragraph 5) is not in Appendix D; rather, readers are referred to Oak Ridge National Laboratory publications (e.g., ORNL, 1995c).

Response
The WM PEIS Hazardous Waste Technical Report contains the chemical constituent composition of the waste stream treatment categories evaluated for hazardous waste. The WM PEIS lists this report, along with the Oak Ridge National Laboratory technical reports referenced in Section D.3.2.2 in Volume III. These documents are available for review in the DOE public reading rooms identified in Volume I, Section 1.9, of the Final WM PEIS.

Comment (2633)
Volume III, Section D.2.7.2. One full-time equivalent (FTE) could also underestimate exposure for workers who work more than or are exposed more than 2,000 hours per year.

Response
An FTE is not necessarily a single individual, but is assumed to be equivalent to one individual working full-time in a waste management facility. Risks to actual individual workers might be overestimated because exposures could be shared by more than one worker working less than full time. Therefore, an FTE could represent the cumulative work time totals of several individuals who are not involved full time in waste management activities. The actual exposures for any individual worker are expected to be within occupational safety and DOE Order guidelines because standard radiation protection and industrial hygiene programs are assumed to be in place.

Comment (2635)
Volume III, Section D.2.7.2. How can a conservative estimate use 5.6 work hours per day as an exposure time?

Response
The value of 5.6 hours per day represents the assumed 70% facility availability for each 8-hour day, which is a realistic and not a conservative estimate. Other elements of the worker exposure scenario do use values and assumptions that provide overall conservative estimates of exposure and risk.

Comment (2637)
Volume III, Section D.2.9. Did DOE use maximum acceptable levels other than EPA reference doses? If so, where are they presented in the PEIS and how were they derived?

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Response
Volume III, Section D.2.9, states that EPA reference doses and reference concentrations were the only sources used as the maximum acceptable concentrations for the Hazard Index calculations.

Comment (2638)
Volume III, Section D.2.10. Are 8-hour time-weighted averages appropriate for the workers at these facilities? Do any sites use shift lengths of a different duration? This could affect the maximally exposed individual's exposure duration.

Response
Standard 8-hour time-weighted average threshold limit values were used to estimate potential worker noncancer health risks resulting from occupational exposures to hazardous chemicals. Although actual shift lengths may differ, for analytical purposes, workers were assumed to be potentially exposed for 8 hours per day, 40 hours per week. This assumption was made in order to provide a consistent framework for risk comparison in this programmatic document.

For hazardous chemical exposure, note that for actual worker exposure to hazardous chemicals, DOE complies with exposure levels established by the Occupational Safety and Health Administration. Waste management worker chemical exposures also are expected to be limited by the workplace practices implemented to ensure safe conditions for workers potentially exposed to radiation or radionuclides. DOE Order 5480.11 specifies the maximum allowable worker exposure for radiation. DOE sites institute their own additional waste operation procedures and worker exposure limits.

Comment (2639)
Where are the Hazard Index calculations?

Response
The Hazard Index calculations are in WM PEIS Volume III, Tables D.3.3-5 through D.3.3-8 for hazardous waste; Tables D.3.4-5 through D.3.4-11 and D.3.4-25 through D.3.4-29 for transuranic waste; and in Tables D.3.5-5 and D.3.5-7 through D.3.5-14 for low-level mixed waste. Additional details about the noncancer health risk analyses are provided in the technical reports cited in Appendix D. Hazard Index analyses are also summarized in the health risk sections of Chapters 6, 8, and 10 in Volume I.

Comment (2641)
In Volume III, Section D.2.15, the WM PEIS provides a poor example for a variable that would be influenced by uncertainty. The consumption of agricultural food products by the offsite population depends on site variables such as geology (soil) and geography, climate (growth parameters) and irrigation, population distribution, and demographics (income). It is not necessarily true that an overestimation of consumption of contaminated agricultural food under one alternative would translate to a similar overestimation for all alternatives.

Response
The WM PEIS risk analysis uses an approach that involves similarities among the alternative scenarios. For example, the variables cited in the comment (e.g., geology, geography, climate, population distribution, and demographics) are site specific, but for a given site are not expected to vary by waste management alternative. The only parameter that varies significantly from alternative to alternative is

the amount of waste that needs to be processed. Although the *actual* consumption of agricultural food products by the offsite population might vary as stated in the comment, for analysis purposes, the *modeled* consumption is similar, except for the influence of the amount of waste processed. This systematic application of modeling and scenario assumptions provides a consistent framework for risk comparison. Therefore, the example given in Section D.2.15 in Volume I of the WM PEIS is correct as stated.

Comment (2642)
For Table D.3.1-13, where is the "risk per year" calculation (for cancer incidence/fatalities) explained?

Response
See Sections D.3.1.1 through D.3.1.3 in Volume III.

Comment (2643)
Volume III, Section D.3.3.2. Why were the 1992 threshold limit values used instead of the 1994 or 1995 versions? How can it be assumed that full-time equivalents are not exposed to chemical concentrations exceeding the time-weighted average threshold limit values?

Response
The 1992 Threshold Limit Values (TLVs) for all 126 chemicals used in the WM PEIS to estimate worker noncancer risks from exposure to hazardous chemicals for low-level mixed waste, transuranic waste, and hazardous waste were compared to the 1996 values published by the American Conference of Governmental Industrial Hygienists. Only arsenic changed significantly, decreasing by slightly greater than one order of magnitude. Four other chemicals had TLV values that changed somewhat, but all four changed by less than half an order of magnitude.

TLV Comparison

Chemical	PEIS Worker TLV	1996 Worker TLV	TLV Ratio (New/Old)
Arsenic	2.00E-01	1.00E-02	0.05
Cyclohexne	0.00E+00	3.00E-02	N/A
Manganese	5.00E+00	2.00E+00	0.4
Mercury	5.00E+02	2.50E-02	0.5
Tetrachloroethylene	3.39E+02	1.70E+02	0.5
Toluene	1.47E+02	1.88E+02	1.3

These TLV changes are all fairly small. In addition, as discussed in Sections 6.4.1.7 and 8.4.1.5 in Volume I of the WM PEIS, no worker noncancer health effects are expected as a result of low-level mixed waste and transuranic waste management. Although worker noncancer health effects are estimated as a result of hazardous waste management, as discussed in Section 10.4.1.4 in Volume I the estimated Worker Exposure Index values are similar among all alternatives (Table 10.4-5). Any adjustments to these values by use of the updated TLVs would be small. These adjustments would be systematically applied across the hazardous waste alternatives and to all sites, so the relative differences among the alternatives would not be expected to change.

Waste management workers are assumed to comply with all standard worker protection and good industrial hygiene practices, including the use of personal protective equipment and appropriate process

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engineering controls. American Conference of Governmental Industrial Hygienists TLVs are industry-recognized benchmarks of acceptable exposure levels.

Comment (2777)
Consider that a group at ANL-E called "Looking Inside the National Laboratory Center," is in the process of constructing an onsite museum open to the general public. It would bring the general public in very close proximity to the waste storage areas.

Response
A number of DOE sites that have waste management facilities, such as Los Alamos National Laboratory (LANL) and Sandia National Laboratory-New Mexico (SNL-NM), have museums open to the public. This could also occur at ANL-E. The WM PEIS analysis showed that impacts to noninvolved workers (i.e., onsite workers not directly involved in waste management actions) at ANL-E would be low under all alternatives. A member of the general public who periodically visited the museum presumably would be on the site less than a noninvolved worker and, therefore, their risk should be less.

Comment (2816)
In Section 4.3.1 of the WM PEIS Summary document, it might be misleading to indicate that risks generally decrease with time. This applies to short-lived radionuclides like cesium-137 and cobalt-60, but not to low-level transuranic wastes and not to nonradioactive metals. Under Superfund, for example, a carcinogenic risk of 1 in 100 or 1 in 1,000 are both unacceptable risks. Please clarify.

Response
Section 4.3.1 of the Draft WM PEIS Summary document described the potential health risk resulting from low-level mixed waste treatment and disposal. The statement cited in the comment about risks decreasing with time refers only to the risks presented by the radionuclide component of low-level mixed waste. DOE has provided a discussion in Section 5.4.1.2.1 on risks from radiation exposure for the hypothetical intruder and hypothetical farm family to demonstrate risk as described in the Summary.

Section 6.4.1.10 in Volume I presents details about low-level mixed waste disposal risks for intruders. The cancer fatality probabilities presented in Table 6.4-16 are generally lower at 300 years after disposal than at 100 years. Strontium-90 (half-life 29 years) was the main radionuclide risk driver at 100 years, whereas longer-lived radionuclides, such as thorium-232 (half-life 1E-10 years), nickel-63 (half-life 96 years), and americium-241 (half-life 432 years) were the main risk drivers at 300 years.

Comment (2817)
Because no estimate was provided for BNL's production of low-level waste, no applicable risk factor could have been computed for BNL. Therefore, any analysis of BNL is fatally flawed.

Response
The Final WM PEIS has been revised to incorporate information from the 1996 Integrated Data Base. This database contains an estimate of 254 cubic meters of low-level waste at BNL (see Chapter 7 in Volume I and Appendix I in Volume IV of the WM PEIS). Therefore, the impact areas, including health risks, were reanalyzed for BNL. Thus, the health risk estimates for management of low-level waste at BNL, which are presented in Section 7.4 in Volume I and in the Volume II Site Data Tables of the Final WM PEIS, are based on this updated waste-volume information.

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Comment (2827)
Volume I, Section 4.3.1, states that maximally exposed individual doses from 40 CFR 61 National Emission Standards for Hazardous Air Pollutants (NESHAP) emissions are used to define the baseline for analyzing impacts of proposed actions. NESHAP maximally exposed individual doses only address the effects from airborne emissions. The baseline should include effects from all pathways.

Response
The WM PEIS health risk analysis evaluates a number of potential exposure pathways for different receptor groups, as described in Section 5.4.1 in Volume I of the WM PEIS. For the offsite population receptor group, inhalation of contaminants released to the atmosphere from waste treatment and storage facilities is considered to be the most important exposure pathway (see Figure 5.4-1). Multimedia pathways are considered to be of less importance than the airborne pathway for most members of the general public. The maximally exposed individual airborne doses presented in Table 4.2-2 in Volume I are taken from the *Summary of Radionuclide Air Emissions from Department of Energy Facilities for CY 1992*. To ensure a common basis for the cumulative impacts analysis, DOE also used maximally exposed individual airborne dose estimates to define the baseline risk conditions at the sites.

Comment (2831)
Volume I, Section 5.4.1. National Pollutant Discharge Elimination System (NPDES) permits might not address radionuclide contamination. The WM PEIS should include a description of the types of permits applicable to radionuclide liquid discharges.

Response
The comment correctly states that NPDES permits might not address radionuclide contamination. Liquid effluent discharges from DOE facilities to the environment would be subject to applicable requirements of Federal and State NPDES and industrial wastewater discharge regulations. These requirements may include limits for non-radiological parameters including hazardous constituents, temperature, and flow. Releases of radionuclides must meet the limits specified in the DOE Orders. Effluent discharges to municipal sewers must meet applicable State and local requirements, including any requirements of the service provider.

DOE intended the reference to NPDES permit compliance to refer only to applicable discharges under the NPDES program. Accordingly, DOE revised Section 5.4.1.3 in Volume I of the WM PEIS to delete the word "permit."

Comment (2833)
Volume I, Section 5.4.1, compares average individual risk to CERCLA risk range guidance (1 in 10,000 to 1 in 10,000,000). As noted in the text, the CERCLA risk range is based on maximally exposed individual risks, not on average risks. Despite the disclaimer, the comparison is not appropriate and should be deleted.

Response
DOE deleted the comparison of "average" individual risk to CERCLA risk range guidance.

Comment (2834)
The discussion in Volume I, Section 5.4.1, regarding population risk does not accurately reflect the EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) (*Federal Register*,

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54 FR 51654, December 15, 1989). The NESHAP describes a two-step process. The first step is determining "acceptable" risk based on maximally exposed individual risk. This risk level is 1 in 10,000. The second step is determining "ample margin of safety" below the 1 in 10,0000 level. This second determination might involve population risk. The example given in Section 5.4.1 is not accurate. A risk of 1 in 100 would not be acceptable compared to the 1 in 10,000 presumptive "acceptable" risk level. The point of including population risk is that even a risk of 1 in 10,000 might not be acceptable if the population exposed at the maximally exposed individual level were too large.

Response
DOE deleted the cited example, and the Final WM PEIS explains that all measures of risk, including population risk, need to be examined to determine if the maximally exposed individual risk should be allowed to exceed the NESHAP "acceptable" risk level. Appendix D, Section D.2.14, of the WM PEIS also was revised to reflect this clarification.

Comment (2836)
Individual risk goals in drinking water standards are set at 1/10,000 or lower for carcinogens. Volume I, Section 5.4.1, of the PEIS should further substantiate and document the claim regarding risk goals of 1 in 100 in drinking water standards.

Response
DOE corrected the WM PEIS to state that drinking water standards have individual risk goals of 1 in 10,000 or lower for carcinogens. See Section 5.4.1.4 in Volume I of the WM PEIS.

Comment (2838)
The radon standard referred to in Volume I, Section 5.4.1, is probably the EPA guidance for residential radon levels. This is guidance, not a standard. In addition, the residential radon guidance (4 picocuries per liter) is not risk based, but was determined based on cost and practicality. Comparing it with risk-based criteria is not appropriate.

Response
DOE deleted the reference to the radon standard identified in the comment.

Comment (2862)
The basis for the computation in Volume I, Section 4.3.1, must be clearly stated, because it is not clear whether the measurements are made on the basis of possible releases or predicted releases. DOE must account for worst-case scenarios, considering the history of DOE operations at sites such as BNL.

Response
DOE revised Section 4.3.1 in Volume I of the WM PEIS to note that predicted releases are used to characterize the affected environment, not measured/monitored results. Additional information is contained in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final WM PEIS.

Waste management risk values are estimates based on modeled releases, not measurements. The assumptions used in the health risk analysis are intended to yield reasonably conservative risk estimates that would overestimate rather than underestimate risk. The best available data at the time of the analysis and state-of-the-art models were used.

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NEPA does not require analysis of worst-case scenarios, but rather requires analysis of reasonably foreseeable consequences in EISs. Note that the WM PEIS health risk analysis includes consideration of very conservative exposures from waste management. As described in Section 5.4.1 in Volume I, these include risks to the offsite population maximally exposed individual from waste treatment, maximum consequence facility accident scenarios, and the hypothetical intruder scenario for waste disposal.

Comment (2900)
It is difficult to understand the nature of the risk posed by the various waste streams.

Response
The WM PEIS analyzes the potential health risks to workers and the public resulting from DOE's management of high-level waste, low-level mixed waste, low-level waste, transuranic waste, and hazardous waste. Health risks result from exposures to radionuclides released from waste treatment, storage, and disposal facilities, from exposure to direct radiation, and from physical hazards associated with facility construction and operation accidents. Members of offsite populations are assumed to be exposed primarily to radionuclides released to the atmosphere from waste treatment facilities. Workers are assumed to be exposed to direct radiation and to experience physical hazard injuries and fatalities.

Details of the health risk analysis methodology are provided in Appendix D in Volume III. A summary of the methodology is presented in Section 5.4.1 in Volume I. Results of the analyses for each waste are presented in summary form in the health risk sections of Chapters 6 through 10 in Volume I. Detailed results for each site and alternative are presented by site and waste type in Volume II Site Data Tables. Chapter 11 in Volume I presents the health risk results for each site from the combined waste management actions across all waste types, and cumulatively, inclusive of existing site conditions and other proposed actions. Guidance on the interpretation of the results of the health risk analysis is provided in Appendix D in Volume III and in Section 5.4.1 in Volume I.

Comment (2921)
Some common measure of hazard reduction must be created for each waste stream. It is not practical to compute a quantitative health risk; at the least, a common measure based on environmental release rates in reasonable scenarios must be established.

Response
The WM PEIS evaluates five waste types: low-level waste, low-level mixed waste, transuranic waste, high-level waste, and hazardous waste. As discussed in Section 5.2 in Volume I of the WM PEIS, for each waste type, DOE combined waste streams into treatment groups based on physical properties to enable the development of generic waste treatment systems. The waste volumes were then "processed" through these conceptual treatment facilities, as discussed in Sections 6.2, 7.2, 8.2, 9.2, and 10.2 in Volume I. As discussed in Section 5.4.1 in Volume I, health risks were quantitatively evaluated both for the public and for waste management workers. These evaluations revealed that risks to members of the offsite public would result from airborne releases of radionuclide and chemical contaminants from the treatment facilities; and risks to workers would result from direct exposure to radiation during facility operation and from physical hazards resulting from facility construction and operation.

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Comment (2924)

In calculating radiation and chemical exposures for workers handling waste and the 50-mile radius population, why estimate for 10 years if 20 years is the time frame covered in document?

Response

As stated in Volume I, Section 5.2.3, of the WM PEIS, the first 10 years of the 20-year time frame used in the waste management analysis was assumed to be a construction phase, during which the treatment, storage, and disposal facilities for a waste type would be built. All inventory and newly generated wastes were assumed to be shipped, treated, stored, and disposed of, as appropriate for the waste type in question, during the succeeding 10-year operational phase. Yearly throughput volumes were based on this 10-year "workoff" assumption. Exceptions to this assumption would include a full 20-year operational phase (i.e., construction phase not applicable) for the No Action Alternative, and the site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS.

Comment (2938)

Section 5.4.1 (under *Health Risks*) must address the high rate of breast cancer on Long Island and the potential risks associated with alternatives proposed for BNL. A commentor does not want DOE to add to the incidence of breast cancer on Long Island.

Response

The WM PEIS health risk analysis addresses the potential risks only from the construction and operation of new waste treatment, storage, and disposal facilities. Section 5.4.1 in Volume I of the WM PEIS provides a description of the methods used to assess health risks. The results for each waste type are presented in Chapters 6 through 10. Chapter 11 also addresses, by site, the cumulative health impacts of the management of the combined waste types, the existing conditions at the site, and other proposed actions at the site.

Note that the WM PEIS health risk analysis considers site baseline risk only as a component of cumulative impacts. In Chapter 11, baseline risk is considered as the potential effect of existing site-related actions on population exposure and risk. The analysis does not include regional epidemiological or health statistics information, such as the rate of cancer incidence on Long Island. The estimated risks of the proposed waste management actions at BNL must be considered as excess latent cancer incidence or fatality risks that would be added to the existing baseline.

BNL continually monitors for impacts to public health, safety, and the environment. Air and water emissions from BNL are permitted and regulated by EPA, NYSDEC, and DOE. When these agencies assign standards to environmental releases, they consider risks to public health, safety, and the environment. The amount of radiation exposure received by BNL's maximally exposed individual (a hypothetical person who receives the largest dose as a result of actions at BNL) is 100 times less than the DOE standard. The potential relationship between cancer incidence rates on Long Island and BNL site activities is currently under independent investigation by a number of local organizations through funding provided by the National Cancer Institute. In addition, Suffolk County has named an independent group to analyze the influence of BNL actions on public health in communities surrounding the site.

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Comment (3016)
Volume I, Section 5.4.1, states that actual data are used where available, but generic assumptions are substituted where needed. It is entirely unclear where the specific versus the generic data were used. Of substantially more concern is the fact that the degree of site characterization across the complex is quite variable. Inclusion of some, but not complete, site-specific data are more likely to bias the results than to meaningfully add to the strength of the analysis.

Response
The WM PEIS health risk analysis is based on the use of state-of-the-art models and the best available data at the time of the analysis. Site-specific environmental data were developed for each site for use in the environmental fate models. This information included meteorological, hydrogeological, and population distribution data. A number of models were used to estimate releases of contaminants from waste treatment, storage, and disposal facilities and their distribution in the environment. Standard assumptions were made regarding the contact of workers and the public with the contaminants through various exposure pathways. All assumptions were consistently applied across all sites and waste management alternatives.

The WM PEIS health risk analysis results are screening-level estimates that are influenced to a large extent by the assumptions and models used in the analysis. Chapter 5 in Volume I describes the methodologies used to evaluate potential impacts. Section 5.4.1 in Volume I includes a discussion of the uncertainty involved in the risk estimates. The consistent application of available data and assumptions throughout the analysis produced estimates that are adequate and useful in comparing the differences among waste management alternatives.

Comment (3026)
There are many uncertainties and arbitrary assumptions used for risk assessment. The risk assessment applied degrees of conservatism for each alternative in an arbitrary fashion. Thus, it is difficult to compare alternatives according to their potential risk. Unless "degree of conservatism" can be handled on an equitable basis (i.e., best estimate, or 95/95 approach for fair comparison), risk comparison of alternatives should not be attempted.

Response
Section 5.4.1.1 in Volume I of the WM PEIS describes the types of uncertainties associated with the risk estimates. As described in this section, for purposes of programmatic analysis, many assumptions were used in the risk assessment. However, they were not arbitrarily selected or applied. For example, standard assumptions were used for a range of exposure assessment parameters, such as length of lifetime, average body weight, amount of air inhaled, etc. The assumptions used were intended to provide reasonably conservative risk estimates. The best available data at the time of the analysis and state-of-the-art models were used in the analysis. The modeling and scenario assumptions were consistently applied throughout the analysis for all alternatives. Therefore, many of the uncertainties are systematic, and should not affect the relative differences in risk estimates among programmatic waste management alternatives.

Comment (3029)
It is not logical to attempt to discriminate between alternatives when the same assumptions are made for each site. If the exact same assumptions are used, the risk is always the same and the analysis is

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useless. The correct method is to make site-specific assumptions, then use the same analysis method to determine relative risk.

Response
Section 5.1.2 in Volume I of the WM PEIS contains a listing of the computer models used in the risk analysis. Although several exposure parameter values were assumed to have the same values at every site (e.g., average body weight, inhalation rate, period of exposure, length of lifetime), many of the models required the use of site-specific hydrogeological, meteorological, and population distribution data. The use of site-specific data in the models produced site-specific estimates of risk.

Comment (3073)
Section 5.4.11 seems to be summarized too briefly, because it does not mention seismic characteristics at Hanford, which were supposed to be accounted for in the health risk assessment.

Response
Information about seismic conditions at Hanford are summarized in Section 4.4.4 in Volume I, and described in more detail in the WM PEIS Affected Environment Technical Report. The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

The potential health risks resulting from waste management facility accidents, including those from earthquakes, are addressed in Volume I in Sections 6.4.3 for low-level mixed waste, 7.4.3 for low-level waste, and 8.4.3 for transuranic waste. Tables 6.4-19, 7.4-16, and 8.4-10 contain summary information on maximum consequence treatment facility accidents, including those caused by earthquakes at Hanford. Additional details about the facility accident analyses are presented in Appendix F (Volume IV).

Comment (3229)
The WM PEIS analysis method does not appear to consider the proposed reduction in the allowable standard for exposure to radiation for the general public from 100 mrem per year to 25 mrem per year.

Response
The WM PEIS is intended to show, on a relative basis, the potential impacts of implementing the proposed alternatives. The relative relationship of these impacts would not change, even with a change in standards. Although the WM PEIS mentions the 100 mrem standard for context, the analyses in the WM PEIS do not determine the acceptability of impacts by comparison to this standard. Therefore, the analyses in the WM PEIS are not dependent on this dose standard.

Comment (3231)
Because of the long half-life and bioaccumulation potential of the wastes under consideration, the arbitrary 50-mile radius for pathway examination should be extended to include all potentially exposed persons using the Columbia River downstream of Hanford.

Response
The general population living within the 50-mile radius of the region of influence is assumed to be exposed to contaminants released to the atmosphere from treatment facilities. Section 5.4.1 in Volume I indicates that direct releases of contaminants to surface water from waste management

facilities are expected to be limited. Dilution of contaminants in surface-water bodies could further limit the importance of this potential route of exposure. Section D.2.3.1 in Volume III states that deposition of airborne contaminants to surface water is expected to result in potential exposures many times lower than those from inhalation. In addition, recharge to surface water of groundwater contaminated as a result of waste disposal is also expected to produce relatively lower concentrations of contaminants because of dilution. Therefore, populations that are potentially exposed primarily by contact with Columbia River water or aquatic organisms downstream of the Hanford Site and outside the 50-mile radius are expected to receive lower exposures to contaminants released from waste management facilities at Hanford than the population living within the region of influence exposed primarily via the airborne pathway.

The WM PEIS health risk analysis described in Section 5.4.1 is a screening-level evaluation. The analysis uses several generic assumptions that are considered to be acceptable given the programmatic nature of the document. Sitewide or project-level NEPA reviews are better able to consider more detailed, site-specific information, such as potential concentrations of bioaccumulative contaminants in Columbia River sediment or aquatic organisms.

Comment (3248)
The Final PEIS should explain how transport and waste facility risk assessments take into consideration uncertainties and inaccuracies in waste characterization data. The WM PEIS should also explain how potential human errors during waste handling and packaging will be minimized, e.g., errors in labeling whereby wastes may be incorrectly classified as not transuranic or not regulated under the Resource Conservation and Recovery Act (a possibility identified in the Tiger Team Report of 1990).

Response
Section 5.4.1 in Volume I and Sections D.2.15 and D.4 in Volume III contain discussions of the uncertainties inherent in the WM PEIS health risk estimates. In addition, Appendix I in Volume IV contains a discussion of the significance of updating waste-volume estimates for low-level mixed waste, low-level waste and transuranic waste.

DOE recognizes the importance of more effective and cost-effective waste characterization approaches and identifies waste characterization technology as a focus area for technology development in Volume IV, Appendix H. The potential for human errors during waste handling and packaging will be minimized by facility design, standard operating practices, and employee training.

Comment (3252)
The WM PEIS risk assessments for transport and offsite health impacts from waste treatment and disposal facilities should use more accurate California population densities, which exceed the 10,000 people per square mile used in the WM PEIS for average population densities.

Response
The population densities for each population zone are identified in Section E.6.3 in Volume 1 of the PEIS. The commentor is correct in stating that some California population densities exceed 10,000 people per square mile. It should be noted, however, that urban transportation of waste shipments is the smallest fraction of travel. In addition, the majority of most urban areas are approximately 10% lower than the 10,000 people per square mile. Thus, DOE believes that impacts from transportation are conservatively estimated.

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In addition, Section E.8.4 in Volume IV of the PEIS describes the uncertainties in the calculation of radiation dose. Uncertainties associated with computational models are recognized but are difficult to quantify. Therefore, assumptions are made at each step of the risk assessment process that are intended to produce conservative results (that is, overestimate the calculated dose and radiological risk). Note that the single largest contributor to the collective population doses calculated with RADTRAN were found to be the dose to members of the public at truck stops. For trucks approximately 80% of the estimated public dose was incurred at stops. Thus, DOE believes the population densities yield conservative results.

Comment (3257)
The Final WM EIS should consider estimated impacts to an offsite maximally exposed individual for *all* relevant pathways, including potential public exposure from radioactive releases into sewer systems and storm drain runoff into streams that leave the site, not just airborne emissions.

Response
Section 5.4.1.2.3 in Volume I of the WM PEIS states that the potential exists for human exposure to radiological and chemical contaminants in the surface water. Receptors can be exposed through use of contaminated surface water for drinking water, bathing, swimming, or irrigation. In addition, ingestion of fish or shellfish taken from contaminated surface waters can be another source of contaminants through bioaccumulation of the contaminants in the tissues of these organisms. Potential pathways for surface-water contamination from waste management practices include deposition of contaminants released to the atmosphere to surface-water bodies, overland runoff to surface waters, releases of contaminants in aqueous effluents from treatment and storage facilities, and recharge of surface waters by groundwaters potentially contaminated through waste management disposal practices.

Of the potential surface-water contamination pathways, only deposition of airborne contaminants is amenable to quantitative analysis without information about the exact location of the facility or technology employed for waste treatment, storage, or disposal on a given site. Preliminary estimates described in Appendix D in Volume III for the Columbia and Clinch Rivers, indicated that the potential dose received from ingestion of surface water contaminated by deposition of airborne contaminants was a thousand to millions of times lower than that received from inhalation in a gaseous plume of hazardous or radioactive material.

Other potential pathways of surface-water contamination can be controlled or are more affected by the technical design and relative location of the waste management facilities with respect to the location of surface-water bodies. Releases of contaminants in aqueous effluents from treatment and storage facilities are expected to be small because process wastewaters from these facilities would discharge to aqueous waste treatment facilities. After treatment, wastewaters would be recycled or discharged from these plants. All wastewaters, including stormwaters, would be discharged in compliance with site-specific DOE, National Pollutant Discharge Elimination System, or industrial wastewater discharge limits, which are established based on consideration of the potential health and environmental effects of contamination of the receiving body. Disposal facilities might eventually degrade and release contaminants to the groundwater. Resultant contamination of surface water from the groundwater depends on the specific location of the disposal facility with respect to the surface water; however, dilution of the contaminants in "clean" surface waters is likely to result in surface-water concentrations that are much lower than the concentrations in the groundwater.

Since the WM PEIS does not attempt to make waste management facility technology or location decisions, there would be a high degree of uncertainty associated with any quantitative surface-water pathway exposure estimates. Consequently, DOE did not conduct a detailed evaluation of this pathway. Surface-water pathway analyses would be presented in sitewide or project-level NEPA reviews, as appropriate.

As stated in Section 5.4.3 in Volume I, the aqueous wastewaters that are currently being managed at the sites are not part of the WM PEIS. The WM PEIS includes only those aqueous wastes generated by the hypothetical facilities analyzed as part of the WM PEIS alternatives. These waste management facilities were assumed to be very efficient in water use. Process wastewater would be treated per regulatory and permit requirements and recycled to the extent practicable with little liquid effluent discharge. Therefore, there is little process wastewater that would be discharged to surface waters after treatment. Since process wastewater treatment would continue at the sites where it presently occurs, and the volumes of process wastewater treated at each site would vary only slightly between alternatives, the effects of process wastewater treatment on surface water and groundwater quality are already accounted for in the affected environment section. These impacts would be evaluated in sitewide or project-level NEPA reviews.

Comment (3287)
The zone of potential impact is a 50-mile radius from the site center, because this radius is judged to encompass virtually all of the human health risks and environmental impacts that might occur. First, this zone of impact assumption would seem to result in misleading assessments across sites, particularly at larger sites such as NTS, that have waste management activities several miles from the center of the site and closer to the perimeter. The true impact zone should be set from the perimeter and should definitely include Pahrump.

Response
Section 5.4.1.2 in Volume I and Section D.2.2 in Volume III discuss the population and individual receptors used in the WM PEIS health risk analysis. The offsite population or general public receptor group was assumed to be the population living within an 80-kilometer (50-mile) radius of either an existing waste management location for the largest DOE sites (the Hanford Site, INEL, LANL, NTS, ORR, and SRS) or the geographic center for the 11 smaller DOE sites.

The WM PEIS does not attempt to place any of the programmatic waste management activities at a particular location on a DOE site. As necessary, sitewide or project-level NEPA reviews will evaluate in greater detail the potential impacts at sites selected for programmatic waste management activities.

Comment (3329)
Referring to the WM PEIS evaluation of health risks to waste management workers and a hypothetical farm family, a commentor stated, "I can't even believe this equation [of an educated, technically schooled radiological worker to a hypothetical farm family]." DOE's own data shows that the primary risk to workers is physical injury, not exposure-related injury.

Response
The WM PEIS health risk analysis estimated potential impacts to several receptors from disposal of low-level mixed waste and low-level waste. Waste management worker risks from disposal include radiation exposure during waste handling prior to burial and physical hazard trauma from facility

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construction and operations accidents. Section 6.4.1.3 in Volume I summarizes the estimated worker fatalities from disposal of low-level mixed waste. The estimated number of radiation-induced latent cancer fatalities was slightly greater than the estimated number of potential physical hazard fatalities for most of the alternatives evaluated (Table 6.4-4). For low-level waste disposal, potential worker physical hazard fatalities were slightly greater than latent radiation-induced cancer fatalities under all but the Centralized Alternatives (Section 7.4.1.3 in Volume I, Table 7.4-4).

Potential health risks from disposal were also estimated for a hypothetical farm family and a hypothetical intruder. The farm family scenario involves exposure of a future public receptor group to radionuclide and chemical contaminants released to groundwater over time from a disposal facility. The intruder is a single individual exposed to constituents of buried waste through accidental incursion into a disposal facility. The summary results of these analyses are presented in Sections 6.4.1.8, 6.4.1.9, 7.4.1.7, and 7.4.1.8 in Volume I. Note that the PEIS health risk analysis presents the potential impacts to these different receptors as discrete risks; risks to workers are not compared to the farm family or intruder.

Comment (3357)
The risk analysis charts are so subjective that they are not useful. In addition, they are conclusory, as they are not supported by credible scientific studies or objective data.

Response
The scatter diagrams presented in the health risk sections of the waste type chapters on low-level mixed waste (Section 6.4, Volume I) and low-level waste (Section 7.4, Volume I) (e.g., Figures 6.4-1, 6.4-2, 6.4-3, 6.4-4, 7.4-1, 7.4-2, and 7.4-3) are not subjective. Rather, they are graphical representations of the health risk analyses results presented in the various tables contained in Sections 6.4.1 and 7.4.1 in Volume I. The values presented in these tables are the outputs of the state-of-the-art health risk models used in the analyses, as described in Chapter 5 in Volume I and in Appendix D in Volume III. The models used the best available data at the time of the analysis and conservative assumptions in order to yield reasonably conservative estimates of risk for this screening-level evaluation.

Comment (3362)
There is no doubt that incineration of dioxin and dioxin-like compounds like polychlorinated biphenyls result in the emission of dioxins. Yet, there is no mention of any impacts associated with such emissions. EPA has already stated in its dioxin reassessment that humans are at near their effect level in terms of dioxin exposure. What is the synergistic effect of dioxin and radioactivity on the genetics, reproductive systems, and cancer and non-cancer for humans? If there is insufficient information or scientific uncertainty regarding this issue, then DOE needs to disclose this in full compliance with NEPA.

Response
As described in the WM PEIS supporting technical reports, dioxins and furans were included in the source terms for low-level mixed waste, transuranic waste, and hazardous waste because these waste types include hazardous constituents. Therefore, dioxins and furans are included in the health risk estimates for these waste types. Because specific molecular forms of the contaminants were not known, hexachlorodibenzo p-dioxin was used as a surrogate for all dioxins.

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Section D.2.5.1 in Volume III states that the risks from enhanced or diminished toxicity from interactions among components of a contaminant mixture (termed "synergy" and "antagonism," respectively), or the effects of multiple chemical forms for the same atom ("speciation") or combination of atoms ("complexing") were not evaluated because not enough information exists on these effects. If synergism or antagonism is occurring at a particular site, the risks there will be accordingly under- or overestimated. Similarly, since complexing and speciation can affect a contaminant's physicochemical and health-related properties, including its toxicity, carcinogenicity, reactivity, and water solubility (hence, transportability), the lack of toxicity information on waste complexing and speciation might introduce some additional uncertainty to the risk analysis.

Comment (3363)
The WM PEIS is deficient in its long-term analysis of the atmospheric deposition of radionuclides and chemical compounds on farm crops and its concomitant effects of biomagnification through the food chain. EPA has already admitted that this is perhaps the most serious threat from toxic emissions. This effect could be very important if there is significant agriculture being locally marketed in a region of influence.

Response
As described in Section 5.4.1.3 in Volume I, the WM PEIS health risk analysis does include evaluation of an agricultural exposure pathway for offsite population receptors. This pathway results from releases of radionuclide and chemical contaminants to the atmosphere from waste management treatment and storage facilities. Airborne contaminants are assumed to be deposited onto surface soils, where they are taken up by plants. The plants are consumed by the local population and are fed to livestock, which is also consumed by the local population. Offsite population receptors, therefore, are assumed to be exposed to contaminants released from treatment and storage facilities through inhalation of airborne contaminants as well as by ingestion of contaminated locally produced plants and livestock.

Comment (3365)
DOE performed the radiological dose assessment modeling of the air transport pathways using models (such as GENII) not approved by EPA for regulatory purposes. CAP-88 is an example of an EPA-approved air dispersion model for determining radiological dose assessments. Therefore, the models used do not appear to be adequate to demonstrate that radiation doses are within regulatory limits.

Response
DOE selected the GENII model for the WM PEIS analysis because of its versatility and documented use in the field of risk assessment. The GENII model is able to simulate both acute and chronic release scenarios and has an exposure pathway component capable of assessing food-chain exposures. The programmatic purpose of this study is to evaluate various waste treatment, storage, and disposal configurations. The GENII model is adequate for this purpose.

Predicted doses due to releases of radionuclides to the air are compared to the 10 mrem per year dose standard in the NESHAPs as an indicator of potential impacts. Comparison to this standard is not intended to demonstrate compliance for permitting purposes. Subsequent permitting documents would utilize EPA approved models to demonstrate compliance with the NESHAPs for radionuclides.

DOE will comply with all applicable air quality regulations when conducting its waste management activities.

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Comment (3370)
Does Appendix D list the EPA reference doses, cancer potency factors, and threshold limit values used in the analysis?

Response
Appendix D does not list these toxicity parameter values. However, DOE revised Section D.2.6.1 in Volume III to include references for the sources of the reference doses, reference concentrations, cancer potency, and threshold limit values used in the analysis.

Comment (3373)
The summation (dose additivity) of noncancer hazard quotients to derive the hazard index is inappropriate unless the toxicological endpoints and mechanisms of action are the same for each substance. (See Volume III, Section D.2.13.) Was this considered? Section D.2.14 mentioned this only in a brief explanation that the risk estimates provide no indication of severity.

Response
The WM PEIS methodology followed the *Risk Assessment Guidelines for Superfund*, which describes the procedure for adding hazard quotients of various contaminants to obtain an overall hazard index. This approach produces conservative estimates of noncancer risk. This level of detail is considered to be sufficient for a programmatic analysis.

Comment (3377)
There is a feeling among the public living around PGDP that cancer rates are already high in the area. For example, there are more cancers on one road [Bedford Road] near PGDP than in any other area in the surrounding region. Residents are concerned that fallout is causing health problems. The U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry is beginning to look at the possibility of existing health problems around PGDP. These problems need to be part of any environmental baselines when considering the wisdom of planning new facilities in such a populated area.

Response
The WM PEIS health risk analysis estimates that there would be no significant health impacts in the offsite population surrounding PGDP resulting from the proposed waste management actions. The analysis addresses only the potential future incremental risk of new waste management actions. This risk would be additive to the baseline cancer risk in the region, some of which could be related to past and current site activities. The PEIS does not attempt to characterize the existing baseline health risk at PGDP through the use of regional epidemiological or health statistics information. That kind of site-specific detail would be addressed in sitewide or project-level NEPA reviews. The cumulative impacts analysis did consider existing environmental conditions at DOE sites combined with potential impacts of the WM PEIS alternatives.

DOE is committed to operating its facilities and managing its wastes safely and in compliance with all applicable laws and regulations. It is DOE policy to maintain releases at levels that are as low as reasonably achievable. In 1992, DOE reported a radiation dose of 0.26 mrem to the maximally exposed individual at PGDP from airborne radionuclides. The maximally exposed individual is a hypothetical person in the offsite population who receives the largest dose from site activities. This is a very small fraction of the annual radiation dose of 10 mrem that EPA has established as a regulatory level for the protection of public health and safety.

Comment (3380)
Volume III, Section D.2.11. What is the reference for the immediately dangerous to life and health (IDLH) indices?

Response
The source of the IDLHs was the National Institute of Occupational Safety and Health. The specific document cited was *Registry of Toxic Effects of Chemical Substances,* which DOE has added to the References section at the end of Appendix D. Section D.2.11 in Volume III of the WM PEIS was revised to include this information.

Comment (3381)
Volume III, Section D.3.1.7: High-efficiency particulate air filtration would not be effective at all for filtering iodine-129. If some filtration was considered in the risk estimates, the estimates would be incorrect.

Response
It is true that high-efficiency particulate air filtration would not be effective in removing iodine-129. Therefore, no allowance was made for removal of iodine-129. DOE has revised the referenced text in Appendix D (Volume III) to indicate that filtration is lost in these risk analyses.

Comment (3384)
Why were hexachlorodibenzo-p-dioxin and hexachlorodibenzofuran used as surrogates for chlorinated dioxins and furans? (See Volume III, Section D.3.3.2) A more conservative assumption would have been 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin and 2, 3, 7, 8-tetrachlorodibenzofuran as surrogates, since the tetra- forms are more carcinogenic that the hexa- forms.

Response
Tetrachlorodibenzo-p-dioxin and tetrachlorodibenzofuran can be used as surrogates for chlorinated dioxins and furans if the isomer of the chemical and corresponding toxicity equivalent factor are known. The source term evaluated in the WM PEIS did not specify specific isomers. In this case, it is appropriate to use the toxicity values for hexachlorodibenzo-p-dioxin mixtures and hexachlorobenzofuran mixtures.

Comment (3385)
What is the rationale behind using the chemical surrogates in Table D.3.3-14? Why weren't components of the established hazardous waste source term used (i.e., Table D.3.3-2)? A better explanation is needed.

Response
The Final WM PEIS, Section D.3.3.6 in Volume III, has been revised to indicate that more toxic chemical components were used as a conservative representation of the wastes if the exact or actual components were unknown for a particular category.

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Comment (3390)
Volume III, Section D.3.4. One of the additional treatment standards for transuranic waste evaluated by this analysis involves the incineration of wastes to destroy *most* of the hazardous organic components. What does "most" mean in this context? What happens to the inorganic components (e.g., metals)? Were incineration wastes and emissions considered in the human health risk assessment, and if so where? Since cadmium drove the risk analysis in the hazardous waste accident scenarios, since 50 to 60% of the DOE inventory of transuranic waste is mixed waste, and since cadmium was considered a component of mixed-waste, where does cadmium end up in the environment after the incineration treatment referred to? It would be helpful to include a table of estimated WIPP waste acceptance criteria level incinerator release rates from the WM PEIS Transuranic Waste Technical Report. Chapters 3 and 8 of the PEIS do not relate this information in detail, although the reader is referred to them.

Response
DOE has revised the text in Volume III, Section D.3.4, to state that inorganic components remain after incineration, and that small quantities of radioactive or hazardous constituents would be released from treatment facilities. Human health risks were evaluated based on these releases. Health risk impacts are presented in detail in Appendix D and in summary form in Section 8.4.1 in Volume I.

Cadmium is included in the transuranic waste treatment source term. The WM PEIS Transuranic Waste Technical Report presents the air release fractions used in the air dispersion modeling for radionuclide and chemical constituents in transuranic waste streams. Some cadmium would remain in the residual material following incineration, which will ultimately be shipped to WIPP for disposal. The fraction of cadmium in the source term released to the atmosphere would eventually deposit into surface soils.

Comment (3391)
Volume III, Section D.3.5.2. It might be overly conservative to use benzene, a "confirmed human carcinogen," to represent all water soluble organic compounds. No other soluble organic compounds are likely to be present in the waste stream that are confirmed human carcinogens (benzidine, β-naphthylamine, etc.). Unless benzene is a major constituent of the waste stream, this assumption could lead to overly conservative risk estimates. The use of 1,1,1-trichloroethane as a surrogate for compounds with three chlorine atoms is not necessarily conservative; trichloroethylene would have been a more conservative choice.

Response
Because of the lack of DOE incinerator stack release data needed to develop emission factors for establishing the hazardous waste treatment facility source-term, a representative surrogate was used. Data that could be used to support emission factors are available for facilities required to conducted "trial-burns" for obtaining operating permits under RCRA, Part B. Commercial facilities used by DOE for organic hazardous waste treatment were contacted to obtain available data. The hazardous waste incinerator in Deer Park, Texas, was selected based on its use by DOE facilities for commercial offsite incineration. Data from a series of Deer Park trial-burns were collected. The waste stream characteristics from these burns were carefully reviewed to select data with characteristics most similar to the DOE hazardous waste streams.

It is conservative to use benzene to represent all water soluble organic compounds, however, benzene was one of the compounds with this characteristic identified in the source term for the Deer Park trial-burn. 1,1,1-trichloroethane, rather than trichloroethylene, was used because it was also found in the source term for the burn.

Comment (3407)
Volume I, Section 5.4.1. Please change "accident-free" to "incident-free."

Response
DOE revised Section 5.4.1 in Volume I of the WM PEIS as requested.

Comment (3574)
It seems that DOE has made an assumption that the dispersion of regulated releases as well as unregulated releases through air, water, land, or some combination of medias, results in concentric and uniformly radiated exposure routes through the environment. This is a faulty assumption and/or portrayal of current as well as potential regulated and unregulated releases. Such an analysis cannot be confined or bound within concentric zones, but must accurately reflect and consider such factors as the influence of surface-water currents, groundwater flow, air currents, and/or geologic formations. All of these factors play an important role in the route of a release and *concentration* of exposures through releases.

Response
The exposure analysis does not assume that exposures to the public occur in concentric, uniformly radiated exposure routes at the sites; rather, the analysis assumes that airborne emissions from waste management facilities would disperse in accordance with local wind patterns. Exposures to these emissions are estimated for the public living within a 50-mile radius either from an existing waste management facility or the geographic center of the site.

Surface-water and groundwater exposure pathways were not evaluated for waste storage and treatment facilities, although the groundwater pathway was evaluated for waste disposal. This pathway accounts for the local hydrogeology at each site.

Comment (3577)
It is unclear what time frame is being considered in conjunction with the 50-mile zone. Only the 20-year period commonly referred to throughout this document? Or 50 years, 100 years, or perhaps the 10,000-year period from guidelines on land disposal in 10 CFR 61? And what of climatic changes over longer periods of time?

Response
The 50-mile zone was used to evaluate human health risks from waste treatment facility emissions. Potential risks of public exposure to radioactivity from waste treatment and storage activities were assumed to occur during the 10-year period of facility operations, which follows the 10-year facility construction period. Therefore, exposure was calculated for 10 years of operations, and project implementation was calculated for 20 years. Exceptions to this assumption would include a full 20-year operations phase (i.e., construction phase not applicable) for the No Action Alternative, and the site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS. Health impacts in the offsite population are evaluated assuming a 50-year

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period of committed effective dose, since radionuclides absorbed into the body after inhalation will continue to irradiate surrounding tissue over the lifetime of the individual. The 10,000-year time period was the current standard for disposal risk analysis at the time the WM PEIS analysis was initiated. The guidance for performance assessments has since been changed; current guidance suggests that a 1,000-year time period should be used in the performance assessments for waste disposal conducted to satisfy the requirements of DOE Order 5820.2A. Prediction of climatic changes would be speculative and therefore was not analyzed. Section D.2.6 in Volume III of the WM PEIS provides additional details regarding the assumptions used in estimating health risks from radionuclide exposure.

Comment (3584)
We feel that more sensitive populations, such as elders and children should be included in DOE's analysis of the impacts of the WM PEIS alternatives, since these populations are more severely impacted by environmental degradation of any sort. Also, mapping of children crosses over with Native issues/populations (as well as other minority issues/populations), since statistically, most members of Native populations are below the age 14. Thus, the risks and potential impacts to Native populations increases. We do not have accurate figures to reflect the percentage of children, collectively or by Nation, within Native populations or other minority groups. We will forward figures for Native populations and, hopefully other minority groups, at a later date. It is incumbent on DOE to assess these factors/statistics in formulating a waste management scheme due to the sensitivity and greater impact potential on children, as well as elders. We suggest the DOE consult with the Bureau of Indian Affairs to obtain these figures on Native Peoples. We do not suggest that the Bureau answer in any way for the needs, concerns, impacts, Treaty Rights, etc., for any Native Nation. The Nations themselves must be cooperated with.

Response
Section D.2.2.1 in Volume III of the WM PEIS states that while the human health risk analysis did not explicitly include risks to sensitive subpopulations (e.g., children or pregnant women), it did consider sensitive subpopulations in the development of the toxicity values used in the analysis. In addition, Section C.4.7.2.3 in Volume III describes the methodology used for evaluating risk and the potential environmental justice impacts to minority populations.

For radiological exposures, the risk factors used to estimate the risk of cancer and adverse genetic effects were taken from International Commission on Radiological Protection Publication 60. These factors differ for workers and the general population. The general population includes the more sensitive younger age groups and pregnant women not included in the worker population.

For chemical exposures, EPA slope factors and reference doses or reference concentrations were used. "Uncertainty factors" are used to derive these toxicity benchmark values from animal toxicity tests. The uncertainty factors used to develop slope factors, reference doses, and reference concentrations ensure that the values are valid for a wide range of potential receptor groups, including sensitive subpopulations such as children, pregnant women, and the elderly.

It is DOE policy to consult with Tribal Governments to ensure Tribal rights and interests are considered and that potential impacts of proposed DOE actions on cultural and religious resources are disclosed. DOE is committed to incorporating this policy into its ongoing and long-term planning and management processes, including the NEPA process, and has worked through its site representatives to notify the

Tribes of the WM PEIS scope and the availability of the document for comment. The WM PEIS has been revised to include a general discussion of the consultation obligations and activities, as well as DOE's treaty obligations in Section 1.4.5 in Volume I. Section 5.4.10 in Volume I was revised to discuss the unique nature of Native American cultural and religious resources.

Comment (3596)
It is necessary to include in the description of transuranic waste that the body can be severely damaged if alpha radiation particles are ingested as well as inhaled.

Response
Volume I, Section 8.1.1, of the WM PEIS has been revised in response to this comment. It now states that human tissue can be severely damaged if alpha particle emitting radionuclides are taken into the body by inhalation, ingestion, or other means such as severe cuts. Section D.2.2 in Volume III states that the scenarios for the maximally exposed individual include radiation dose for inhalation and ingestion.

Comment (3635)
If effects within a certain radius is the method of analysis used, in order to more accurately reflect the impacts of the radiation over time, the center of the circle should not be at the center of the site, but begin at the perimeter of the site because the health risks for the waste management workers and noninvolved workers have already been (insufficiently) assessed. In reality, if we really want to understand the past, present and future health risks, concentric circles from the perimeters of all the sites, final destinations of waste and transportation routes should cover the globe. The bi-lateral convergence of these circles would give a realistic picture of the cumulative impacts/risks as well as the past, present and future health risks.

Response
DOE estimated health risks from airborne releases from treatment and storage facilities to offsite populations living within 50 miles of an existing waste management facility or the geographic center of each major DOE site and within 0.5 miles of the road and rail shipment routes. Population and individual risks would generally be low, so evaluation of impacts outside these limits was considered to be unnecessarily detailed for a programmatic analysis.

Comment (3636)
We would like to include as part of our comments and to be part of the record the book, *Dead Reckoning: A Critical Review of the Department of Energy's Epidemiological Research*, written by Physicians for Social Responsibility's Physicians Task Force on the Health Risks of Nuclear Weapons Production to be included. We make particular reference to the discussion on the low-dose ionizing radiation controversy; the BEIR V Report; and Chapters III, VI, and VII.

Response
It should be noted that the book referenced by the commentor was published in 1992, prior to recent developments within DOE such as the environmental dose reconstruction studies currently underway at many DOE sites. For example, the States of Colorado and Tennessee are reconstructing doses at RFETS and ORR, respectively. Dose reconstruction involves determining potential radiation exposure and doses from past releases to people who lived near nuclear facilities where these releases occurred. The results of these studies can be used as a basis for deciding if epidemiological studies should be

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undertaken. Further information on dose reconstruction projects is provided in the October 1966 issue *Health Physics*, which is devoted to this subject.

In living organisms, the chemical changes induced by high doses of radiation can lead to serious illness or death. At lower doses, radiation can damage DNA, sometimes leading to cancer or genetic mutations. The reference cited in the comment indicates that genetic effects may be of concern from ionizing radiation. Ionizing radiation can produce submicroscopic changes in individual genes (gene mutations) and damage the chromosome structure. Damage to the genes in the germ cell of the testes or ovaries may result in the transmittal of heritable mutations. Little experimental study data exists on humans. Most of the available data are based on experimentation with animals. However, as described in the Hanford Tank Waste Remediation System EIS, a study of 38,000 offspring who had a least one parent exposed to radiation at Hiroshima or Nagasaki showed no statistically substantial effects resulting from the exposure. Based on human and animal genetic data, the number of genetic effects in an average population exposed to 1 rem per 30-year generation was calculated to be 15 to 40 additional cases of genetic disorders per million live birth offspring. Assuming the conservative end of the range, 40 additional cases per million results in a dose-to-risk conversion factor of 4×10^{-5} for genetic effects. For radiological doses, DOE calculated estimates of potential genetic effects within the PEIS using the conversion factors of 1×10^{-4} genetic effects per rem for public receptors and 6×10^{-5} genetic effects per rem for worker exposure (see Section D.2.8.2 Appendix D). Thus, the dose-to-risk conversion factors used in the WM PEIS analysis were more conservative than that used in the study cited in the reference.

The primary source of judgments on the effects of low-dose radiation has been the National Academy of Science's succession of reports on the Biological Effects of Ionizing Radiation (BEIR). The National Academy of Sciences BEIR V report asserted in 1990 that radiation is almost nine times as damaging as estimated in BEIR I and that annual doses should no longer exceed 5 rem per year. The Federal Government established its own radiation protection standard to be 5 rem per year in 1968.

Chapter III of the BEIR V report of the above-cited reference addresses the DOE epidemiologic studies conducted prior to 1992. The reference indicates that there was a lack of information at that time concerning past human exposures. However, it should be noted that the DOE recently has undertaken "dose reconstruction" studies around several of its facilities to gain a clearer understanding of potential health effects through epidemiological research. As an example, one of the earliest and more thorough research efforts concerned the Hanford Site in Washington State, where historical data are being identified, reviewed, and analyzed in order to understand atmospheric, river, and groundwater conditions that affected the transport of radioactivity. Dose reconstruction studies at Hanford and other sites will help build the informational foundations for sound risk assessment and will be invaluable in a wide range of environmental projects.

Chapters VI and VII of the BEIR V report imply that secrecy concerning epidemiological data for DOE workers has "plagued the entire AEC/ERDA/DOE operation and is totally inappropriate in investigations of health and safety." Note that Energy Secretary Hazel O'Leary's "openness initiative" has identified many types of information that no longer need to be kept secret to protect National security. Since December 1993, the DOE has opened its files on various information concerning issues such as health and safety, experiments with human beings, and hundred of other subjects. In addition, DOE's leadership in the recent past has made a substantial effort to expand its existing mechanisms for informing the public of potential risks and benefits of the DOE's proposed actions. Citizen advisory boards at 11 of the major sites in the weapons complex have been established. Several of the DOE's external advisory groups have been restructured and strengthened to further support and encourage public involvement.

Comment (3637)
Are you assuming that the hypothetical farm family is incestuous? or they mate with aliens to create the next generation! We are concerned that the hypothetical farm family is not an accurate representation of a farm family that would live on the same land for 10,000 years. The analysis does not take into account the genetic exchange and accumulated genetic damage with outside populations living around the same DOE site (the girl next door?), thus being a member of another hypothetical farm family. The accumulated genetic damages (from regulated and/or unregulated radiological and chemical releases) throughout the generations is obviously not taken into account.

Response
The WM PEIS does not make the assumptions referenced in the first part of the comment. Volume II Site Data Tables present estimates of the probability of the farm family maximally exposed individual from the most exposed lifetime experiencing genetic effects. Tables D.3.2-33 through D.3.2-46 and D.3.5-23 through D.3.5-29 in Appendix D (Volume III) present the estimated numbers of genetic effects summed across all 143 lifetimes of the hypothetical farm family. Note that these estimates are simply totals of the discrete estimates for each lifetime. Potential genetic damage is *not* accumulated across generations.

Comment (3639)
Table 8.4-2, Transuranic Waste Health Risk Analysis Components. We are not clear as to why for the column "endpoints" under the rows for "number of genetic effects" and "probability of genetic effects," chemicals are not listed in the "source" column. Especially in light of the fact that all transuranic waste is being analyzed as if it were mixed waste.

Response
Table 8.4-2 in Volume I is intended to be used as an overview of the health risk end points, receptor groups, hazard sources, pathways, and exposure periods evaluated for transuranic waste treatment. The number of potential genetic effects and probability of genetic effects resulting from exposure to chemicals are not included in the table because none of the hazard or exposure indices estimated for the alternatives or evaluated in transuranic waste treatment exceed 1.0. Therefore, no non-cancer risks of concern are expected.

Comment (3642)
In Tables 8.4-4 and 8.4-7, we are not clear as to why in the rows labeled "Number of Genetic Effects" and "Probability of Genetic Effects" there is no analysis of chemical genetic effects for the offsite population, noninvolved workers, and waste management workers. Please explain.

Response
Genetic effects from chemicals are included in the hazard index, but were not analyzed separately as were radionuclide effects.

As described in Section D.2.9, Appendix D in Volume III, the hazard index is an indicator of the total *additive*, non-cancer toxicity from exposure to mixtures of hazardous chemicals. It is calculated for the

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offsite and noninvolved worker maximally exposed individuals at each site, by alternative, for both routine waste management operations and potential accidents. The highest offsite and noninvolved worker hazard indices for a particular alternative represent the estimated highest noncarcinogenic chemical exposure that an offsite individual and individual noninvolved worker, respectively, would receive at any site under that alternative.

Comment (3645)
What does "the number in this table are the estimated probabilities that the MEI will die of cancer from radiation exposure" mean for Table 8.4-5? Will the person die immediately upon exposure, or some other alternative? What time-frame are we talking about? This analysis is unclear and needs to be clarified.

Response
Table 8.4.5 in Volume I of the WM PEIS presents estimates of the probability of cancer fatality for the maximally exposed individuals (MEIs) in the offsite population. The MEI risk estimates are the probability that the individual will die from cancer that developed from exposure to the released radionuclides. The probability estimates are for latent cancer fatalities; that is, for disease that develops over a period of decades following the exposure. The PEIS estimates represent the probability of a cancer fatality over the lifetime (assumed to be 70 years) of the MEI as a result of the exposure.

The MEIs are assumed to be exposed to radionuclides released to the atmosphere from waste treatment and storage facilities. The facilities are assumed to operate for 10 years, except under the No Action Alternative, where the impacts of only the first 20 years of an indefinite storage period are evaluated. However, radionuclides that are inhaled or ingested are assumed to be deposited in the body and remain radioactive for a period of 50 years. Section D.2.6.3 in Appendix D, Volume III, contains additional information about the assumed 50-year period of accumulated internal radiation dose.

Section 5.4.1 was revised to incorporate information on the average risk of death from cancer in the U.S. The reader can, therefore, compare this risk to the estimated probabilities that the MEI in the WM PEIS analysis will die of cancer from radiation exposure.

Comment (3646)
Table 8.4-6 does not include analysis for offsite maximally exposed individual cancer fatality probabilities at WVDP. Why?

Response
Table 8.4-6 in Volume I has been revised in the Final WM PEIS. A footnote was added to the table to indicate that offsite maximally exposed individual cancer fatality probabilities were not estimated at WVDP due to the low inventory of transuranic waste at the site.

Comment (3647)
What does it mean to be "protective" of human health?

Response
Concentrations "protective of human health" are concentrations of hazardous chemicals that are not expected to cause adverse health effects following continuous exposure. These concentrations, which are derived only for hazardous chemicals that are *not* known or suspected carcinogens

(i.e., cancer-causing agents), are based on long-term studies using laboratory animals. Sections D.2.6.1 and D.2.9, Appendix D, in Volume III contain additional details about the calculation of these chemical-specific reference doses for ingestion exposures and reference concentrations for inhalation exposures.

Comment (3648)
Is the "Hazard Index" based on a child's exposure? If no, then why not?

Response
The Hazard Index is the ratio of the estimated concentration of a noncarcinogenic hazardous chemical in an exposure medium to the concentration presumed to be protective of human health. The latter are chemical-specific reference doses and reference concentrations. The exposure levels estimated in the WM PEIS are for an adult. However, the reference doses/reference concentrations include uncertainty factors for variability in human sensitivity to chemical exposures, which account for sensitive subpopulations, such as children and the elderly.

Comment (3649)
Why are workers generally assumed to be in better health than the general population?

Response
Besides using protective gear, populations of workers generally are healthier than the population at large, for several reasons. The general population includes many more people who are too sick to work, who have some sort of disability, who lack good medical care, or who have lower socioeconomic status. In addition, the general population includes sensitive subpopulations, such as children and the elderly.

Comment (3682)
Where and what group is used for the OK exposure standard for human health.

Response
There are a number of exposure standards proposed by EPA and DOE. These standards are developed, using all relevant available laboratory bioassay and epidemiology information, to be broadly applicable to the public in general rather than to specific populations or individuals living or working in specific locations. For example, national standards have been proposed for workers and for the general public.

Section 5.4.1.4 in Volume I contains a discussion to guide the reader in interpreting the results of the health risk analyses. Relevant risk management exposure benchmarks noted in this section include the National Emission Standards for Hazardous Air Pollutants (NESHAP) for radionuclides of 10 mrem per year, the Safe Drinking Water Act drinking water standard of 4 mrem per year, the worker radiation protection standard of 5 rem per year, and DOE's maximum allowable annual radiation dose to members of the public from DOE-operated nuclear facilities of 100 mrem per year. These standards and guidelines have been developed to be protective of human health following long-term exposure to radiation and radionuclides. Section 5.4.1.4 in Volume I also includes information about background radiation exposure and risk.

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Comment (3755)
DOE needs to be conservative and not take chances. Any radioactive exposures to the public are dangerous.

Response
The assumptions made in performing the program-level screening analyses were intended to yield reasonably conservative risk estimates (i.e., estimates that tend to overestimate rather than underestimate risk). The methods used to estimate health risk, summarized in Section 5.4.1 in Volume I and detailed in Appendix D in Volume III, have been found to be reasonable by a peer review panel, EPA, and the Centers for Disease Control. Sitewide or project-level NEPA analyses will contain more detailed assessments of worker and public health risks.

DOE is cognizant of the potential health risks posed by exposure to radioactivity. It has, therefore, adopted a policy known as ALARA (as low as reasonably achievable). ALARA is an approach to control or manage radiation exposure (both individual and collective to the workforce and the public) and releases of radioactive material to the environment as low as social, technical, economic, practical, and public policy considerations permit. This is a process that has as its objective the attainment of dose levels as far below applicable limits as possible.

Comment (3758)
From an economic perspective, it is understandable that to use an existing facility would be cheaper than to build a new one. How can DOE measure in dollars the value of human health. One child dying is too many.

Response
DOE does not attempt to trade-off the potential risks versus the costs of waste management actions. Rather, the WM PEIS addresses health risks and costs as separate impact parameters. Each is independently considered in the decisionmaking process.

Comment (3776)
The deposition of nuclear waste, perhaps even small flakes, could cause 93 people to die. Even over the long-range, this is too many people.

Response
DOE cannot respond precisely to this comment without further information about the commentor's concern. DOE's approach to its management of radioactive waste is known as ALARA--as low as reasonably achievable. This is an approach to control or manage radiation exposure and release of radioactive material to the environment as low as social, technical, economic, practical, and public policy considerations permit. ALARA is a process that has as its objective the attainment of dose levels as far below applicable limits as possible.

Comment (3802)
Predictions for cancer fatalities should be based on actual data. Get actual or real data.

Response
Toxicity and exposure values used in the WM PEIS are based largely on actual human and animal data. Cancer fatalities are considered in the development of the toxicity and exposure values that were used in the analysis, hence, are indirectly included.

Any prediction into the future involves assumptions and uncertainties. The human health risks analysis, including potential cancer fatalities, used a conservative approach to be as protective as possible. In radiation-induced cancer, the PEIS assumed that there is no threshold below which there is no cancer risk. In addition, the risk of cancer from multiple exposures to different sources was assumed to be additive, and a certain percentage of radiologically-induced cancers were assumed to be fatal. Similar assumptions regarding potential fatalities from chemically-induced cancers are not possible because of the diverse nature of chemically induced cancer. More details about the methodologies and assumptions used to assess human health impacts can be found in Section 5.4.1 in Volume I, Appendix D in Volume III, and Appendices E, and F in Volume IV of the WM PEIS.

Comment (3880)
The PEIS projects essentially zero deaths to the ANL-E offsite population based on a 10-year exposure and a 70-year life expectancy. DOE needs to look at using a 90-year life and 60-year exposure in the cancer fatalities estimates.

Response
The WM PEIS health risk impacts analysis estimates less than one latent cancer fatality in the offsite population at ANL-E as a result of exposure to radionuclides released from waste treatment facilities. The treatment facilities are assumed to operate over a 10-year period. Exceptions to this assumption would include a full 20-year operations phase (i.e., construction phase not applicable) for the No Action Alternative, and the site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS. Once radionuclide contaminants are inhaled or ingested, they are assumed to continue irradiating body tissues for a period of 50 years. This assumption, known as committed effective dose equivalent, is commonly used in assessing potential risks from radionuclide exposure. Section D.2.6.3 in Volume III provides additional details of the radionuclide exposure assessment. The assumed 70-year average lifetime is also a standard factor used in health risk assessments. The health risk analyses are based on a number of conservative assumptions which likely account for differences due to longer exposure periods.

Comment (3881)
DOE needs to explain how they measure illness from radiation exposure.

Response
The health endpoints used in analyzing radiation risk were cancer incidence, cancer fatality, and adverse genetic effects which, for members of the public, were assumed to be directly proportional to the amount of absorbed radiation and to occur in a fixed ratio of 15:7:1. See Section D.2.5 in Volume III for details of the WM PEIS.

Comment (3884)
All radiation causes genetic changes.

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Response

As described in Section D.2.6.2 in Volume III of the WM PEIS, all radiation is not equal in terms of causing genetic damage or other effects to human cells. The same dose (absorbed by the human body) of different types of radiation (e.g., alpha, beta, gamma) can produce different health risk outcomes and different effects on living cells. To standardize for these effects, a unit of radiation measure called a "rem" is used as a way of measuring the biological effects of a given dose of any type of radiation. The rem has built-in factors that weight the dose according to each type of radiation's capacity for causing biological damage (this capacity is called the "biological effectiveness" of the radiation). This unit of measure allows comparison of the biological effects (on a given type tissue) of radionuclides that emit different types of radiation. See *DOE Worker Health Risk Evaluation Methodology for Assessing Risks Associated with Environmental Restoration and Waste Management* (ORNL, 1995b) for a more detailed description of the different types of radiation.

The various organs of the body have different susceptibilities to harm from radiation. For example, the gonads tend to be more sensitive to radiation damage than the cornea of the eye. The unit of measure that takes these different susceptibilities into account to provide a broad indicator of the total effective radiation dose is called an "effective dose equivalent." It is obtained by multiplying the dose (or "dose equivalent") in rems in each major organ or tissue by a weighting factor associated with the risk susceptibility of the tissue or organ, then summing the totals. This unit of measure allows comparison of the general adverse consequences to people who are exposed to radiation, regardless of the different susceptibilities of individual types of tissue in different organs to such exposure.

Comment (3905)

DOE needs to look into whether any studies have been done on ANL-E employees for cancer. DOE needs to use actual data and not projected or expected data.

Response

DOE has undertaken "dose reconstruction" studies around several of its facilities to gain a clearer understanding of potential health effects through epidemiological research. As an example, one of the earliest and more thorough research efforts concerned the Hanford Site in Washington State, where historical data are being identified, reviewed, and analyzed in order to understand atmospheric, river, and groundwater conditions that affected the transport of radioactivity. Dose reconstruction studies at Hanford and other sites will help build the informational foundations for sound risk assessment and will be invaluable in a wide range of environmental projects. Discussions with Argonne National Laboratory-East (ANL-E) site personnel indicated that cancer incidence studies had, however, not been performed on ANL-E employees.

Any prediction into the future involves assumptions and uncertainties. The human health risks analysis, including potential cancer fatalities, used a conservative approach to be as protective as possible. In radiation-induced cancer, the PEIS assumed that there is no threshold below which there is no cancer risk. In addition, the risk of cancer from multiple exposures to different sources was assumed to be additive, and a certain percentage of radiologically induced cancers was assumed to be fatal. Similar assumptions regarding potential fatalities from chemically-induced cancers are not possible because of the diverse nature of chemically-induced cancer. More details about the methodologies and assumptions used to assess human health impacts can be found in Section 5.4.1 in Volume I, Appendix D in Volume III, and Appendices E and F in Volume IV of the WM PEIS.

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Comment (3906)
DOE needs to explain expected rates of cancer to the public so they can understand.

Response
Section 5.4.1 in Volume I describes the methods used to evaluate health risk impacts in the WM PEIS. This section contains a discussion on how risk results should be interpreted. Section 5.4.1.4 in Volume I specifically explains cancer fatalities and incidences, and how they are analyzed in the PEIS. Chapters 6 through 10 in Volume I present the waste-type specific results of the health risk analyses.

The PEIS health risk analyses evaluated the potential impacts of exposure to radionuclides and hazardous chemicals released from waste treatment, storage, and disposal facilities. Risks were estimated for populations of workers and the general public living within a 50-mile radius either from existing waste management facility or the geographic center of the site. The PEIS analysis estimated the potential numbers of *cancer fatalities* for populations of workers and the general public receiving exposure to radionuclides or direct radiation (workers). The analysis also estimated the numbers of *cancer incidences* in these populations resulting from exposure to hazardous chemicals. In addition to these estimates of collective risks to populations of receptors, the analysis also evaluated the risks to the individual receptors in the populations estimated to receive the highest exposures. The risks to these maximally exposed individuals are estimated as the probability of cancer incidence or cancer fatality over the lifetime of the individual.

Comment (3942)
Assumptions of impacted regions surrounding DOE sites should be calculated from the site boundaries, not from the center of sites. Calculations of impacted regions should be done by air miles, not road miles.

Response
The WM PEIS considered sites where waste management facilities might be built, but not the precise locations on those facilities. Where to locate a facility on a site is more appropriately addressed in sitewide or project-level environmental analyses. For analysis purposes, the WM PEIS assumed that future waste treatment and storage facilities will be located at the center of the site, except at the larger sites, where the new facilities are assumed to be located in the vicinity of existing waste management facilities. Additional information on the assumed locations at each site used in the health risk analysis is presented in the technical report referenced in Section D.2.1 in Volume III. Note that the new waste management facilities were not assumed to be located at the boundaries of any of the sites evaluated.

The region of interest for health risks was an area with a radius of 50 miles as discussed in Volume I, Section 4.2.2. As discussed in Section 5.4.1.2 in Volume I and in Section D.2.2 in Volume III, the offsite population or general public receptor group was assumed to be the population living within this circle. Since the radius is a straight line, distance is measured in "air miles."

Comment (3991)
Did DOE consider adverse impacts to members of the public who rely on the Ohio River for their drinking water?

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Response
For the WM PEIS, DOE did not evaluate the health risk to persons who drink water supplied by contaminated surface water, or who derive a portion of their food supply from plants and animals that obtain water from contaminated surface water. Such an evaluation cannot be performed with confidence until the locations of the facilities on the sites are known and the routes of exposure explicitly defined. In addition, the airborne pathway is much more significant than other pathways for most members of the offsite public; therefore, DOE considers evaluation of health risks due to exposure to airborne contaminants to be sufficient for a programmatic, screening-level analysis such as the PEIS. DOE did consider the potential impacts of low-level mixed waste and low-level waste disposal on groundwater quality and the potential risks to individuals using contaminated groundwater for drinking water. The results of these analyses are presented in Sections 6.4.1.8 and 7.4.1.7 in Volume I. Sitewide and project-level NEPA analyses would consider more detailed site-specific information, such as potential concentrations of bioaccumulated contaminants in aquatic organisms.

Comment (4004)
DOE has yet to calculate specific dose limits for the Yucca Mountain repository. The agency has been mandated to attempt to calculate dose exposures for materials that will remain both toxic and hazardous to human health and the environment for time periods beyond reasonable human comprehension, let alone prediction. The agency's mandated predictions of possible human exposure pathways and human activities ten thousand years into the future would seem to me to point out clearly that the half-lives of the materials created far out distance current human knowledge. Predictions of future climatic conditions based upon current climatic conditions likewise seem to me beyond present human abilities. Ten thousand years ago Southern Ohio was under a melting glacier.

Response
The impacts of disposing of high-level waste in a repository are not within the scope of the PEIS, but will be analyzed in a subsequent DOE NEPA document relating to a geologic repository.

As described in Section 5.4.1 in Volume I and Appendix D for the proposed disposal actions for low-level waste and low-level mixed waste in Volume III, the PEIS also examined potential risk to a farm family for 10,000 years. The PEIS did not attempt to predict future climatic conditions for this period.

Comment (4033)
The Final WM PEIS should include information on risk assessments that have not been performed or are not referenced in the draft for the public and decisionmakers to consider. The public has a right to know the social and environmental consequences of the No Action Alternative (i.e., taking no remedial or waste management action). The public needs such a comparison to grasp the need for the project and to better understand why they must shift large societal resources to this project.

Response
The WM PEIS health risk analysis addresses the potential risks to the public and to workers from the proposed waste management actions. The waste-type specific results presented in Chapters 6 through 10 in Volume I of the WM PEIS describe the risks associated with construction and operation of new treatment, storage, and disposal facilities, as well as the social and environmental consequences of implementing the alternatives. Waste management alternatives are compared to a No Action Alternative. The No Action Alternative provides an estimate of impacts for the first 20 years of an indefinite storage period if DOE continues with current activities and does not reconfigure the waste

management complex. Chapter 11 in Volume I contains discussions of the potential impacts of the management of the combined waste types, on a site-specific basis, as well as the cumulative impacts of the proposed waste management actions, the impacts of existing site actions, and those of reasonably foreseeable future actions. Chapter 11 contains references to the other sources of information (e.g., sitewide EISs) used to characterize existing site conditions and the impacts of other proposed future actions for the cumulative impacts analysis.

DOE compiled a large amount of information in connection with the WM PEIS. Additional background information was placed in appendices to the PEIS or in technical reports that are readily available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (4039)
The WM PEIS does not fulfill its proper purpose as a programmatic review of alternative cleanup and waste management policies and their impacts. In addition to omitting any reference to the public health risk from ongoing operations, the Draft WM PEIS does not make a serious effort to quantify health risks from existing waste inventories at DOE sites or from contaminated sites. Such assessments would establish at least a partial need for the project and should not be part of separate risk assessment documentation.

Response
The WM PEIS health risk analysis addresses the potential risks to the offsite public and to workers from proposed new waste treatment, storage, and disposal actions. Impacts from the proposed waste management alternative configurations are compared to a No Action Alternative, which provides an estimate of impacts if DOE continues with current activities and does not reconfigure the waste management complex. The estimated health risks resulting from management of each of the waste types considered in the WM PEIS are presented in Chapters 6 through 10 in Volume I.

Chapter 11 in Volume I addresses, on a site-specific basis, the health risks associated with the combined future management of each of the pertinent waste types, the existing site operations, and the estimated impacts of other reasonably foreseeable site actions. Human health risks resulting from environmental restoration activities are generally not included in the cumulative impacts analysis because, for most sites, they cannot be meaningfully evaluated at this time.

Comment (4417)
The Draft WM PEIS contains a discussion of comparing radionuclide exposures to chemical exposures that includes potency issues without raising the fundamental issue that carcinogenic risk assessment for radiation predicts most likely cancer risks (based usually on the observed potency in humans), while carcinogenic risk assessment for chemicals uses 95% upper limit risks based on a conservative model, usually based on animal studies.

Response
DOE has revised Section D.2.8.2 in Volume III of the WM PEIS to provide the following clarification: A comparison of the risks associated with radionuclide exposures to those associated with chemical carcinogen exposures must consider the use of different methods to determine radionuclide and chemical carcinogen risks. The dose conversion factors used to estimate radionuclide-associated risks are based on observed potency in humans (typically studies of atomic bomb victims). The slope factors used to

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estimate chemical carcinogen-associated risks are derived from animal studies and are believed to be more conservative due to the uncertainty involved in extrapolating results for humans.

Comment (4419)
The Draft WM PEIS addresses only the impacts on human health of air pollution from waste treatment, making the unjustified and unlikely assumption that water pollution impacts will be negligible because associated discharges will go through wastewater treatment systems.

Response
DOE assumed that some impacts on water resources would be minimal at all sites, regardless of the waste type and alternative. The WM PEIS discusses these potential minimal effects (e.g., impacts to floodplains, impacts from runoff and sedimentation, impacts from wastewater discharges, impacts from disposal) in Section 5.4.3.3 in Volume I; they are not addressed in the waste-type impacts analyses presented in Chapters 6 through 10 in Volume I. DOE would conduct further evaluations of these potential effects as part of sitewide or project-level NEPA studies. Releases of hazardous constituents to surface waters from the operation of routine waste management facilities were assumed to be limited because of treatment and recycling of wastewaters. Releases to surface waters could result from accidents at waste management facilities or from transportation accidents. The WM PEIS assumes that the impacts from a spill or leak of wastes will be limited by:

- Dilution in the receiving water body;
- Remedial actions taken to contain or remove the contaminants;
- The relatively smaller number of individuals potentially exposed than those exposed through the air pathway.

Finally, the potential frequency of occurrence of the accident or initiating event could limit the impacts; that is, an accident could have the potential to produce adverse impacts on a relatively large area of surface water if it occurred, but the actual probability of occurrence could be small.

Comment (4426)
DOE should quantitatively evaluate the differences in the conservatism of modeling and associated assumptions for evaluating transportation impacts versus stationary source impacts and their implications concerning trade-offs between site impacts and transportation impacts. The WM PEIS should also include information on the combined risks of transportation and stationary source impacts. An imbalance in the systematic uncertainties between transportation and stationary source models and associated assumptions could systematically bias the relative differences in risk estimates among risk management alternatives to favor alternatives with minimum transportation.

The Draft WM PEIS does not contain information on the combined impacts for enough combinations of alternatives for the cumulative impacts section to provide adequate input for deciding where to treat, store, and dispose of waste.

Response
The WM PEIS used different types of models to estimate potential risks from stationary sources, such as waste management facilities, versus those from wastes transported under the Regionalized and Centralized Alternatives. The risk analyses for waste management workers considered the effects of shielding on limiting exposures to direct radiation from stationary sources. However, the transportation

assessment could not use shielding as a factor in reducing exposures because of uncertainties about potential locations of the receptors (e.g., the offsite population) in relation to the shipments. As a result, the transportation radiological risk estimates are conservative, i.e., higher than would be likely to occur on the implementation of the alternatives. This difference in conservatism does not complicate the risk management decisionmaking process because transportation radiological risk estimates are routinely lower than transportation physical trauma risks. Therefore, the risk manager must balance potential risks associated with exposure to radionuclides and radiation released from waste management facilities under the various alternatives against potential transportation risks associated with physical trauma from accidents.

The combined impacts analysis looks at the impacts of waste management operations at a particular site as defined in the WM PEIS analysis of alternatives.

Transportation and stationary source risks are not combined because the receptors differ between the two sources. The maximally exposed individuals for transportation occur along the transportation route, whereas, the maximally exposed individuals for stationary sources occur in the offsite populations of individual DOE facilities.

Comment (4432)
When delineating exposures from DOE sites, DOE should quantitatively characterize, in the affected environment and cumulative impact sections of the WM PEIS, impacts at the locations of existing receptors and potential maximum impacts at the location where the general public currently has access (or would in the future under WM PEIS assumptions), unless mitigating measures are taken. The Hanford Site, ORR, ANL-E, and PGDP have hot spots near the site boundaries that are not currently occupied, but which could be in the future unless appropriate mitigating measures are taken.

Response
The WM PEIS evaluates potential health risk impacts to offsite populations from waste treatment operations that would occur over an assumed 10-year period. Exceptions to this assumption would include a full 20-year operations phase (i.e., construction phase not applicable) for the No Action Alternative, and the site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS. Impacts to offsite populations during the operations period would result primarily from airborne releases of radionuclides and hazardous chemicals from waste treatment facilities. DOE would maintain institutional control of the sites during this 10-year operations period. As a consequence, the offsite population should not be able to come in contact with hot spots of contamination inside the site boundary. The WM PEIS Affected Environment Technical Report cited in Chapter 4 in Volume I contains quantitative estimates of existing hot spot contamination at the sites. This technical report is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final PEIS. DOE deals with mitigation measures for hot spots at each site as part of the site environmental restoration and health and safety programs.

The PEIS evaluates the health risk impacts from waste treatment to offsite populations living within a 50-mile radius either from an existing waste management facility or the geographic center of the site, to site workers not directly involved in waste management activities (noninvolved workers), and to waste management workers. The health risk analyses include quantitative estimates of risk for maximally exposed individuals (MEIs) in the offsite population and the noninvolved worker populations. The modeling analyses estimate the locations of the MEIs in the regions of influence and on the site. The

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location of the offsite MEI was considered only in the environmental justice analysis and was determined by reviewing the WM PEIS risk modeling results to locate the census tract in the sector block containing the offsite MEI for each selected site. It is inappropriate to compare the locations of MEIs estimated by the PEIS analyses to those identified in other DOE reports, such as site annual monitoring reports, or to estimate waste treatment exposures and risks at other locations (e.g., at fencelines) because different models and assumptions were used for these calculations. Within the WM PEIS, the MEIs for chemical risk assessment and radiological risk assessment could be in different physical locations.

Comment (4443)
With respect to the time periods over which health risks were evaluated, the statement in the Draft PEIS Summary, Section 3.2.1, that 70-years was used to evaluate risks from exposure is misleading because the number of fatalities from radiation from existing DOE sites in the Cumulative Impacts section of the Draft PEIS is based on only one year of exposure.

In addition, radiation and radionuclide exposure can cause mutagenic impacts that can be passed from generation to generation. These should be evaluated in terms of the risk to the children and to those exposed, and in terms of the total expected number of persons adversely impacted for all future generations combined.

According to other studies, the number of persons suffering severe mutation from radiation and among their offspring for all future generations combined from a single exposure could be an order of magnitude higher than the number predicted by the theory used in the WM PEIS, due to such persons having children and genetic equilibrium limiting the extent of their reproduction in future generations. In addition, the proportion of a population suffering from severe handicaps due to continuous exposure could be an order of magnitude higher than the modeling predicts.

The impacts of soil contamination often manifest as a maximum risk to the public decades or even hundreds of years after the soil was contaminated, when the contaminants leach out of the soil and into groundwater. Persons are exposed to much larger volumes of contaminated groundwater than contaminated soil. The routes of exposure include direct ingestion, skin contact, and airborne contact (when showering, washing, cooking, as well as when using groundwater irrigation).

Soil contamination and associated groundwater contamination could occur from dustfall and other deposition phenomena from air pollution. DOE should evaluate this route of exposure, at least to the degree necessary to determine if it could be significant compared to the other routes of exposure evaluated.

Response
DOE revised Chapter 11 in Volume I of the WM PEIS to incorporate estimates of the collective radiation dose and cancer risk for the offsite population. These estimates represent doses and risks that would occur over the 10-year time frame of operations. The PEIS presents offsite maximally exposed individual impacts as annual exposures and risks.

The PEIS does not address the tracking of mutagenic effects across generations. The limited methodologies developed to address inheritable mutagenic effects from radiation have not been sufficiently adopted by the risk assessment community to justify their use in all cases.

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Section D.2.3.1 in Volume III of the WM PEIS reports that human health risk from the consumption of surface water contaminated by airborne deposition would be at least three orders of magnitude smaller than the dose resulting from inhalation. Therefore, DOE eliminated this pathway from detailed analysis. Airborne deposition onto soils and subsequent leaching into the groundwater probably would have less health risk than direct deposition onto surface water due to the time lag involved and the adsorption of contaminants onto the solid particles.

DOE assumed groundwater pathways of exposure were most significant for disposal scenarios in which waste is buried. For routine operations associated with treatment and storage, exposures resulting from atmospheric emissions from stacks and vents were assumed to be of primary concern. Although contaminants released to the atmosphere could settle on the ground and migrate through soil into the groundwater, the contaminants would be highly diluted at this point and subsequent risks would not be expected to be significant. The analysis of health risks resulting from the disposal of low-level waste and low-level mixed waste evaluated only ingestion of contaminated groundwater as drinking water and use of contaminated groundwater to irrigate crops. The PEIS evaluated potential health risks of the irrigation scenario in the hypothetical farm family analysis. In this analysis, a farm family receptor draws water from a well 300 meters (984 feet) downgradient from the center of the disposal facility. The receptor drinks water, irrigates crops, and waters livestock from a contaminated well. The farm family scenario addresses potential risk to a series of individual receptors. This analysis has been supplemented in Section 6.4.1.8 and 7.4.1.7 in Volume I in the Final WM PEIS by an analysis of the relative vulnerability of the proposed disposal sites for risks to the offsite public from groundwater contamination.

Although any number of exposure pathways could be applicable to a particular scenario at a particular site, DOE selected the pathways assumed to be applicable and most significant with regard to risk for assessment in the PEIS. Although other routes of exposure (e.g., shower inhalation) could be applicable, DOE assumed that exposures from disposal would be driven by the ingestion of contaminated drinking water and of agricultural products contaminated by irrigation.

Comment (4454)
In the Draft WM PEIS Summary, analysis of human health risks in Section 4.3 focuses on population risks exclusively, failing to cover risks to the maximally exposed individual (MEI). Many State and Federal regulations (such as the Clean Air Act of 1990 and the National Contingency Plan and associated Superfund regulations), as well as RCRA guidance to permit writers, focus on risks of cancer (not cancer fatality) to the MEI in the general public. DOE should include meaningful summaries of this for members of the general public workers.

The information on population risks in the Draft PEIS is inadequate to resolve differences among alternatives concerning cancer risks to the general public. Many categories of population risks are not adequately quantified. DOE should quantify the order of magnitude of such risks.

Information on the order of magnitude of the uncertainties in the population risk numbers and MEI risk numbers should be provided in the WM PEIS Summary. They should be quantified as they impact the relative impacts of alternatives compared to each other, and in terms of uncertainties in absolute risks.

In addition, the tables in the PEIS should specifically delineate the risks for workers and for members of the general public if trains rather than trucks are used for transportation.

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Response
The summary sections in the WM PEIS present a general overview of the analysis of particular waste types. Specific numbers associated with the waste types (i.e., costs, risks [including MEI], volumes, etc.) are reported in other sections of the WM PEIS along with interpretations and discussions of the results. For example, MEI cancer incidence and cancer fatality risks are reported in Chapters 6 through 10 in Volume I and Appendix D in Volume III.

Table 4.3-1 in the Summary document lists estimated numbers of fatalities in receptor populations from low-level mixed waste treatment, disposal, and transportation. The information in this table is a subset of the more detailed information presented in Section 6.4 in Volume I. In addition, Table 4.3-1 in the Summary lists only transportation risks for trucks because truck risks are higher than those for rail. Tables 6.4-17, 7.4-14, 8.4-9, and 9.4-7 in Volume I list information on rail transportation risks.

Comment (4468)
Section 8.3.1 of the Draft WM PEIS Summary document states that incidences of cancer to the offsite populations for routine operations and accidents would be less than one for all hazardous waste management alternatives. DOE should evaluate an incidence of cancer of even 0.00001. Merely saying that the incidence of cancer is less than one is inadequate. Cancer risks to the maximally exposed individual should be summarized. Section 8.3.1 also refers to noncancer risks to the maximally exposed individual as low. What is meant by "low"?

Response
The Section referenced in the comment is intended to summarize the risk of cancer for the offsite populations. Therefore, Section 8.3.1 of the Summary document indicates that less than one incidence of cancer is likely to result in the offsite populations at the hazardous waste treatment sites. More specific information on the WM PEIS health risk analysis for hazardous waste is presented in Section 10.4 in Volume I. As described in Section 10.4, risks were estimated for both the entire offsite population receptor group at each site and for the maximally exposed individual in the offsite population. Collective population risks are presented as numbers of incidences of cancer or other adverse effects in the population. Maximally exposed individual risks are presented as probabilities of incidence in the lifetime of the maximally exposed individual.

DOE estimated cancer incidences for the offsite population and waste management worker populations for every alternative; the estimates include those reported only as "less than one" in Section 10.4. The estimates are presented in Appendix D in Volume III and in the Volume II Site Data Tables for each of the proposed hazardous waste management sites identified in Section 10.1.2 in Volume I.

The statement in Section 8.3.1 about maximally exposed individual noncancer risks being "low" means that adverse noncancer health effects are not likely to result from exposure to hazardous chemicals released from waste treatment facilities.

Comment (4474)
The WM PEIS analysis of cumulative impacts should include the following considerations: While an individual worker might not work simultaneously at more than one type of facility, some workers have more than one job and some workers might change jobs during their careers. Measures designed to prevent excessive exposure to people with multiple jobs should also be factored into the analysis.

Response
Chapter 11 in Volume I of the Final WM PEIS was revised to incorporate waste management worker risk information into the cumulative impacts analysis. Collective radiation dose and cancer risk for the worker population at each site over a 10-year period of operations was included. Exceptions to this assumption would include a full 20-year operations phase (i.e., construction phase not applicable) for the No Action Alternative, and the site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS.

The detailed analysis for individual workers as described by the commentor is not appropriate for the cumulative impact analysis of a programmatic EIS and has not been incorporated into Chapter 11. However, DOE takes precautions to minimize worker exposures including multiple exposures. DOE would comply with all applicable laws and regulations pertaining to worker exposure, such as 10 CFR Part 835 and DOE Order 5480.11. DOE uses further guidance provided in the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, Standard Operating Safety Guides, Field Standard Operating Procedures, and the DOE Radiological Control Manual.

Comment (4483)
The Draft WM PEIS does not adequately characterize the differences in risk assessment for radiation versus chemical exposure.

Response
Section D.2.6.3 in Volume III of the Final WM PEIS has been revised to provide the following clarification: In comparing the risks associated with radionuclide exposures to those from chemical carcinogen exposures, it is important to note that radionuclide and chemical carcinogen risks are determined by different methods. The dose conversion factors used to estimate radionuclide associated risks are based on observed potency in humans (typically studies of atomic bomb victims). The slope factors used to estimate chemical carcinogen associated risks are derived from animal studies and believed to be more conservative due to the uncertainty in extrapolating results for humans. These differences in risk estimation should be considered when comparing radionuclide and chemical carcinogen risks.

Comment (4488)
No justification for limiting human health impacts to 50 miles from sites is provided in the Draft WM PEIS. DOE should analyze how much the number of predicted fatalities would increase if inputs were evaluated worldwide to determine if the relative and absolute impacts of the alternatives beyond 50 miles could be significant. Even if this is not done for a new Draft PEIS, it must be done for cumulative impacts to meet NEPA requirements. This requires coordination of the human health impact assessment methodologies and assumptions and sharing of information among the various PEISs being written by DOE. It also requires a detailed evaluation of the methods and parameters used to evaluate human health impacts in past PEISs, and mapping the results into the framework used to evaluate risks, with appropriate caveats for uncertainties.

Response
Estimating exposures to the population residing within a 50-mile radius of a site is very typical in the field of risk assessment and in NEPA assessments in general, and is reasonable for the purposes of the WM PEIS. Most atmospheric fate and transport models are designed to calculate exposures within a 50-mile radius. For the WM PEIS, the public receptor group was assumed to be the population living within an 80-kilometer (50-mile) radius of either an existing waste management location for the largest

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DOE sites (the Hanford Site, INEL, LANL, NTS, ORR, and SRS) or the geographic center for the 11 smaller DOE sites.

Comment (4520)
Taken alone, the hazard quotients referred to in Section 5.4.1 of the Draft WM PEIS are inadequate for evaluating the threshold toxic impacts of chemical pollutants to the general public. Standard EPA Superfund risk assessment procedures use hazard indices for these purposes, based on the sum of hazard quotients. The hazard index concept is very similar to the Exposure Quotients used to evaluate worker exposure.

Most Occupational Safety and Health Administration standards for carcinogenic risks are based on Threshold Limit Values (TLVs). Exposure at TLVs, when based on threshold toxicity, is unlikely to cause adverse impacts on normal healthy workers. However, about 10% of the workers are considered to be hypersusceptible and may be adversely affected at TLVs. Screening procedures, medical monitoring, and other measures taken to reduce the number of hypersusceptible workers who may be exposed should be evaluated as part of the WM PEIS.

Response
The WM PEIS evaluation of noncancer toxic effects resulting from exposures to hazardous chemicals follows the recommendations for such analyses in EPA risk assessment guidelines. As described in Section D.2.9 in Appendix D (Volume III), Hazard Quotient values are calculated for each hazardous chemical to which receptors might be exposed. These values are calculated by estimating the receptor's predicted exposure and dividing by maximum acceptable exposure levels based on chemical-specific EPA Reference Dose and Reference Concentration values. The Hazard Quotient values for each hazardous chemical are summed to yield a Hazard Index estimate. According to the EPA risk assessment guidelines, if the Hazard Index value is less than or equal to 1, the potential exposure is unlikely to produce adverse toxic effects.

As a screening-level analysis, the WM PEIS worker health risk assessment does not address particularly susceptible members of the workforce. Risks to sensitive subpopulations of receptors and any needed mitigation measures can only be meaningfully addressed in site worker protection and medical monitoring programs.

Comment (4521)
DOE should provide in the WM PEIS a credible analysis of the adequacy of the risk assessment within a 50-mile radius of sites as well as within 0.5 mile of transportation routes for estimating the total numbers of fatalities associated with alternatives (regardless of the distance from the source).

Response
The primary route of exposure of offsite populations to contaminants released from waste management actions would be airborne exposure to radionuclides or hazardous chemicals released from waste treatment facilities. Air dispersion of contaminants within a 50-mile radius of the discharge point is commonly used in these types of analyses. This distance is believed to adequately address potential exposure and risk from this pathway.

Exposure to members of the public from waste transportation is primarily from direct radiation of the cargo. Exposure decreases as distance from the surface of the truck or railcar increases. A 0.5-mile distance from transportation corridors adequately addresses potential exposure and risk from this pathway.

Comment (4526)
DOE should evaluate in the WM PEIS exposure to the offsite population from surface water contamination and associated contamination of fish. The impacts from this exposure pathway exceed those from air pollution and groundwater at several sites, and from high-level waste treatment at West Valley, according to site safety report information. DOE does not provide convincing evidence in the Draft WM PEIS that discharges to surface water would not be significant for the alternatives being evaluated, and that the resulting exposure pathways would not cause the highest potential human health and environmental impacts for waste treatment, storage, disposal (especially for intruder scenarios), along with transportation accidents.

Groundwater pathways from waste treatment, storage, and transportation accidents should be evaluated in the WM PEIS to establish if their significance compared to other pathways is negligible, or to quantify the impact if it is not.

Contamination of wildlife and subsequent ingestion of such wildlife in accident scenarios (including transportation accidents) should be evaluated in the WM PEIS, along with mitigating measures. DOE should commit to appropriate containment and operation of waste storage, treatment, and disposal facilities to ensure that contamination by direct contact with contaminated portions of waste treatment, storage, and disposal facilities (such as open-top wastewater treatment tanks, landfills while material is being placed in them, waste storage piles, etc.) or by eating biota that had direct or indirect contact.

Response
The WM PEIS health risk analysis does not address bioconcentration of contaminants in aquatic systems, which would require an array of assumptions about site-specific variables, including exact locations of new waste treatment facilities on DOE sites. Siting treatment facilities is not part of PEIS decisionmaking. Any such analysis would be subject to extreme variability based on the analysis assumptions and location selection. However, Section 5.4.3 in Volume I and C.4.3.4.10 in Volume III have been revised in the Final WM PEIS to provide more detailed discussions of the potential vulnerability of sites to surface water impacts from waste management actions. In addition, the groundwater pathway was evaluated in the hypothetical farm family scenario analysis for disposal of low-level mixed waste and low-level waste.

Consumption of wildlife contaminated as a result of the routine operation of waste management facilities or from facility or transportation accidents is not evaluated in the WM PEIS because this exposure pathway is not relevant for most members of the offsite public. Additional site-specific information, which would be better addressed in sitewide or project-level NEPA, would be required in order to develop credible estimates for this pathway.

As noted in Section 1.7.3 in Volume I, reduction of human health risk and minimization of adverse environmental impacts were criteria for selecting the WM PEIS preferred alternatives. Moreover, DOE must comply with all applicable environmental and safety laws and regulations, which ensures that DOE's waste management facilities will be appropriately contained and operated.

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Comment (4528)
With regard to Section 5.4.1 of the Draft PEIS, which discusses surface water contamination: While the concentrations in surface water may be less than those in groundwater, surface water contamination may nevertheless have higher impacts than groundwater contamination because the contaminants are bioconcentrated in fish, which are eaten.

Response
The WM PEIS health risk analyses does not address bioconcentration of contaminants in aquatic systems. This type of analysis would require that an array of assumptions be made about site-specific variables, including the exact locations of new waste treatment facilities on DOE sites. The latter is not part of programmatic decisionmaking. Any such analysis would be subject to extreme variability based on the analysis assumptions and location selection. However, Section 5.4.3 in Volume I and Section C.4.3.4.10 in Volume III have been revised in the Final WM PEIS to provide a more detailed discussion of the potential vulnerability of sites to surface water impacts from waste management actions.

Comment (4530)
With regard to the observation in Section 5.4.1 of the Draft WM PEIS that genetic toxicity is more difficult to assess because of its diverse nature: It is not the diverse nature of chemicals that makes genetic toxicity more difficult than radioactivity toxicity to assess; it is the lack of information and methods to assess the genetic potency of the chemicals and the mixtures of chemicals.

Response
Genetic toxicity includes a number of different kinds of effects or endpoints, including gene mutations, which alter the makeup of genes, and gross chromosomal aberrations, which alter the structure or number of chromosomes. The type of genetic toxicity resulting from exposure to hazardous chemicals depends on the mechanism of action by which the compound interacts with the genome. Because different compounds can produce different types of effects, such an analysis must consider chemical-derived genetic toxicity on a compound-specific basis. This kind of analysis is more difficult and requires more assumptions than appropriate for a programmatic study.

By contrast, it is easier to analyze potential genetic effects resulting from radiation exposure because the mechanism of radiation effects on genetic material is similar for all radionuclides. Potential exposures were estimated using the environmental fate models identified in Section D.5 in Volume III of the WM PEIS. These models summed potential exposures from different types of radionuclides as person-rem (population) or rem (individual) estimates. The estimated doses were converted to risks by the application of International Commission on Radiological Protection risk factors. For example, the International Commission on Radiological Protection risk factor for genetic effects (which is treated as a single endpoint) for public receptors was 0.0001 genetic effects per rem-lifetime. This value was multiplied by the estimated population exposure (person-rem per lifetime) to obtain an estimate of the number of genetic effects that could occur in the population. This analysis did not require tracking exposure to individual radionuclides.

Comment (4531)
DOE should explain in more detail in Section 5.4.1 of the Draft WM PEIS how the probability of cancer fatalities is calculated. The probability of cancer and cancer fatality for individuals is generally calculated for the most exposed individual, or for various individuals with various levels of exposure.

Calculating total cancer fatalities for populations involves multiplying the populations with various amounts of risk of cancer fatality by the associated risks and adding the resulting amounts of calculated fatalities to get a total for the population, or computing some sort of risk and population weighted average risk and multiplying by the population (a mathematically equivalent procedure). DOE indicates that the total number of people in the population in each generation is assumed to stay the same. Elsewhere in the Draft WM PEIS, the problem of estimating impacts to future offsite populations of unknown sizes is used as an excuse for not calculating offsite population impacts and focusing on a farm family. This seems quite contradictory.

Response

In accordance with common risk assessment practice, the WM PEIS health risk methodology includes the estimation of collective risks to populations of receptors and risks to maximally exposed individuals living in those populations. The health risk methodology discussion in Section 5.4.1 in Volume I is a summary of the detailed information presented in Sections D.2.6, D.2.7, and D.2.8 in Volume III.

The hypothetical farm family scenario used to assess potential health risks from the disposal of low-level mixed waste and low-level waste assumed a family of four individuals. The size of the family was assumed to remain constant over each of the 143 generations analyzed. In the discussion of populations and individuals at risk in Section 5.4.1.2.3 in Volume I, the rationale for not evaluating risks to current offsite populations from disposal is based on the use of generic siting assumptions in the WM PEIS, not on problems related to estimating future population sizes. The rationale goes on to state that analysis of future offsite population risks from disposal requires similar information on the exact location of disposal facilities on a site, and involves additional uncertainty about the sizes of future offsite populations (i.e., non-farm family receptors living in the region of influence). Therefore, the discussions are not contradictory.

Comment (4532)

The statement in Section 5.4.1 of the Draft WM PEIS that the occurrence of other health impacts evaluated (except noncancer toxicity) generally follows the same pattern as radionuclide impacts is misleading, because the occurrence of genetic impacts does not follow the same pattern as radionuclide-induced cancer fatalities; the impacts of genetic damage continue for future generations and spread throughout populations.

Response

In the discussion of potential cancer fatalities in Section 5.4.1.4 in Volume I, the other health impacts evaluated, except noncancer toxicity, were reported to follow the same general pattern as potential radionuclide-induced cancer fatalities. Genetic effects are noncancer toxic effects. The WM PEIS considers genetic effects only for currently exposed generations, and does not attempt to assess such impacts across future generations. This issue is seldom addressed in risk assessments. Although limited methodologies for addressing inheritable genetic effects from radiation might have been developed, these methodologies have not been sufficiently adopted by the risk assessment community to justify their use in all cases.

Comment (4533)

DOE should provide evidence to support the statement in Section 5.4.1 that total cancer incidence and cancer fatalities are overestimated by a factor of two. The high incidence of skin cancer is one of the

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reasons why the proportion of calculated cancer fatalities from radiation is as low as it is, and total cancer incidence would include all cancers (including skin cancer).

Response
Section 5.4.1.1 in Volume I states that the risk assessment conducted for the WM PEIS overestimates total cancer incidence and nonfatal cancer incidence, not potential cancer fatalities, by a factor of about two because the International Commission on Radiological Protection dose conversion factor produces estimates that contain a relatively large component of skin cancers. Skin cancers are not likely to be induced by the internal exposure pathways evaluated in the WM PEIS.

Comment (4534)
Hazard quotients are used by EPA to indicate (not measure, as stated in Section 5.4.1 of the Draft WM PEIS) noncancer chemical effects of single chemicals. The sum of hazard quotients for all chemicals in a mixture that cause the same effect through the same mechanism, and the sum regardless of the route and effect are used by EPA for detailed and screening level estimation of noncancer chemical exposure impacts on human health. The WM PEIS should use hazard indices to evaluate risks from mixtures of chemicals, and not merely use hazard quotients for the individual chemicals.

Response
The WM PEIS evaluation of noncancer toxic effects resulting from exposure to hazardous chemicals follows the recommendations for such analyses in EPA's risk assessment guidelines. As described in Section D.2.9 in Appendix D in Volume III of the WM PEIS, for each of the hazardous chemicals to which receptors may be exposed, Hazard Quotient values are calculated. These values are calculated by estimating the receptor's predicted exposure and dividing by maximum acceptable exposure levels based on chemical-specific EPA Reference Dose and Reference Concentration values. The Hazard Quotient values for each of hazardous chemicals are summed to yield a Hazard Index. According to EPA's risk assessment guidelines, if the Hazard Index value is less than or equal to 1, the potential exposure is unlikely to produce adverse toxic effects.

Comment (4535)
Bureau of Labor Statistics do not cover all significant physical injuries because such injuries are not always reported to the Bureau of Labor Statistics. Significant discrepancies have been reported in some private companies when insurance medical records on injuries on the job were compared to Bureau of Labor Statistics. No evidence for the adequacy of Bureau of Labor Statistics for appropriately counting all injuries in the sanitary services occupational group is provided in the WM PEIS, nor is the applicability of these statistics to DOE waste management workers documented.

Response
DOE believes that the Bureau of Labor Statistics data are the best overall source of statistical information for worker injuries. The Bureau of Labor Statistics, National Safety Council, and DOE maintain records of worker-related personnel illnesses, injuries, and fatalities. The U.S. Department of Energy Worker Health Risks Associated with Environmental Restoration and Waste Management Technical Report (ORNL 1994) provides a table comparing construction illness and injury rates from these three sources. The risks per person-hour are less for DOE-related activities than for commercial activities. Therefore, Bureau of Labor Statistics data were used for illness/injury rates in the WM PEIS because they are more conservative.

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Comment (4536)
Why were exposure indices used for workers and similar hazard indices not used for characterizing non-threshold impacts on the general public?

Response
The WM PEIS evaluation of noncancer toxic effects resulting from exposure to hazardous chemicals follow the recommendations for such analyses in EPA's risk assessment guidelines. As described in Volume III, Section D.2.9 in Appendix D of the WM PEIS, for each of the hazardous chemicals to which receptors may be exposed, Hazard Quotient values are calculated.

Section 5.4.1.4 in Volume I of the Final WM PEIS has been revised to clarify that Hazard Index values were used to evaluate potential noncancer risks for members of the offsite population as well as for workers.

Comment (4537)
Models and assumptions used in the Draft WM PEIS to estimate the numbers of fatalities from different causes are based on models and assumptions with different amounts of conservatism, and DOE lacked the will, expertise, and/or resources to conduct the research necessary to sort this out.

To attempt to add the fatalities, without appropriate caveats and adjustments, with a scientifically sound analysis of the limitations of the procedures used, would have invited scientific criticism. The result is that disconnected estimates of fatalities of unknown accuracy and conservatism from different methods are presented in the WM PEIS. Such estimates also lack scientific credibility.

The estimated fatalities from transportation and stationary source radiation, radionuclide, accidents, chemical exposures, groundwater impacts, air pollution exposures, chemical exposures, and radiation exposures are presented separately. This flood of disconnected information is presented in a manner that makes it unusable for providing a meaningful overview of the total numbers of fatalities that can be expected for the various alternatives, or for understanding the limitations of the modeling.

Trade-offs between transportation impacts versus stationary source impacts are central to the nature of the relative environmental impacts of the alternatives and should be presented in a common frame of reference to provide adequate, understandable input for identifying the relative impacts of potential configurations of waste management facilities. The WM PEIS fails to do this, and, as a result, fails to provide adequate input for informed decisionmaking.

The problem is solvable by having people who actually understand the models and assumptions used in the WM PEIS, and their differences, do the analysis needed to integrate the results of the modeling of fatalities, risks to maximally exposed individuals, etc., in a meaningful, valid, and useful manner. The purpose of such work is to provide the information needed by administrators to make informed decisions and by the public to understand what those decisions imply, along with the limitations of our current ability to predict impacts. The Draft WM PEIS fails at this concerning human health impacts (except for supporting the conclusion that trains should be used for waste instead of trucks).

When the Draft WM PEIS is revised, and a new Draft PEIS written (the problems in the current Draft WM PEIS are too severe to go directly to a Final WM PEIS), this problem can be and must be solved

5.2 Human Health Risk Assessment

if the human health impact assessment work is to provide useful input for selecting configurations of waste management facilities.

Response

DOE believes that the WM PEIS health risk estimates are scientifically credible. These estimates were developed using the best available data at the time of the analysis and state-of-the-art environmental fate and dose conversion models.

The WM PEIS health risk analysis does not aggregate estimates of potential fatalities either across or within receptor groups. For example, waste management worker fatalities from physical trauma are reported separately from latent cancer fatalities that would result from radiation exposure. In addition, latent cancer incidence from radiation exposure is not aggregated with latent cancer incidence from exposure to chemical carcinogens. The analysis did not combine these different health risk endpoints because they involve different mechanisms of action and are operative over different time frames (e.g., acute physical trauma hazards versus latent cancer fatalities).

The uncertainties associated with the WM PEIS health risk estimates have not been quantitatively evaluated. However, risk estimate uncertainty can be qualitatively differentiated. Certain risks, such as transportation accident physical trauma injuries, are based on a limited number of parameters (e.g., number of miles traveled) for which historical statistical data are available. These risks can be estimated with a relatively high degree of confidence. On the other hand, risks associated with the release of radionuclides or chemicals to ambient environmental media during the routine operation of treatment or storage facilities are estimated using probabilistic models. Therefore, the risk estimates produced by these models have a larger uncertainty than those based on historical data. These mathematical models generally use many parameters and information on these parameters is often limited.

Comment (4538)

The interpretation of CERCLA risk assessment guidelines in the Draft WM PEIS is wrong and grossly misleading. Average risks are not compared to the 1 in 10,000 or the one in one million criteria, according to EPA CERCLA guidance. In CERCLA guidelines and in the National Contingency Plan, risks to the maximally exposed individual in the general public should be compared to these levels. EPA technical directives for CERCLA remedial investigations, feasibility studies, and baseline risk assessments, require this. To compare the "average individual risks" to these levels and to cite CERCLA guidelines to justify it is misleading. Moreover, EPA, in its CERCLA, RCRA, and Clean Air Act regulations, uses calculated individual lifetime risks of cancer, not of fatal cancer.

Based on the National Contingency Plan, lifetime cancer risks above 10^{-4} (E-4) to the maximally exposed individual in the general public are unacceptable, and a lifetime risk of 10^{-6} (E-6) is used as a point of departure when evaluating remedial action objectives. A risk of 10^{-6} (E-6) is also used as a goal in the Clean Air Act of 1990 that, if not achieved, will result in a re-assessment of the need for further pollution control eight years after promulgation of the initial Clean Air Act regulations. Risks exceeding one in ten thousand to the maximally exposed individual in the general public are also unacceptable, according to EPA guidance for RCRA permit writers, which allows permit writers to issue special requirements to sources causing impacts more restrictive than the regulatory limits in the Code of Federal Regulations, and that could be as restrictive as limiting risks to one in ten million.

Response
The WM PEIS does not estimate "average" individual risks. In the Draft PEIS, the Chapter 5 (Volume I) discussion on interpreting health risk results introduced the concept of "average" individual risk as an aid to the reader interested in obtaining site-level information from the analyses. DOE has revised Section 5.4.1.4 in Volume I to delete the comparison of average individual risks to the CERCLA target risk range.

As described in Appendix D, Section D.2.6.3 (Volume III), the WM PEIS health risk analysis estimates both cancer incidence and potential cancer fatalities for radionuclide exposure, but only cancer incidence for exposure to hazardous chemicals.

Comment (4539)
The health risk conversion factors used by ORNL and ANL in WM PEIS calculations (including 1.7×10^{-3} (1.7E-3) induced cancer cases per person-rem, for members of the general public) were derived from ICRP-60. The NESHAPS regulations (40 CFR 61) state that "emissions of radionuclides to the ambient air from Department of Energy facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr."

These standards do not include radon. Under NESHAPS, for a 70-year exposure, the maximum lifetime risk of cancer would be 1×10^{-3} (1E-3) at the EPA limit (based on ICRP-60 as used in the WM PEIS). However, for a 30 year exposure (used in Risk Assessment Guidance for Superfund), the maximum individual risk of cancer would be 5×10^{-4} (5E-4). Neither is approximately equal to 1 in 10,000.

Furthermore, a 1E-02 risk would not be acceptable for even one person in the general public, since the standards apply to any member of the public.

Response
The discussion of the NESHAPs limits in the section on interpreting risk results in Section 5.4.1.4 in Volume I has been revised in the Final WM PEIS to address the comment.

Comment (4540)
DOE should explain in detail the relevance of the disposal standard for spent nuclear fuel, high-level waste, and transuranic waste as a benchmark, and the limitations of its relevance to the specific waste treatment, storage and disposal actions analyzed in the WM PEIS. One thousand premature deaths over a 10,000-year period and an average of 0.1 fatality per year (seven over a 70-year lifetime) may meet certain Federal standards for certain situations; but the public in impacted areas and their local elected officials are likely to be justifiably outraged at the lack of adequate protection indicated by such standards.

Their outrage and its impact on their health and the potential impact of actions they may take to try to prevent such impacts could have significant environmental impacts that need to be adequately assessed in the WM PEIS.

Response
Section 5.4.1.4 in Volume I has been revised in the Final WM PEIS. DOE has revised the discussion on interpreting risk results to indicate that the disposal standard benchmark for spent nuclear fuel, high-

5.2 Human Health Risk Assessment

level waste, and transuranic waste presented in 40 CFR 191 is a maximally exposed individual exposure of 15 millirem per year or less.

Comment (4547)
Groundwater plumes may impact receptors hundreds of years after the waste is disposed of and, therefore, institutional control sufficient to ensure compliance with current standards should not be the only results displayed in the main body of the WM PEIS. The unadjusted risk estimates, which could be used to help indicate the difficulty of disposing of the waste at a given site, should appear in the main body of the WM PEIS, along with an analysis of the amount of control needed to reduce the impacts to the levels associated with compliance with current standards, and the environmental impacts of such mitigating measures.

Response
Unadjusted farm family risks resulting from the disposal of low-level mixed waste and low-level waste are discussed in Sections 6.4.1.8 and 7.4.1.7, respectively, in Volume I of the WM PEIS, and are presented in Volume II in the disposal risk tables.

5.2.1 Treatment and/or Storage Risks

Comment (67)
Seepage or other distribution of radioactive and hazardous materials from storage sites at Site 300 would be disastrous for the residents of the City of Tracy.

Response
DOE would store radioactive and hazardous materials in compliance with all regulatory requirements. For example, any radioactive and/or hazardous waste must be solidified or stabilized prior to disposal, so any low-level waste or low-level mixed waste disposed of at Site 300, or at any facility, would be disposed of in a dry form. Because stored wastes will not come in contact with surface water, groundwater, or soil, the WM PEIS does not consider impacts to these media under routine operating conditions. The potential health risk impacts resulting from storage facility accidents are described in Sections 6.4.3.1, 7.4.3.1, 8.4.3.1, and 10.4.3 in Volume I. In the unlikely event of a storage facility accident, DOE would take response actions consistent with all applicable regulations to minimize adverse health risks.

Comment (350)
A serious health and safety study including economic impacts must be done addressing LLNL as the preferred site for treating mixed wastes containing radioactive components.

Response
The WM PEIS provides a serious study of health, safety, and economic impacts at the 17 "major" sites, including LLNL. DOE found that human health and environmental risks would be low for low-level mixed waste treatment; however, some sites, such as LLNL, would probably require different technologies to minimize treatment risks. The most adverse effects from treatment of transuranic waste would result from the alternatives under which transuranic waste would be treated to meet the land disposal restrictions. Such alternatives are not considered for LLNL.

Nationwide, the greatest economic benefits resulting from low-level mixed waste and transuranic waste management would be for the Decentralized Alternative, and would generally decrease as the alternatives become more centralized. The greatest benefit at any site occurs when low-level mixed waste and transuranic waste are managed at that site.

Low-level mixed waste would be treated at LLNL only under the Decentralized Alternative and Regionalized Alternative 1, whereas transuranic waste would be treated at LLNL (only to meet WIPP waste acceptance criteria) under the No Action and Decentralized Alternatives. Section 3.7 in Volume I of the WM PEIS presents DOE's preferred alternatives and the reasons they are preferred for low-level mixed waste and transuranic waste treatment.

Before actual waste management facilities, including low-level mixed waste and transuranic waste treatment facilities, are constructed, site-specific studies would be prepared.

Comment (493)
The WM PEIS would have to be updated to account for the risks associated with the treatment technology used at the vendor sites, as well as transportation risks.

5.2.1 Treatment and/or Storage Risks

Response
The impacts at offsite commercial facilities are generally not analyzed in the WM PEIS. DOE assumes that these facilities meet all applicable regulations and are permitted by the appropriate agencies. Moreover, there are many offsite waste management facilities that are operated by private companies. It would be difficult to determine which facilities DOE would use, how much waste they would receive, and what types of waste they would receive. All of these factors are fundamental to determining the potential impacts from transportation to, and waste management at, commercial facilities.

DOE has changed portions of the PEIS (Sections 1.5, 6.2, 6.16, 7.2, and 7.16) and a new section (1.7.4) to discuss the issue of waste management privatization at DOE sites. As stated in Section 1.7.4, the impacts associated with DOE waste management facilities are expected to be representative of the impacts of private facilities located on DOE sites.

Although DOE identifies preferred alternatives in the WM PEIS (see Volume I, Section 3.7), decisions on privatization are site-specific in nature, and would be addressed in site-specific documents. Under the Decentralized, Regionalized, and Centralized Alternatives, DOE would maintain the flexibility to use private facilities.

Comment (1486)
Clarify the potential effects from receiving low-level and low-level mixed waste at LANL. The Regionalized Alternative indicates that 97% of the low-level mixed waste generated at offsite facilities would come to LANL. Clarify the facilities that would be contributing to this 97%, and when DOE would dispose of this waste at LANL.

Response
Regionalized Alternative 5 would bring the largest amount of offsite low-level waste to LANL for management. Under this alternative, 64% of the waste would come from three DOE sites: Pantex, RFETS, and SNL-NM. The potential health impacts at LANL from the implementation of the low-level waste Regionalized Alternatives are described in Volume I, Section 7.4, of the WM PEIS.

Regionalized Alternative 2 would bring the largest amount of offsite low-level mixed waste to LANL. Under this alternative, 22% of the waste coming to LANL for treatment would be from the DOE sites at Pantex and SNL-NM; in addition, 97% of the low-level mixed waste coming to LANL for disposal would come from the DOE sites at Pantex, SNL-NM, Grand Junction, Kansas City, and RFETS. The potential health impacts from the implementation of the low-level mixed waste Regionalized Alternatives at LANL are described in Section 6.4.

For purposes of analysis, the PEIS assumes that DOE would locate new facilities near existing facilities or at the center of the site. Before building a new waste treatment facility at LANL or any site, DOE would conduct detailed site-specific studies to design and locate the facility.

Comment (1583)
There is no safe way and place to store high-level waste, and if the true costs of waste disposal were included, nuclear power would be too expensive.

5.2.1 Treatment and/or Storage Risks

Response
High-level waste is (1) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and (2) other highly radioactive material that NRC, consistent with existing law, determines by rule requires permanent isolation. Only four sites (Hanford, INEL, SRS, and WVDP) store and manage high-level waste. DOE is proceeding with plans to treat high-level waste by vitrification, which will process it into a solid form that would not be readily dispersible into air or leachable into groundwater or surface water, as explained in Volume I, Section 9.1.1 of the WM PEIS. This PEIS analyzes the impacts of the *stored vitrified* high-level waste. The potential disposal of high-level waste is not within the scope of the WM PEIS. Possible environmental impacts from construction, operation, and eventual closure of a potential repository for spent nuclear fuel and high-level waste would be addressed in a separate, ongoing EIS.

Comment (1702)
Volume I, Table 4-4, does not include treatment facilities within ORR that process DOE-generated wastes. This data should be included in the region of influence, maximally exposed individual dose, and population dose studies because they would influence the impacts of wastes when the processing operations are assumed by waste management sites determined by this PEIS.

Response
The maximally exposed individual and population dose values presented in Table 4.2-2 in Volume I of the WM PEIS do include releases from existing treatment facilities at ORR. Additional information is presented in Section 4.4.9 of the WM PEIS, and in Volume I, Section 2.8, of the WM PEIS Affected Environment Technical Report.

Comment (1723)
Incineration of transuranic waste at RFETS is not an acceptable treatment because of the high mobility of airborne contaminants and local weather patterns, such as inversions.

Response
Volume I, Section 8.4, of the WM PEIS contains the health risk impacts analysis for the treatment of transuranic waste. Under Regionalized Alternative 2, treatment at RFETS includes thermal treatment of wastes to satisfy RCRA land disposal restrictions.

The health risk impacts to members of the offsite population were evaluated for airborne releases of radionuclide and hazardous chemical contaminants resulting from thermal treatment of transuranic waste. Airborne releases were modeled using site-specific meteorological and population distribution data, as described in Appendix D (Volume III) of the WM PEIS. For RFETS, the air dispersion modeling took prevailing wind conditions and historical weather patterns, including inversion potential, into consideration.

Properly designed and operated incinerators have been shown to be as or more effective than other *proven* treatment technologies and DOE does not preclude their use at any site. However, DOE has an aggressive technical development program to explore alternatives to incineration, and technologies will be tested and deployed depending on their potential to safely and effectively treat wastes.

5.2.1 Treatment and/or Storage Risks

Comment (1985)
The low-level mixed waste Regionalized Alternative might increase worker exposure to radionuclides. Therefore, DOE should institute a radiation protection program for the safe placement and inspection of waste in storage, and for maintaining occupational exposures as low as reasonably achievable. Such a program should include periodic radiation and contamination inspections of storage areas, as well as posting the storage area (see 10 CFR 20.203 and 10 CFR 20.1902).

Response
DOE is committed to worker safety and must comply with all applicable worker safety standards at all times. This includes protecting workers from radiation hazards. When new activities might expose workers to radionuclides or radiation, DOE implements radiation protection programs that include periodic inspections and appropriate postings.

DOE's radiation protection standards and program, including adherence to the principle of maintaining radionuclide exposure as low as reasonably achievable (the ALARA principle), are described in Volume III, Section D.2.7.2, of the WM PEIS.

Comment (2137)
Risks associated with dioxin and incineration need to be addressed in more detail in the WM PEIS.

Response
Emissions of dioxin from hazardous waste treatment facilities were considered in the health risk analysis conducted for that waste type, the results of which are presented in Section 10.4 in Volume I. The estimated population risks from treatment facility routine operation would be generally small for most sites and most waste types, but not zero. In addition, Section 5.4 of the WM PEIS states that "secondary pollutant" discharges resulting from the burning of fuel for waste treatment are analyzed in the air quality sections of the waste-type chapters. The air quality impacts analysis considered emissions of criteria pollutants from waste incineration and from combustion processes used to provide heat for buildings. Emissions of these pollutants were compared to applicable standards to determine compliance. The standards are set, in part, through consideration of adverse health effects. Therefore, the health impacts of "secondary pollutants" were indirectly considered in the air quality impact analysis. Secondary pollutants discharged from waste treatment facilities were not directly considered in the health risk assessments conducted for waste types other than hazardous waste because the potential impacts from exposure to these contaminants are expected to be minor in comparison to impacts from releases of radionuclides.

Trial burn data were used to estimate emissions for air quality modeling. None of the trial burn data indicated that dioxins had been measured. Current regulations require the burn temperature to be high enough that dioxin emissions are extremely small and have very low impacts. These impacts would be expected to be addressed in sitewide or project-level NEPA studies.

Comment (2307)
What happens to storage sites in deserts as a result of global warming and the resulting climate change? These changes should be considered in both storage and transport.

Response
For purposes of this programmatic analysis, DOE defines storage as the collection and containment of waste (in such a manner as not to constitute disposal) to await treatment or disposal. Thus, storage, by definition, is not permanent.

The 10- to 20-year time frames considered for operation of waste management facilities and transportation of waste in the WM PEIS would not be subject to long-term climatic change. The impacts of long-term climatic changes for proposed disposal sites are more appropriately addressed in site-specific performance assessment evaluations. In general, future changes in climate are too speculative to yield a highly accurate assessment.

Comment (2542)
Volume I, Section 9.4.1.2 states that, on a site-level basis, estimated cancer incidences exceeded one. Where is this shown? The incidence values in Table 9.4-6 are all *below* one for Hanford and SRS. Is a table missing?

Response
Section 9.4.1.2 in Volume I of the WM PEIS discusses the estimated number of cancer incidences and genetic effects resulting from storage of high-level waste canisters at Hanford, INEL, SRS, and WVDP under the alternatives evaluated. The discussion is a summary of data presented in the Site Data Tables for Hanford, INEL, SRS, and WVDP contained in Volume II. The values presented in Table 9.4-6 are incremental annual risks from storage beyond 2015, which is a different scenario.

Comment (2617)
The text in Volume I, Section 10.4.1.2, does not agree with Table 10.4-3 (i.e., one cancer death under Regionalized Alternative 1 and two cancer deaths under Regionalized Alternative 2).

Response
Section 10.4.1.2 in Volume I of the WM PEIS describes the estimated number of cancer *incidences* program-wide resulting from hazardous waste treatment. The text explains that the program-wide waste management worker cancer incidences of one and two were estimated under Regionalized Alternatives 1 and 2, respectively. These values are presented correctly in Table 10.4-3.

Comment (2646)
Volume III, Section D.3.3.2. Since the health risks for commercial treatment are not addressed in this analysis, is the percentage of waste treated commercially across the DOE complex presented somewhere in the text? This weakness should also be addressed in the risk characterization.

Response
More than 90% of hazardous waste in a given year is generated by 11 or fewer DOE sites. Section 10.1.2 in Volume I of the WM PEIS presents the estimated volumes of hazardous waste at such sites. In terms of volume percentages, more than 99% of this hazardous waste is hazardous wastewater and some hazardous waste treated or stored onsite. The remaining 1% is shipped offsite for commercial treatment. The WM PEIS alternatives focus on that 1% being shipped offsite.

5.2.1 Treatment and/or Storage Risks

Comment (3151)
The WM PEIS does not fully discuss the impacts of transuranic waste storage, as evidenced by the lack of analysis of accidents and source terms for current storage. Thus, it does not provide a basis for selecting storage options to meet RCRA requirements, the analytical basis for selecting among sites to minimize impacts for consolidated storage options, or the basis for determining which sites should be given priority for upgraded or new storage facilities.

Response
The WM PEIS does not separately analyze accidents and source terms for current storage because the results would not help to discriminate among the alternatives. The PEIS analysis assumed that all sites would accumulate (or, at least, not reduce) their inventories for approximately 10 years, at which time complex-wide treatment would begin. Therefore, all DOE sites would achieve their maximum inventories (leading to maximum potential releases during a storage facility accident) regardless of the alternative. Recent DOE safety analysis reports and NEPA evaluations provide guidance on the potential risk impacts applicable to transuranic and low-level mixed waste storage facility accidents.

Current safety analysis reports and site-specific NEPA analyses are valid indicators for predicting the consequences of a range of selected waste storage accidents of varying frequency. This information is qualitatively discussed in Volume I, Section 8.4.3.1. Section 8.4.3.2 presents quantitative estimates of the potential risks resulting from transuranic waste treatment facility accidents. Appendix F (Volume V) summarizes some key accidents and assumptions the sites used to prepare the analyses and the related release or health effects-related results. Examples of existing safety documentation results applicable to transuranic waste storage facility accidents include a range of accidents from severe breaches of single drums to severe fires in centralized facilities from both man-made and natural sources. Appendix F contains a more detailed explanation of these accidents scenarios. Although there is considerable variation in the assumptions the DOE sites used to develop accident scenarios and predicted impacts, the studies suggest that public risk for transuranic waste storage would be low.

The WIPP SEIS-II addresses the potential impacts of operating WIPP as a repository for transuranic waste. As part of the WIPP SEIS-II, the No Action Alternatives evaluate the continued management of transuranic waste at treatment/generator facilities and the decommissioning or other disposition of the WIPP facility if transuranic waste is not disposed of at WIPP.

In addition, the WM PEIS does identify potential mitigation measures, including the options of combining facilities for the management of waste types and waste streams. DOE will consider project- or site-specific issues after it select locations for waste management facilities on sites.

Comment (3383)
Volume III, Table D.3.2-6, lists 7.0E-1 cancer fatality in the offsite population from tritium due to low-level waste treatment under Centralized Alternative 5. Table D.3.2-2 lists 9.8E-2 cancer fatalities in the offsite population at *all* sites from *all* isotopes due to low-level waste treatment under Centralized Alternative 5. Similar discrepancies appear for other alternatives (Regionalized 4 and 5; Centralized 3 and 5) and in associated text discussions.

Response
DOE has corrected Tables D.3.2-6, D.3.4-18, D.3.4-34, and D.3.5-6.

5.2.1 Treatment and/or Storage Risks

Comment (3992)
Volume I, Section 6.10. DOE has failed to consider risk to public health from a treatment alternative it apparently plans to construct and operate at the Portsmouth Plant.

Response
Section 6.10 in Volume I is a description of the results of the environmental justice analysis for low-level mixed waste. The risk to human health from proposed treatment facilities at the Portsmouth Plant are considered for the low-level mixed waste alternatives in Section 6.4.

Data for the Portsmouth Plant were inadvertently omitted from Table 6.4-8 in the Draft WM PEIS. However, the Portsmouth Plant health risk data for low-level mixed waste were provided in the Volume II Site Data Tables (Table II-13.1-4). DOE has revised the PEIS to include data for the Portsmouth Plant in Table 6.4-8.

Comment (4469)
DOE should rewrite the second paragraph in Section 8.3.1 of the Draft WM PEIS Summary document because it appears to contain contradictions. Risks to workers at DOE sites or at commercial sites should be evaluated.

Response
DOE has revised the WM PEIS Summary document to clarify the distinctions made between a DOE waste management worker and a waste management worker at a commercial facility. Worker risk is assumed to be similar at either facility, although the WM PEIS did not analyze risk from commercial treatment facilities. DOE would treat more of its hazardous waste under the Regionalized Alternative, and would use commercial hazardous waste treatment facilities under the No Action and Decentralized Alternatives.

5.2.2 Disposal Risks

Comment (478)
The exposure risks to the hypothetical farm family over a 10,000-year time frame are extreme.

Response
The hypothetical farm family represents an exposure that occurs at a time when institutional controls (fences, warning lights, land records, etc.) no longer exist. The purpose of this analysis is to determine upper-bound exposures only. The farm family is assumed to draw water from a well 300 meters (984 feet) downgradient from the center of the disposal facility. The distance ensures that the farm family's groundwater well would be beyond the boundary of the disposal site.

Risks to the hypothetical onsite farm family were evaluated for 143 consecutive 70-year lifetimes (i.e., 10,000 years) to determine the upper bound of long-term risks from exposure to groundwater contaminated by the failure of an underground waste disposal facility. The maximum exposure could be significant over a series of lifetimes. The 10,000-year period was selected for the analysis in the Draft PEIS to maintain consistency with the *Guidelines for Radiological Performance Assessment of DOE Low-Level Radioactive Waste Disposal Sites* (Case & Otis, 1988) that existed at the time the WM PEIS analysis was initiated. The guidance for performance assessment has since been changed; current guidance suggests that a 1,000-year time period should be used in the performance assessments for waste disposal conducted to satisfy the requirements of DOE Order 5820.2A.

To provide some perspective on the timing of health risks predicted to result from disposal, the risk analysis identifies the 70-year lifetime during which the highest exposures (and hence, risks) are estimated to occur for the hypothetical farm family. This lifetime is referred to in the results as the "most-exposed lifetime" of the farm family.

Comment (498)
The loss-of-institutional-control assumption in the risk assessment is extreme and not very realistic. If a loss of institutional control were to occur at ORR, a social or domestic disaster would have to precede it. The magnitude of such a disaster would surely overshadow any risks of impacts from the loss of institutional control. Exposure scenarios in the WM PEIS need to be more reasonable.

Response
NEPA requires DOE to consider a range of potential exposure scenarios to evaluate the risks of possible program occurrences. Although it is extreme, DOE believes that loss of institutional control is an assumption necessary to address potential risks to generations far in the future. DOE used conservative scenarios to ensure that estimates of potential risks would represent the upper limit.

Comment (544)
In the scenarios described in the WM PEIS, the distance of the hypothetical farm family well from the disposal unit should be site-specific information. Depending on the size of the disposal facility, it could be shorter or longer than the 300 meters assumed in the analysis.

Response
The evaluation of health risks to the hypothetical farm family is a screening-level analysis that enables a comparison of the relative sensitivity of various sites to disposal actions. Therefore, it uses a generic set of scenario assumptions (see Volume I, Section 5.4.1), including the location of a well 300 meters

(984 feet) from the center of the disposal unit at all sites. Sitewide or project-level NEPA reviews would incorporate the environmental conditions unique to a particular site.

Comment (546)
The risks resulting from the "intruder drilling scenario" should be assessed. The long-term collective risks associated with failure of the disposal facility could be significant if the facility is located near populated areas or water supplies.

Response
The WM PEIS analysis of disposal health risks includes consideration of a hypothetical intruder scenario for low-level mixed waste and low-level waste. The intruder scenario used in the WM PEIS assumes that a single adult drills a well directly through the disposal facility to the water table. The methods and assumptions used in the hypothetical intruder scenario are presented in Section 5.4.1 in Volume I and Appendix D in Volume III. The results of the analyses are presented in Sections 6.4.1.10 and 7.4.1.9 in Volume I and in Appendix D.

The WM PEIS does not address quantitatively collective risk to offsite populations from disposal of low-level waste and low-level mixed waste. DOE believes that it is not possible to develop plausible estimates of risk to offsite populations resulting from exposure to contaminated groundwater in this programmatic document because the exact locations of disposal units are not being determined in the PEIS. DOE determined that some relative indicator of the potential for offsite risk would be an appropriate approach. It has, therefore, added a population risk vulnerability analysis in Section 5.4.1.2.3 in Volume I and in Section C.4.1.2 in Volume III, which provides a basis for comparison of low-level mixed waste and low-level waste disposal alternatives using measures that characterize their relative potential to cause risks to offsite populations from groundwater contamination.

Comment (548)
The 10,000-year period used for estimating risks from the disposal of low-level mixed waste and low-level waste might not be sufficient to provide upper-bound risk estimates for some radionuclides (e.g., long-lived radionuclides that move slowly through the soil).

Response
DOE selected an evaluation period of 10,000 years to conform with the analysis period used for the performance assessments required by DOE Order 5820.2A for the design and siting of low-level waste disposal units. This clarification has been added to the Summary document and to Chapters 5, 6, and 7 in Volume I of the WM PEIS.

Certain long-lived, relatively immobile radionuclides may take longer than 10,000 years to leach from disposal units into drinking water wells. Estimation of future risks resulting from exposure to these contaminants is constrained by the limitations of the models to accurately predict conditions so far into the future. These limitations, however, do not prohibit comparison of the relative risks estimated for the potential disposal sites for the 10,000-year period of evaluation.

5.2.2 Disposal Risks

Comment (549)
The WM PEIS should provide information about the assumed design life of the low-level mixed waste and low-level waste disposal facilities and how long DOE assumes it will retain institutional control over these sites.

Response
The assumed design life of disposal facilities for low-level and low-level mixed wastes would vary with the different types of units. The WM PEIS assumes that shallow land burial units would breach immediately after disposal, and that aboveground vaults and belowground vaults would breach 300 years and 750 years after disposal, respectively.

DOE intends to maintain indefinite institutional control of these facilities. However, for purposes of analysis, DOE assumes that the hypothetical farm family scenario would occur in the future under conditions without institutional control, enabling the family to establish a residence adjacent to the disposal unit.

Comment (550)
Since it is possible for the disposal facilities to fail following the institutional control period, the PEIS should include the leach rates assumed for the radionuclides in the waste.

Response
The WM PEIS analysis used leach rates from the *Mixed Low-Level Waste Systems Analysis Methodology Report* (prepared for DOE by IT Corporation, 1992); the rate for concrete is 0.001 grams per square centimeter per day, and that for borosilicate glass is 0.000001 grams per square centimeter per day.

Comment (551)
Since it is possible for the disposal facilities to fail following the institutional control period, the PEIS should include the radionuclide partition coefficients or distribution coefficients that were assumed for the unsaturated zone and the saturated zone. Are they site specific or generic?

Response
DOE selected the partition coefficients used in the WM PEIS from a contaminant-specific matrix of nine possible predetermined values, depending on the geology of the site. Geologic parameters influencing the selection of a value included the percent clay composition, percent organic matter, and pH. As such, the partition coefficients used in the PEIS are both contaminant- and site-specific. DOE also selected specific coefficients for each unsaturated and saturated zone. Documentation for the fate and transport model used for evaluating migration in the vadose and saturated zones (MEPAS Application Guidance: PNL-7216) also describes the distribution coefficients and their applicability.

Comment (553)
How do the uncertainties of the assumed leach rates, radionuclide partition coefficients, and distribution coefficients affect the long-term results of the health risk assessment?

Response
Leach rates have a direct impact on source terms. A higher leach rate would result in a higher concentration of contaminants reaching a receptor at an earlier point in time. A lower leach rate would

allow more time for radioactive decay, thus decreasing the source term and associated health risks. This effect is not as significant for long-lived radionuclides. Partitioning coefficients and distribution coefficients (i.e., K_d values) would have a similar impact on health risks. These parameters influence the rate at which contaminants move through vadose and saturated zones. This in turn influences the time period in the future at which the contaminants reach the receptor. Longer periods of time would result in more dispersion and decay, which would result in lower health risks.

Section D.2.15 in Volume III of the WM PEIS presents an overview of uncertainty in the WM PEIS health risk analyses. Section D.4 provides a more detailed discussion, as well as estimates of the magnitude of uncertainty in the estimates of health risks resulting from waste treatment, storage, and disposal actions.

Comment (556)
The WM PEIS should evaluate the potential risk to current and future local populations from the disposal of low-level waste and low-level mixed waste.

Response
To supplement the quantitative estimates of maximally exposed individual disposal risks presented in Sections 6.4.1.8 and 7.4.1.7 in Volume I, DOE performed semi-quantitative analyses of the potential for offsite population risk in Section 5.4.1.2.3 of the Final PEIS. These analyses produced estimates of relative population vulnerability of the sites, rather than quantitative estimates of person-rem doses and cancer fatalities. For these semi-quantitative analyses, DOE used simple statistical methods and information about site characteristics known or expected to be associated with the potential for offsite population disposal risk to develop “risk vulnerability” groupings of the sites. The sites within each of the three vulnerability groups developed in this analysis have similar potential for offsite population health risk from disposal.

Comment (557)
How do the models used in the waste disposal risk assessments treat the decay of long-lived radionuclides, the ingrowth of daughter products, and their transport to groundwater?

Response
DOE assumes that the disposal facilities evaluated for the WM PEIS would break down after a certain period of the time, depending on the type of facility (300 years for tumulus, 750 years for belowground vaults, and immediately for shallow land burial). To calculate the source term, the analysis would “predecay” the inventory in the facility for the lifetime of the facility. The DUST code simulates the release of the decayed inventory (including daughter products) and estimates an annual flux of the contaminants from the facility. The flux rates go into the MEPAS groundwater model, which simulates the fate and transport of the contaminants to the receptor. MEPAS does not track ingrowth of daughter products, but accounts for decay by tracking radionuclide parents to the receptor boundary and estimating the amount of associated daughter product at the receptor based on the concentration of the parent. Additional details are presented in Volume III, Section D.5.

Comment (558)
How do the models used in the waste disposal risk assessments treat the inhalation and exhalation of radon-222 and radon-220?

5.2.2 Disposal Risks

Response
As described in Section 5.4.1 in Volume I and Appendix D in Volume III, the WM PEIS health risk analysis for disposal of low-level mixed waste and low-level waste evaluates human exposure only through the groundwater pathway. The hypothetical farm family is assumed to be exposed via the consumption of contaminated groundwater as drinking water and its use in irrigation of crops and livestock, which are subsequently consumed. Inhalation of radon, tritium, or other volatile radionuclides or hazardous chemicals was not considered in the disposal risk analysis.

Comment (1675)
ORR with its complex geology, hydrogeology, and shallow groundwater, as shown by the National Governors Association/DOE Disposal Workgroup, is suitable for disposal of only a very restricted list of radionuclides since protection of human health and the environment is of primary importance. To truly evaluate the suitability of ORR for low level mixed or low level waste disposal, technical siting criteria such as that used by NRC in 10 CFR 61.50 will have to be applied.

Response
The WM PEIS low-level mixed waste disposal analysis is a screening-level assessment. The objective of the assessment is to provide a relative comparison of the potential suitability of sites for disposal of low-level mixed waste as waste management alternatives are varied. The analysis assumes the use of conceptual, generic disposal facilities; generic waste forms (e.g., polymers or grout); and that the entire inventory of waste will be disposed of (i.e., no waste exclusion). Although generic ORR hydrogeological and meteorological data were used in the environmental fate modeling, no attempt was made to site disposal units at specific locations on ORR. The results of the PEIS screening-level analysis include the potential risk to hypothetical maximally exposed individual farm family members from new disposal facilities, since no credit is taken for the use of engineering controls and careful site selection that could minimize potential groundwater contamination.

In the actual design of a disposal facility at ORR or any other DOE site, more detailed, site-specific analyses would be conducted in accordance with the requirements of DOE Order 5820.2A. The objective of the analyses required by this Order is to design and site a facility that will satisfy the performance objectives specified for the protection of human health and environmental quality. Implementation of the requirements of the Order could involve: (1) modifying the engineering design of the disposal facility (e.g., addition of a clay liner to increase contaminant adsorption, or a concrete cap to reduce infiltration); (2) modifying the form of the waste to be disposed of (e.g., changing from grout or polymer to a vitrified waste form); and (3) imposing waste acceptance criteria (i.e., restricting the amounts of radionuclides or hazardous chemicals allowed in a given disposal facility).

DOE Order 5820.2A is intended to satisfy the substantive requirements of NRC regulations (10 CFR Part 61) for DOE facilities, which are not subject to NRC requirements, or those imposed by States through agreements with NRC.

The results of the low-level mixed waste disposal risk analysis, presented in Volume I, Section 6.4.1.8, of the WM PEIS, suggest that disposal of low-level mixed waste at ORR should not present significant risks to the individual farm family receptor. However, the results of collective risk vulnerability analyses presented in Section 5.4.1.2.3 suggest that ORR is among the DOE sites with the highest potential vulnerability for offsite population health risks from disposal. Results of this PEIS evaluation support the findings of other studies (e.g., National Governor's Association/DOE Disposal Workgroup).

Comment (1678)
The intruder theory, with calculations based on 10,000-year period (173 lifetimes), is totally misleading. In the event of a serious accidental exposure or contaminant ingestion, the imminent danger to the population during one lifetime, or at the most two, is significant. Beyond that point, since migration patterns are much more complex, risk calculations have no validity.

Response
The exposure scenarios are discussed in Section 5.4.1 in Volume I of the WM PEIS. Risks to the hypothetical onsite farm family were evaluated for 143 consecutive 70-year lifetimes (i.e., 10,000 years) to determine the upper bound of long-term risks from exposure to groundwater contaminated by the failure of an underground waste disposal facility. The maximum exposure could be significant over a series of lifetimes. The 10,000-year period was selected for the analysis to maintain consistency with the *Guidelines for Radiological Performance Assessment of DOE Low-Level Radioactive Waste Disposal Sites* (Case & Otis, 1988) that existed at the time the WM PEIS analysis was initiated. The guidance for performance assessment has since been changed; current guidance suggests that a 1,000-year time period should be used in the performance assessments for waste disposal conducted to satisfy the requirements of DOE Order 5820.2A.

The hypothetical "intruder" is an imaginary adult who drills a well directly through a low-level mixed waste or low-level waste disposal unit to the groundwater. As a result of the drilling, contaminated soil from within the unit is brought to the surface, where it mixes with the top layers of the surface soil. The exposure pathways for the intruder were inhalation of resuspended contaminated soil, and direct radiation from contaminated soil. Two hypothetical intrusions were assumed to occur; 100 years and 300 years after closure of the disposal facility. The intruder scenario is assumed to occur at a time in the future after the loss of institutional control.

Evaluating the potential risks to the hypothetical intruder is consistent with the analysis required for disposal facilities under DOE Order 5820.2A.

Comment (1680)
ORR groundwater quality reports for the years 1992 through 1994 reveal contaminants at levels of concern, gradually decreasing with progressive time periods. Additional incremental increases in pollutants released (by incremental increases in treatment and disposal of low level mixed waste) can cause elevated levels of radionuclide contamination that exceed drinking water standards.

Response
The potential interaction of groundwater contamination from low-level mixed waste disposal facilities and existing groundwater contamination would depend on the locations of the facilities. The WM PEIS does not attempt to identify potential locations for disposal facilities at ORR or other DOE sites. The siting of disposal facilities would require additional analyses and the performance assessments required for conformance with DOE Order 5820.2A. This Order is intended to satisfy substantive requirements of NRC regulations (10 CFR Part 61) for DOE facilities, which are not subject to NRC requirements, or those imposed by States through agreements with NRC.

5.2.2 Disposal Risks

In April 1996, DOE issued guidance for the conduct of composite analyses in addition to performance assessments to help ensure that continued disposal of low-level waste will not compromise the future radiological protection of the public. The composite analysis will estimate the potential cumulative impacts to a hypothetical future member of the public from an active or planned low-level waste disposal facility and other sources of radioactive material in the ground that might interact with the low-level waste disposal facility.

Comment (1681)
For the intruder hypothesis to gain validity, DOE would have to lose institutional control. Under that circumstance, the pressing issues would be population migration.

Response
The hypothetical intruder scenario evaluated in the WM PEIS for the disposal of low-level mixed waste and low-level waste is a very conservative accident analysis. The scenario is assumed to take place in the future at a time when the disposal facilities are no longer under institutional control. The loss of institutional control is a hypothetical assumption that would have to be true to allow the intruder to be located directly above the disposal unit. Note, however, that DOE does not intend or expect to loose institutional control, nor is this assumption consistent with current land use plans, as described in the April 1996 publication, *Charting the Course - The Future Use Report* (DOE/EM-0283). The scenario further assumes that the adult intruder drills a well directly through the disposal unit to the water table. Contaminated soil from within the unit is brought to the surface as a result of the drilling, where it mixes with the top layers of the surface soil. The individual raises crops on the contaminated plot of land and consumes the resulting produce. The intruder is assumed to be exposed to disposal unit contaminants via inhalation of resuspended contaminated soil, inadvertent ingestion of contaminated soil, ingestion of plants grown in contaminated soil, and direct radiation from contaminated soil.

Comment (1706)
Referring to Volume I, Section 4.3, a commentor stated that in its evaluation of land-based waste disposal, the WM PEIS consideration of hydrology and geology are inadequate. Specifically, the commentor stated:

Performance assessment strategies have been primarily restricted to deterministic modeling of radionuclide fate and transport, followed by risk assessment. The potential of a land-based disposal site to impact human health and the environment should be considered by alternative means to provide a check on fate and transport models, which might be inappropriate or misapplied to greater or lessor extents at the various sites.

DOE should use the NEPA process as an opportunity to evaluate relative suitability of disposal sites based on generic technical requirements similar to those used by NRC. Demographic and land-use considerations are discussed in some detail in this PEIS, but hydrology and geology have received little attention. Evidently, only seismic activity, flooding, and some general characteristics of soils and topography have been considered.

If the hydrogeology and geochemistry of a site are complex and/or the correct chemical and physical processes of contaminant transport are not incorporated into the model, these qualitative technical requirements might offer guidance that will prove to be superior to risk assessment when evaluating relative performance between sites.

Faulting, folding, and karstification at ORR have produced an extremely complex hydrogeology that has not yet been adequately monitored or modeled. It is doubtful that generic transport models of the kind used in this PEIS can yield much but misinformation when applied in such circumstances.

Response
The hydrology, geology, and meteorology of ORR are considered in Section 4.4.9 in Volume I of the WM PEIS and in Volume I of the WM PEIS Affected Environment Technical Report. Sections 5.4.1 and 6.4.1.8 of the PEIS provide additional information about the analyses of disposal risks. Please note that site-specific environmental setting data are used in the environmental fate models.

The WM PEIS risk analyses do not attempt to predict risks to current or future offsite populations from the disposal of low-level waste and low-level mixed waste. Estimating these risks requires knowing the exact location of disposal facilities on a site with respect to existing aquifers and the populations that might use them. Since the PEIS does not attempt to make decisions about locations of facilities on sites, quantitative estimates of collective dose and risk are not attempted. However, Section 5.4.1.2.3 in Volume I describes an analysis of the relative vulnerability of offsite populations to risk from disposal based on site environmental data. The results of the analysis indicate that ORR is among the group of sites with the highest potential vulnerability.

Comment (1713)
Waste should not be buried at RFETS or anywhere else.

Response
Analyses performed for the WM PEIS presented in Sections 6.4.1.8 and 7.4.1.7 in Volume I indicate that disposal of low-level mixed waste and low-level waste at RFETS would result in a low risk of groundwater contamination and a low risk to human health for a member of a hypothetical farm family. However, on the basis of site environmental data, the results of a collective population risk vulnerability analysis presented in Section 5.4.1.2.3 suggest that RFETS is intermediate among the 16 proposed DOE disposal sites in its potential for offsite population risk from disposal. DOE would take further actions to minimize the potential for contamination at RFETS or other sites by selecting locations for disposal facilities only after conducting additional environmental analyses. Furthermore, DOE will design and operate new facilities in compliance with all applicable regulations, and will adapt the facilities to site-specific conditions as necessary.

DOE prefers waste disposal to long-term storage for two primary reasons. First, disposal involves the placement of treated waste in facilities that will effectively remove the material from contact with human or environmental receptors for very long periods of time. For example, disposal of treated transuranic waste and high-level waste in geologic repositories will isolate these materials for the long periods of time they are likely to remain hazardous. If DOE kept these materials in long-term storage facilities they could be subject to potential releases as a result of facility accidents or natural disasters.

Second, fewer resources are required to dispose of treated materials than to store them for indefinite periods. The operational costs associated with maintaining, securing, and monitoring aboveground storage facilities exceed those for underground disposal facilities.

5.2.2 Disposal Risks

Comment (1733)
The selection criteria for the PEIS for acreage available for site development is unclear. Assuming that the area is available, has any work been done to ascertain that it is acceptable for treatment, storage, or disposal facilities? This is vital, because ORR is underlain by known solution-prone limestones and varying carbonaceous geological formations.

Response
The land area used in the analysis was either the acreage designated by the site for use for waste management facilities or estimated as available for construction of facilities by subtracting unsuitable areas from the site total acreage. DOE made no attempt in the WM PEIS to identify or select the actual locations of new waste management facilities on any site, including ORR, or to determine the suitability of the available land, in terms of soils or hydrologic conditions, for constructing waste management facilities. Rather, the PEIS determines whether sufficient land will be available to enable DOE to avoid environmentally or culturally sensitive areas. Site-specific or project-level NEPA reviews for ORR to support the development of particular facilities at this site would determine if specific locations on a site are suitable for treatment, storage, or disposal facilities.

The results of the low-level mixed waste disposal risk analysis, presented in Volume I, Section 6.4.1.8, of the WM PEIS, suggest that disposal of low-level mixed waste at ORR should not present significant risks to an individual farm family receptor. However, the results of collective risk vulnerability analyses presented in Section 5.4.1.2.3 indicates that ORR is among the DOE sites with the highest potential for offsite population health risks from disposal. Results of this PEIS evaluation support the findings of other studies (e.g., National Governor's Association/DOE Disposal Workgroup).

In the actual design of a disposal facility at ORR or any other DOE site, more detailed, site-specific analyses would be conducted in accordance with the requirements of DOE Order 5820.2A. The objective of the analyses required by this Order is to design and site a facility that will satisfy the performance objectives specified for the protection of human health and environmental quality. Implementation of the requirements of the Order could involve: (1) modifying the engineering design of the disposal facility (e.g., addition of a clay liner to increase contaminant adsorption, or a concrete cap to reduce infiltration); (2) modifying the form of the waste to be disposed of (e.g., changing from grout or polymer to a vitrified waste form); and (3) imposing waste acceptance criteria (i.e., restricting the amounts of radionuclides or hazardous chemicals allowed in a given disposal facility).

DOE Order 5820.2A is intended to satisfy the substantive requirements of NRC regulations (10 CFR Part 61) for DOE facilities, which are not subject to NRC requirements, or those imposed by States through agreements with NRC.

Comment (1736)
Generic groundwater contaminant transport models will not be capable of simulating the transport of contaminants through the fractures and karst conduits that are the contaminant pathways in bedrock at ORR, and such models will not necessarily yield conservative results when misapplied in fracture flow situations.

Response
Section 6.4.1.8 in Volume I of the WM PEIS discusses the objectives and outputs of the hypothetical farm family disposal risk analysis in comparison to those of the DOE Order 5820.2A performance

assessment process. The objective of the PEIS disposal risk analysis is to provide a relative comparison of potential risk among low-level mixed waste and low-level waste management alternatives. The analysis assumed generic disposal facilities and generic waste forms. The outputs of the analysis are risk estimates for the hypothetical farm family and hypothetical intruder. The Final WM PEIS has been revised to incorporate an analysis of the potential for offsite population risk from waste disposal. Section 5.4.1.2.3 describes the methodology used in the analysis, which involves consideration of a number of site-specific parameters, including groundwater travel time. The results of this risk vulnerability screening analysis for low-level mixed waste and low-level waste disposal are presented in Sections 6.4.1.9 and 7.4.1.8, respectively.

DOE would conduct detailed groundwater modeling that can better characterize the fracture flow conditions at ORR as part of the performance assessment analyses required before the implementation of any disposal alternatives. The objective of the performance assessment analyses is to design a disposal facility that will satisfy the performance objectives specified in DOE Order 5820.2A. The facility design could involve modifying the engineering design of the disposal facility, modifying the waste form, selecting the location of the disposal facility, and imposing waste acceptance criteria. To a large extent, these factors will influence potential risk from implementation of disposal facilities. The WM PEIS analysis does not address these factors at each of the 17 major sites, but rather serves as a screening analysis to identify potential problem sites and contaminants.

Comment (1738)
It appears that the only exposure considered to the hypothetical farm family is exposure from future disposal facilities. The PEIS failed to provide risk analyses that include continuing releases from past operations, as well as releases from potentially sited waste disposal facilities.

Response
Section 5.4.1 in Volume I of the WM PEIS explains that the hypothetical farm family disposal risk estimates are only for new disposal facilities. The risk estimates assume that each disposal unit is a discrete structure. For sites that would require the construction of multiple disposal units under certain alternatives, the analysis assumes that there will be no mixing of groundwater plumes from these units at the 300-meter (984-foot) well. DOE assumes that each of these close-in receptors will be affected primarily by the contaminant plume from the facility closest to him/her. Commingling of contaminant plumes from multiple disposal units could occur as distance from the units increases. However, at greater distances from the disposal units, the concentrations in any given plume should be lower than those estimated at the 300-meter well as a result of dispersion and dilution.

In addition, the PEIS analysis does not account for existing disposal inventory or existing groundwater contamination at a site, since the PEIS does not attempt to locate disposal units on the sites. More detailed analyses, such as the performance assessments required under DOE Order 5820.2A, will address the issues of existing groundwater contamination and multiple disposal units. For example, in April 1996 DOE issued guidance for the conduct of composite analyses in addition to performance assessments to help ensure that continuing disposal of low-level waste will not compromise the future radiological protection of the public. The composite analysis will estimate the potential cumulative impacts to a hypothetical future member of the public from an active or planned low-level waste disposal facility and other sources of radioactive material in the ground that might interact with the low-level waste disposal facility.

5.2.2 Disposal Risks

Although the WM PEIS cumulative impacts analysis for human health risk does not account for existing disposal inventory or existing groundwater contamination, the cumulative impacts analysis for groundwater quality does consider existing groundwater contamination (which in some instances may be due to disposal activities) to the extent that the information is available.

Comment (1753)
Because transuranic waste is dangerous waste and has long-lived radionuclides, environmental pathways should be protected for hundreds to thousands of years into the future. The overriding factor in transuranic waste management should be long-term health impacts.

Response
The WM PEIS evaluates alternatives to support programmatic decisions on national transuranic waste treatment and storage siting configurations. The WM PEIS alternatives analyze minimal processing of waste to meet current WIPP waste acceptance criteria, intermediate treatment to reduce the potential for gas generation, and more extensive treatment to satisfy RCRA land disposal restrictions.

DOE is analyzing long-term impacts of disposal and continued storage of transuranic waste in the WIPP SEIS-II and will make both disposal and transuranic waste treatment decisions based on that analysis. The WM PEIS will provide a basis for decisions on where any transuranic waste treatment and storage facilities would be sited.

Comment (2106)
One commentor stated that the hypothetical farm family scenario is not so imaginary. There is a woman who lives downgradient of a site who performs farming activities and uses the water. DOE needs to explain how this can be considered a worst-case scenario when the situation already exists.

Response
The WM PEIS health risk analysis uses the hypothetical farm family scenario to address the potential risks from groundwater contamination following disposal of low-level mixed waste and low-level waste. The scenario takes place in the future when a farm family moves onto the site and drills a well 300 meters (984 feet) from the center of a disposal unit. This scenario is assumed to represent potential future maximum exposure conditions, since the well is located only 300 meters from the center of the disposal unit. At this distance, radionuclide and hazardous chemical contaminant concentrations should be higher than concentrations at locations further from the unit. Therefore, the hypothetical farm family receptors should receive higher doses from contaminated groundwater than persons using wells located farther from the disposal units, where dispersion and dilution are more likely to reduce concentrations of contaminants to which the offsite public might be exposed.

Some elements of this scenario, such as the use of groundwater by individuals living downgradient from the site for farming purposes, might be similar to existing conditions at some sites. However, the total scenario is considered to be hypothetical because it should produce impact estimates that would be greater than those expected under reasonable future conditions. For example, although individuals currently living offsite might utilize potentially contaminated groundwater, and site boundaries might change in the future, it is unlikely that a member of the general public will, at some time in the future, develop a drinking water well within 300 meters of a low-level mixed waste or low-level waste disposal unit.

5.2.2 Disposal Risks

Comment (2393)
We do not find persuasive the WM PEIS use of the "hypothetical intruder" and "hypothetical farm family" to model the risk of individual exposure. The use of these categories in the WM PEIS may contribute to a misunderstanding of what levels of exposure might actually be encountered because of the extreme assumptions used in the models.

Response
The WM PEIS uses farm family and intruder scenarios to evaluate the potential public health risks from long-term exposure and accidental exposure, respectively. The farm family and intruder scenarios are typical of scenarios used in performance assessments. Given the scope of the PEIS, the farm family and intruder scenarios seem appropriate. Specific disposal sites will invariably have conditions or features that are not addressed within the limits of the PEIS methodology. These issues would be more appropriately addressed in site-specific assessments performed by site experts using fate and transport models designed and calibrated specifically for that site.

The Final WM PEIS has been revised to incorporate an analysis of the potential for collective risk from waste disposal. Section 5.4.1.2.3 describes the methodology used in the analysis, which involves consideration of a number of site-specific parameters. The results of this risk vulnerability screening analysis for low-level mixed waste and low-level waste disposal are presented in Sections 6.4.1.9 and 7.4.1.8, respectively.

Comment (2447)
The WM PEIS estimates the impacts of waste disposal using generic disposal facilities and practices. Actual disposal at a particular site will certainly differ, and this uncertainty needs to be incorporated into the risk interpretation for waste management workers and the hypothetical intruders and farm families.

Response
Section 5.4.1.1 in Volume I of the WM PEIS contains a summary of uncertainty in risk estimates used in the health risk analyses. More detailed information on the hypothetical farm family and hypothetical intruder scenarios is in Section D.4 in Volume III. The risk models were applied consistently to all sites in order to have comparable results. As indicated in Section 5.4.1.1, the uncertainty associated with the disposal risk estimates for waste management workers is relatively smaller than the uncertainty associated with the farm family and intruder risk estimates.

Sections 6.4 and 7.4 in Volume I of the WM PEIS further describe the screening-level risk analyses conducted for low-level waste and low-level mixed waste disposal, respectively. These sections also describe the performance assessment process and compare the performance assessments to the screening-level analyses conducted for the WM PEIS.

Actual design, siting, construction, and operation of disposal facilities will require additional analyses, such as performance assessments, and will be in compliance with all applicable site-specific requirements.

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Comment (2502)
The intruder scenario assumes that crops can be grown on the waste-contaminated soil. This might not be true for some sites due to poor soil, adverse climatic conditions, etc.

Response
Section 5.4.1 in Volume I of the WM PEIS explains that the hypothetical intruder scenarios used in the analyses are not intended to suggest that farming is a reasonable or preferred future land use at DOE sites upon loss of institutional control. DOE used farming in the scenarios to ensure that it did not underestimate potential risks associated with exposure to and risk from contaminated groundwater (through its use as drinking water and crop irrigation at arid sites) and soils (through uptake of contaminants by crops).

Comment (2532)
In Volume I, Section 6.4, the assumptions made in the intruder scenario represent a maximally exposed intruder and this should be indicated. The uncertainty in the scenario needs to be better characterized.

Response
The term "maximally exposed individual," or MEI, refers to the single receptor within a population estimated to receive the highest dose. Since the intruder scenario involves one individual, the MEI designation would be redundant and is not necessary.

Sections 5.4.1, 6.4.1.7, and 7.4.1.8 in Volume I of the WM PEIS contain descriptions of the hypothetical intruder scenario, including qualitative discussions of the relative uncertainty associated with the intruder analyses. These sections provide fuller descriptions than the section cited in the comment.

Comment (2533)
The box on page 6-32 in Volume I in the Draft WM PEIS states that a downgradient distance of 300 meters was used for the hypothetical farm family and that this distance is consistent with DOE Order 5820.2A requirements for analysis of disposal facilities. In the INEL performance assessment for active low-level waste disposal units, the site boundary was used for the first 100 years after facility closure and then, assuming the loss of institutional control, a distance of 100 meters. How did DOE choose 300 meters for the WM PEIS analysis?

Response
The hypothetical farm family scenario uses a distance of 300 meters (984 feet) from the center of the disposal unit as the location for the downgradient drinking water well. Given the assumed dimensions of the disposal facility, this distance is roughly equivalent to the 100-meter (328-foot) distance from the edge of the disposal unit used in the performance assessment analyses. In other words, 100 meters from the *edge* of the unit is approximately 300 meters from the *center* of the unit. Thus, the analyses are comparable.

Comment (2535)
Volume I, Section 6.4.1. Is the contaminated soil considered to be contaminated with both radionuclides and chemicals?

Response
Yes. DOE revised Volume I, Section 6.4.1, to clearly state this assumption.

Comment (2572)
How was 300 meters downgradient selected for the hypothetical drinking water well, and why is it worst-case?

Response
DOE used the distance of 300 meters (984 feet) from the center of the disposal unit as the location for the downgradient drinking water well for the hypothetical farm family scenario, which describes one potentially exposed population. Given the assumed dimensions of the disposal unit, this distance is essentially equivalent to the 100-meter (328-foot) distance from the edge of the disposal unit (including buffer zones) used in assessing the performance of a disposal unit. The 300-meter distance is, of course, a simplifying (yet conservative) assumption. The scenario also assumes that the hypothetical farm family would not live closer to the *center* of a waste disposal facility.

Comment (2800)
DOE used computer models to compute the risk of human health impacts from waste disposal operations, generically and for each particular option. Because the assumptions used and modeling results are "in dispute," DOE should not use any value developed from these models for BNL. DOE should consider it extremely relevant to any consideration of human health impacts that BNL has the greatest population potentially exposed to adverse effects from disposal operations.

Response
Since the WM PEIS analysis attempts to estimate future risk, a number of environmental fate, exposure assessment, and risk assessment models must be used to prospectively predict exposure and risk. The WM PEIS human health impacts methodology is provided in Section 5.4.1 in Volume I and in Appendix D in Volume III of the WM PEIS.

The toxicity data used as benchmarks or dose conversion factors in the models are not in dispute. The values used were developed by recognized organizations and they have been subjected to scientific peer review. They are the standard values used in radiological and chemical risk assessments. The dose conversion factors used to estimate chronic health effects resulting from exposure to direct radiation or radionuclides were developed by the International Commission on Radiation Protection. The cancer (i.e., slope factor) and noncancer (i.e., reference dose and reference concentration) toxicity values used were developed by EPA.

To identify reasonable proposed sites for waste management facilities in the WM PEIS, DOE determined where the largest volumes of waste are and where transportation requirements would be minimized. Although storage and disposal in less populated regions might lessen some impacts, the risks from transporting waste to these remote areas would increase. These trade-offs are described in the WM PEIS and are important factors that will be considered in the actual decision process. Waste management decision criteria and factors are described in Section 1.7.3 in Volume I of the WM PEIS.

The Final WM PEIS has been revised to incorporate an analysis of the potential for collective risk from waste disposal. Section 5.4.1.2.3 describes the methodology used in the analysis, which involves consideration of a number of site-specific parameters, including population size. The results of this risk

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vulnerability screening analysis for low-level mixed waste and low-level waste disposal are presented in Sections 6.4.1.9 and 7.4.1.8, respectively.

Comment (2830)
DOE's failure to incorporate and discuss many BNL-specific factors prevents the WM PEIS from achieving a serious, substantive review of the impacts caused by conducting any disposal activities at BNL.

Response
The WM PEIS analysis of impacts from proposed waste disposal actions focused on impacts to groundwater quality and on health risk. Impacts on land use and ecological resources were also addressed. The environmental fate models used to estimate the movement of radionuclide and hazardous chemical contaminants from disposal units to groundwater used site-specific information on hydrogeology and meteorology. In addition, DOE added an offsite population risk vulnerability analysis for the proposed disposal sites to the Final WM PEIS. This analysis, which is presented in Sections 5.4.1.2.3, 6.4.1.9, and 7.4.1.8, considered a number of BNL site factors, including the size of the offsite population, site acreage, annual rainfall, aquifer depth, annual aquifer recharge, and an estimate of groundwater travel time (see Table 5.4-1 in Volume I). The analysis indicated that BNL is intermediate among the 16 proposed disposal sites in its potential vulnerability from offsite population risk from disposal. Therefore, BNL-specific factors were included in the analyses of water quality and health risk impacts from the proposed disposal of low-level mixed waste and low-level waste at BNL.

Comment (2835)
40 CFR 191 does not set disposal criteria in terms of average population cancer fatality rates. The requirements are set in terms of annual committed effective dose (15 millirem per year) to the maximum exposed individual.

Response
DOE deleted the description of disposal criteria in terms of average population cancer fatality rates from Volume I, Section 5.4.1, and replaced it with the requirements provided in the comment.

Comment (2936)
Assumptions regarding the health risks from radiation and exposures to other environmental contaminants presented in Chapters 5, 6, and 7 are still in serious dispute. A computer model necessarily needs to use particular values of risk(s). If the underlying assumptions of a model are later shown to be incorrect, the conclusions of the model are extremely likely to be flawed. We would prefer not to use any value developed from these models, even as a measure of relative risk. However, we do believe there is one fact that is extremely relevant to any consideration of human health impacts: BNL has the greatest population potentially exposed to adverse effects from disposal operations.

Response
Since the WM PEIS analysis attempts to estimate future risk, a number of environmental fate, exposure assessment, and dose conversion models must be used to prospectively predict exposure and risk. The toxicity data used as benchmarks or dose conversion factors in the models are not in dispute; they are the standard values used in radiological and chemical risk assessments. The values used were developed by recognized organizations and they have been subjected to scientific peer review. The dose conversion factors used to estimate chronic health effects resulting from exposure to direct

radiation or radionuclides were developed by the International Commission on Radiation Protection. The chemical cancer (i.e., slope factor) and noncancer (i.e., reference dose and reference concentration) toxicity values used were developed by EPA.

The health risk estimates presented in the WM PEIS do have associated uncertainties, as discussed in Section 5.4.1 in Volume I and in Sections D.2.15 and D.4 in Volume III. As described in these sections, many of the uncertainties associated with the WM PEIS risk estimates are applied consistently or systematically throughout the analysis. Therefore, the relative differences in risk estimates among waste management alternatives should not be affected by errors associated with these systematic uncertainties.

DOE added an offsite population risk vulnerability analysis for the proposed disposal sites to the Final WM PEIS. This analysis, which is presented in Sections 5.4.1.2.3, 6.4.1.9, and 7.4.1.8 considered a number of BNL site-specific factors, including the size of the offsite population.

Comment (2941)
The WM PEIS Summary document states that doses to the hypothetical farm family were estimated for a 10,000-year period because the maximum exposure would occur in the future. This is not at all clear; the half-lives of everything except the transuranic waste isotopes are much shorter.

Response
In Volume I, Section 5.4.1, and Volume III, Appendix D, the WM PEIS provides details on the hypothetical farm family scenario. In the scenario evaluated in the PEIS, the farm family could be affected by groundwater contaminated by leachate from the disposal unit, which takes thousands of years to reach the farm family well, located 300 meters (984 feet) from the center of the disposal unit. Most short half-life radionuclides would decay to levels that are not harmful before they reach the farm family well. Therefore, most of the radionuclides that would cause adverse health effects for the farm family are long half-life radionuclides, which are not confined to the transuranic radionuclides. For example, thorium-232 and uranium-238 have half-lives of 14,000,000,000 years and 4,500,000,000 years, respectively. Both are considered in the PEIS analysis.

As described in Section 5.4.1, the 10,000-year modeling period consists of 143 farm family lifetimes, each assumed to be 70 years. The lifetime having the highest dose is reported as the maximally exposed farm family lifetime in the PEIS. DOE revised the Summary document (Section 3.2.1), and Sections 5.4.1, 6.4.1, and 7.4.1 in Volume I of the Final WM PEIS to indicate that the 10,000-year analysis period was selected to be consistent with the guidelines for the conduct of performance assessments that existed at the time the WM PEIS analysis was initiated. The guidance for performance assessments has since been changed; current guidance suggests that a 1,000-year time period should be used in the performance assessments for waste disposal conducted to satisfy the requirements of DOE Order 5820.2A.

Comment (2947)
If the hypothetical well is drilled at some locations on ORR, there could be a major exposure. How is this treated in the PEIS?

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Response
As discussed in Volume I, Section 5.4.1, the location of the hypothetical farm family well was assumed to be 300 meters (984 feet) downgradient from the center of an underground disposal unit. The WM PEIS does not attempt to identify specific individual disposal locations on DOE sites or pre-existing contaminants in groundwater. The locations of the disposal units on a DOE site would determine the effect on the hypothetical farm family and the well. Site-specific decisions about the locations of individual disposal units will be based on site-specific studies as explained in Section 1.7.3 in Volume I of the WM PEIS.

Comment (3018)
Volume I, Table 6.4-11, states in the footnote that hypothetical cancer fatality probabilities have been "adjusted" so that groundwater contamination represents 100% of the current standards. DOE must explain these adjustments.

Response
Section 6.4.1.8 of the WM PEIS provides the rationale for adjusting maximally exposed individual cancer fatality risk estimates based on groundwater contamination data. As explained in this section, the performance assessment process required under DOE Order 5820.2A would ensure the design and siting of a disposal unit that complies with the performance objective requirements of the Order, including groundwater protection. Several mitigation measures are available to achieve this objective. Therefore, the hypothetical farm family risk estimates have been adjusted to reflect groundwater contamination that does not exceed existing standards.

Unadjusted risk estimates are provided in the Volume II Site Data Tables and in Appendix D (Volume III).

Comment (3068)
In Table 5.4.1, the disposal phase should include "accidental" releases due to such things as earthquakes, floods, etc.

Response
As discussed in Volume IV, Appendix F, disposal accidents were not evaluated because of the lack of details of ultimate disposal. However, except for dedicated centralized repositories such as Yucca Mountain or WIPP, disposal sites would generally lack a concentrated volume of material at risk being stored in a configuration susceptible to phenomena such as fires and explosions capable of causing significant releases. These repositories have accident analyses performed as part of their site-specific EISs. Although seismic events could breach in-ground containers leading to airborne releases, the potential impacts from such events would be included by accidents breaching the concentrated volumes of waste being held in a treatment or storage facility because the disposed of waste would be in a stabilized form (e.g., grout).

Comment (3080)
Volume I, Section 7.4.1.5. Although DOE will conduct performance assessments for disposal facilities according to the requirements of DOE Order 5820.2A, the WM PEIS discounts the Order and assumes a generic disposal-unit size. This could markedly underestimate disposal-unit requirements and land required for disposal.

Response
The discussion in Volume I, Section 7.4.1.5 (7.4.1.7 in the Final WM PEIS), is not meant to discount the requirements of DOE Order 5820.2A. Rather, reference to this Order was meant to indicate that implementation of the performance assessment analyses findings could increase or decrease the estimated number of disposal units presented in Table 7.4-10. A brief comparison of the performance assessment process and the WM PEIS low-level waste disposal ahalysis is contained in Section 7.4.1.7. A brief description of DOE Order 5820.2A is presented in Section 1.4.3.

Comment (3147)
The WM PEIS does not support decisions that DOE intends to make for using WIPP for disposal regarding transportation and facility capacity because (1) DOE intends to use truck and not rail, although the fatalities for the former are higher and (2) DOE fails to analyze non-fatal transportation accidents and their effects on various communities, and the costs and benefits of providing emergency training and equipment required by the WIPP Land Withdrawal Act.

Response
The specific potential impacts from operating WIPP as a transuranic waste repository, including transportation by truck and/or rail over current specific routes are addressed in the WIPP SEIS-II. The WIPP SEIS-II also discusses provisions for emergency training.

In keeping with the programmatic nature of the PEIS, DOE utilized a broad-based, or more generic analysis of transportation routes, and transportation modes. The PEIS analyzes transportation-related impacts in terms of health risks, and ecological resources. These health and ecological risks for transuranic waste are found in Sections 8.4 and 8.7 in Volume I, respectively, and detailed in Appendices C (Volume III) and E (Volume IV) of the PEIS.

Comment (3182)
DOE examined the capabilities of the various sites to handle waste. The results of this analysis are available to DOE in a draft report prepared by the Federal Facility Compliance Act Disposal Workgroup. It is clear from this report that Hanford is among the least suitable sites for a low-level or low-level mixed waste repository. Based on geology, hydrology and related issues, 10 other sites have fewer restrictions on the materials they could accept. Despite this, Hanford is the only site DOE considered for a centralized national low-level and mixed waste repository.

Response
The draft report mentioned in the comment was a scoping-level analysis used to compare the strengths and weaknesses of 15 DOE sites for disposal of low-level mixed waste. Except for uranium, Hanford was typical of an arid disposal site in that the water pathway (which was analyzed along with atmospheric pathways and inadvertent intrusion) was of minor importance. However, due to factors not accounted for in the draft report, uranium exposure from the water pathway will likely be lower than estimated. The final report clarifies this point. The final report and site-specific performance assessments will be factored into DOE's waste management decisionmaking process.

As described in Section 6.3.5 in Volume I of the PEIS, candidate low-level mixed waste disposal sites were selected as the reasonable upper bound based on screening performed in coordination with the States under the Federal Facility Compliance Act. To narrow the number of possible low-level mixed waste disposal sites, three exclusionary criteria were applied to the 37 sites with low-level mixed waste,

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reducing the number of reasonable sites to 22 locations. The exclusionary criteria related to proximity to floodplains and seismic faults, and to buffer area between the disposal structure and the site boundary. Three additional sites were then removed with the concurrence of the States for technical and practical considerations, leaving 19 sites for disposal consideration. DOE eliminated three other sites for reasons related to land ownership, availability, and ground conditions. This left 16 sites currently evaluated for low-level mixed waste disposal in the PEIS. For consistency, the same sites were also evaluated for low-level waste disposal.

Hanford was evaluated for centralized disposal based on anticipated large onsite volumes of low-level mixed waste and low-level waste. This included considerations of secondary streams of low-level mixed waste and low-level waste from the high-level waste treatment process that is evaluated in other documents, and recognized to exist at Hanford. Another site, NTS, is also evaluated for centralized disposal of low-level mixed waste and low-level waste.

Comment (3235)
A draft DOE report entitled *Performance Evaluation of The Capabilities of DOE Sites For Disposal of Mixed Low-Level Waste* (Predecisional Draft, 10/10/95) indicates that many sites, including Hanford, have severe restrictions on the concentrations of waste they can accept without violating applicable standards. Section 6.2.3 of the Draft WM PEIS asserts that no acceptance criteria are imposed. Appropriate acceptance criteria must be imposed to limit the risks to the appropriate standards when considered along with the risks from all other wastes and activities on the site.

Response
For purposes of analysis, DOE assumed that each low-level mixed waste disposal site would be able to accept all wastes designated for the site, according to the proposed waste management alternative (see Volume I, Section 6.2.3). If subsequent analyses, including the performance assessment process, show that additional measures must be taken to meet waste acceptance limitations, DOE will take such measures. In addition, DOE will comply with all applicable regulatory requirements for disposal of its low-level mixed waste.

The performance assessment process, described in Section 6.4.1.8, provides for a more detailed analysis of site-specific factors than the PEIS screening-level analysis. The performance assessment process will identify whether disposal facilities will require engineering controls, waste form controls, facility location controls, or waste acceptance criteria to meet the performance objectives of DOE Order 5820.2A. A combination of these and other measures will ensure protection of human health and the environment from waste disposal activities.

Comment (3246)
Appendix D, Table D.4-5, identifies the uncertainties of risk predictions via the groundwater pathway. The table shows uncertainties for Hanford of 12 orders of magnitude. Page D-343, first paragraph states "Excluding the lower 80th to 95th percentile of the uncertainty for Hanford from consideration (because this behavior appears to be unique to Hanford and is extremely uncharacteristic of the other sites), the most reasonable estimate of the uncertainty with respect to disposal risks in the PEIS would be between 1 and 2 orders of magnitude." It is unacceptable to disregard the Hanford risk uncertainty in this manner. Some groundwater pathways at Hanford move quickly. Some members of the public and Tribes are more likely to be exposed.

Response
The paragraph to which the commentor refers explains that most of the uncertainty in the Hanford estimates are in the lower risk range as values approach zero. Orders of magnitude change in this direction reflect a much lower absolute change in risk estimates than orders of magnitude change in the upper range. Thus, it is more conservative, in terms of risk interpretation, to exclude the skewed uncertainty in the lower range of values at Hanford, which is what the paragraph describing Table D.4-5 in Volume IV suggests.

Comment (3255)
The WM PEIS does not address the risks of vapor phase transport of radionuclides disposed of in shallow land burial sites. At Beatty, Nevada, a commercial radioactive waste site is leaking tritium and carbon-14 into the vadose zone. The vadose zone contamination due to radionuclide migration at Beatty should cause DOE to take another look at its fate and transport models. Appendix D does not have enough information on the DUST and MEPAS models to determine if all likely transport scenarios were included. DOE should examine the risks of its continued shallow land burial of radioactive waste and its future plans for the burial of radioactive waste.

Response
The WM PEIS is a screening-level analysis. It assumes that engineered containment of radionuclides is lost after a certain period of time and that risks are driven by the leaching and subsequent transport of contaminants in the groundwater. For the purposes of the PEIS analysis, other exposure pathways (e.g., vapor phase transport) were assumed to be less important than the groundwater pathway and were not evaluated. Therefore, the discussion of the DUST and MEPAS models in Appendix D (Volume III) focuses on the groundwater pathway because the WM PEIS evaluated only this exposure pathway in developing risk estimates for the hypothetical farm family. Multimedia pathways will be better addressed in site-specific NEPA reviews or performance assessments required under DOE Order 5820.2A. This Order requires that site-specific performance assessments be conducted to demonstrate that a given disposal practice can be reasonably expected to comply with specified performance objectives for protection of public health and groundwater resources.

In April 1996, DOE issued guidance for the conduct of composite analyses in addition to performance assessments to help ensure that continuing disposal of low-level waste will not compromise the future radiological protection of the public. The composite analysis will estimate the potential cumulative impacts to a hypothetical future member of the public from an active or planned low-level waste disposal facility and other sources of radioactive material in the ground that might interact with the low-level waste disposal facility.

Comment (3367)
Is it common for owners of wells to spread the core soil over a 2,500 square-meter area? (See Volume III, Section D.2.2.)

Response
A number of assumptions were required for the hypothetical intruder scenario analysis. The 2,500-square-meter soil coverage area assumption is based on information contained in Kennedy and Peloquin (1988).

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Comment (3393)
Volume I, Sections 5.4.1, 6.4, and 7.4, state that the WM PEIS analysis does not attempt to predict the potential risks to current offsite populations from the disposal of low-level waste and low-level mixed waste and does not predict adverse human health impacts from disposal for future offsite populations. Such analysis could be relevant in selecting or eliminating a site for waste disposal. How can the site(s) for disposal of low-level waste and/or low-level mixed waste possibly be selected in the absence of such analysis? Analysis of farm family and intruder scenarios is not sufficient for site selection without analysis of potential offsite impact.

Response
Risk assessments generally evaluate potential health risks for populations of receptors and for maximally exposed individuals. However, the WM PEIS disposal risk analysis provides quantitative estimates of risk only for the farm family maximally exposed individual. Although this screening-level assessment used site-specific hydrogeologic and meteorologic data, the analysis did not attempt to identify exact locations of the "conceptual" disposal units on a site. Rather, new waste management units were assumed to be placed either near existing disposal units (where such units exist) or at a location on the site expected to be most sensitive to groundwater contamination. Since the analysis does not attempt to actually locate the disposal units on sites, DOE believes it cannot develop plausible estimates of the risks to offsite populations resulting from exposure to contaminated groundwater. Both the concentrations of contaminants in the groundwater and the number of people potentially exposed will be strongly influenced by the locations of the disposal units and receptor wells. Therefore, a hypothetical siting decision for purposes of this analysis is not recommended. The results of the analysis would be a direct reflection of the choice of location. Such a subjective location choice would produce a quantitative analysis that might mislead rather than inform.

To supplement the quantitative estimates of individual disposal risks presented in Sections 6.4.1.8 and 7.4.1.7 in Volume I, DOE performed semi-quantitative analyses of the potential for offsite population risk. These analyses produced estimates of the relative vulnerability of sites, rather than quantitative estimates of person-rem doses and cancer fatalities. For these semi-quantitative analyses, DOE used simple statistical techniques and information about site characteristics known or expected to be associated with the potential for offsite population disposal risk to develop "risk vulnerability" groupings of the sites. Sites in each of the groups have similar potential for offsite population health risk.

Comment (3644)
Where is the hypothetical farm family maximally exposed individual in the transuranic waste analysis?

Response
The hypothetical farm family analysis was used to address potential health risks from disposal of low-level waste and low-level mixed waste. Disposal of transuranic waste is not within the scope of the WM PEIS and, thus, there is no hypothetical farm family analysis for transuranic waste. The environmental impacts, including potential human health risks, of disposal of transuranic waste are addressed in the WIPP SEIS-II.

Comment (3783)
What is the buffer zone for having a disposal facility? DOE needs to explain what regulations may restrict a site within so many miles of a populated area.

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Response
DOE Order 58202.A, *Radioactive Waste Management*, specifies performance objectives for disposal of low-level waste at DOE sites. The performance objectives are intended to provide for protection of (1) members of the public who might be exposed to radionuclides released to the general environment, (2) inadvertent intruders onto disposal sites following loss of active institutional control, and (3) groundwater resources that might be contaminated by releases of hazardous materials from disposal facilities. The Order also defines a low-level waste disposal site as consisting of disposal units (i.e., discrete portions of the disposal site into which waste is place for disposal) and a surrounding buffer zone, which is defined as the smallest region beyond disposal units that is required as controlled space for monitoring and for taking any needed mitigative measures.

DOE guidance developed in 1994 (DOE/LLW-157) states that the buffer zone should be defined in site-specific performance assessments, but it should not extend more than 100 meters (3,281 feet) from any disposal unit.

Due to its programmatic nature, the WM PEIS assumes the use of generic disposal facilities located near existing disposal facilities or in hydrogeologically sensitive areas. Two types of disposal facilities were analyzed: engineered disposal and shallow land burial. Candidate disposal sites were identified using three exclusionary criteria: (1) sites could not be located within a designated 100-year floodplain; (2) sites could not be located within 200 feet of a seismic fault; and (3) sites were required to have sufficient area for a 100-meter buffer zone between the disposal unit and the site boundary.

Comment (3945)
The farm family scenario lacks merit and does not address impacts of exposure and actual risk to populations that grow both crops and livestock as food. It completely "glosses over" the fact that rural and indigenous peoples gather plants and hunt wild game as major sources of food.

Response
As described in Section 5.4.1.2.2 in Volume I, the farm family scenario evaluates long-term impacts of exposure due to the ingestion of contaminated drinking water, crops, and livestock following waste disposal. The estimates of human health risk were determined assuming the receptors were located close to the disposal units. As a result, the analysis is a conservative estimate of potential risk and potential long-term impacts. Specific subsistence issues were not the focus of this analysis.

Section D.2.2.1 in Volume III explains that DOE did not evaluate health risks to subpopulations living near DOE sites that might derive a major portion of their food supply from native plants and animals. The results of such complex analyses would likely vary widely both within and among sites, depending on the assumptions used for parameters, such as locations of facilities on the sites, routes of exposure, and dietary habits of subpopulations. Therefore, analysis of potential health effects from subsistence consumption of fish, wildlife, and native plant species is not included in the WM PEIS, but could be considered in sitewide or project-level NEPA reviews. Section 5.4.7.2.3 in Volume I provides additional information about subsistence consumption for specific subpopulations.

Comment (3982)
The hypothetical farm family and hypothetical intruder scenarios presented in Chapter 5 do not consider former disposal units currently onsite, do not include existing groundwater contamination

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onsite, and assume no mixing of groundwater plumes has occurred or will occur. These assumptions and omissions make the risk assessments meaningless.

Response
The WM PEIS uses the simplifying assumptions cited in the comment because (1) the locations of the future disposal facilities on the sites are not known; (2) releases from the tumulus and below-ground vault facilities would not occur for hundreds of years; (3) many contaminants do not reach peak concentrations for thousands of years; (4) the population distributions around the sites are predictable for tens of years but not for thousand of years; (5) new facilities are generally located in uncontaminated areas to simplify groundwater monitoring; and (6) environmental restoration activities are containing and/or cleaning up much of the existing contamination.

In addition, risks from existing groundwater contamination are outside the scope of the WM PEIS; therefore, they only added to the waste management risks in the cumulative impacts analysis (see Chapter 11).

Comment (4445)
With respect to health risks from disposal, the WM PEIS should include a summary of the available information on risks from disposal for transuranic waste (TRUW) and high-level waste (HLW) (forever, not just for 10,000 years), as well as the potential significance of alternative sites to Yucca Mountain and WIPP on the relative impacts of the alternatives evaluated in the WM PEIS.

DOE should also address basic policies on how much risk would be acceptable, and whether to use relatively unretrievable storage versus retrievable long-term storage at the DOE sites that currently have the waste or at other locations.

Population impacts were not adequately evaluated in the Draft PEIS. While individual members of a hypothetical farm family might have the highest individual risks, what assumptions were made to evaluate risks to entire populations?

Where did the assumption of the distance of the farm family to the sites comes from? How conservative and how realistic is it, and how does this compare to current distances of people from the sites? How would the alternative distances impact the relative risks posed by alternatives?

Response
The impacts of the disposal of TRUW and HLW are outside the scope of the WM PEIS; DOE is evaluating them in separate EISs. However, to the extent available, information on such impacts has been considered in the WM PEIS cumulative impacts analysis presented in Chapter 11 in Volume I.

Issues related to disposal technologies, and associated risks are discussed in the WIPP SEIS II and the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste in a Geologic Repository at Yucca Mountain EIS.

Sections 5.4.1, 6.4.1.8, and 7.4.1.7 in Volume I describe the hypothetical farm family scenario as a screening-level assessment. Impacts to the farm family would include impacts to families living farther from the disposal facility boundary. Extrapolation of farm family risks to the entire population would be speculative. DOE has supplemented the farm family scenario analysis in the Final WM PEIS with an analysis of the relative vulnerability of the candidate disposal sites for potential risks to offsite populations from disposal. The results of this analysis are presented in Sections 5.4.1.2.3, 6.4.1.9, and 7.4.1.8 in Volume I.

The 300-meter (984-foot) distance from the farm family to the center of the disposal facility is analogous to the 100-meter (328-foot) distance to the edge of the disposal facility suggested by DOE guidance on performance assessments required for low-level waste disposal by DOE Order 5820.2A.

Comment (4473)
With regard to groundwater risks and contamination, what is the basis for the assumption referred to in Section 9.2 of the Draft WM PEIS Summary document that contaminants from different disposal sites do not merge or commingle? Given that plumes move up to 50 miles in the environment, this seems to be a highly unlikely assumption. Also, people move around and might be exposed to contaminants at several locations. The weather also moves the air so that people are exposed to plumes from more than one source during a lifetime.

Response
DOE has revised the PEIS Summary document and Section 5.4.1.2 and Chapter 11 in Volume I to clarify this assumption. Concentrations of groundwater contaminants are assumed to be higher at 300 meters (984 feet) from the center of the disposal unit than at greater distances due to the dispersion of contaminants. DOE assumes that contaminant plumes from multiple units will not commingle at the 300-meter wells, but that the likelihood of commingling increases with distance from the unit. However, at distances greater than 300 meters, the concentrations of groundwater contaminants in any given plume should be lower as a result of dispersion and dilution than those estimated at 300 meters.

Comment (4524)
The risk assessment in Section 5.4.1 of the Draft WM PEIS is inadequate because it does not predict potential risks to current or future offsite populations from disposal of low-level waste, and low-level mixed waste, the range of risks at such sites, availability of locations at different sites, or availability of locations at different DOE sites that would render such risks negligible, minimal, or monitorable.

Response
Risk assessments generally evaluate potential health risks for populations of receptors and for maximally exposed individuals. However, the WM PEIS disposal risk analysis provides quantitative estimates of risk only for the farm family maximally exposed individual. Although this screening-level assessment used site-specific hydrogeologic and meteorologic data, the analysis did not attempt to identify exact locations of the "conceptual" disposal units on a site. Rather, new waste management units were assumed to be placed either near existing disposal units (where such units exist) or at a location on the site likely to be the most sensitive to groundwater contamination. Because the analysis does not attempt to identify the actual location of disposal facilities on sites, DOE believes it is not possible to develop plausible quantitative estimates of the risks to offsite populations resulting from exposures to contaminated groundwater. Both the concentrations of contaminants in the groundwater and the number of people potentially exposed will be strongly influenced by the locations of the disposal units and receptor wells. Therefore, a hypothetical siting decision for this analysis is not appropriate. The results of the analysis would be a direct reflection of the choice of location. Such a subjective location choice would produce a quantitative analysis that might mislead rather than inform.

5.2.2 Disposal Risks

To supplement the quantitative estimates of individual disposal risks presented in Sections 6.4.1.8 and 7.4.1.7 in Volume I, DOE performed statistical analyses of site environmental characteristics. These analyses produced groupings of sites by relative vulnerability, rather than quantitative estimates of person-rem doses and cancer fatalities. Section 5.4.1.2.3, 6.4.1.9, and 7.4.1.8 in Volume I and Appendix C in Volume III contain additional details about the methods and results of these analyses.

Actual design, siting, construction and operation of disposal facilities will require additional analyses, such as performance assessments, and will be in compliance with all applicable site-specific requirements.

Comment (4525)
The problem of estimating impacts from waste disposal on future offsite populations of unknown sizes could be avoided by assuming that the population distribution remains as it was in 1992 (as was apparently done for air emissions) and caveating the results appropriately. DOE should evaluate extent and severity of potential contamination, along with the amount of uncertainty in such estimates, to understand the potential hazards posed by subsurface disposal. Alternatives to subsurface disposal should also be evaluated.

Response
Even if DOE assumed a certain population distribution, since the analysis does not attempt to actually locate the disposal units on sites, DOE believes it cannot develop plausible estimates of the risks to offsite populations resulting from exposure to contaminated groundwater. Both the concentrations of contaminants in the groundwater and the number of people potentially exposed will be strongly influenced by the locations of the disposal units and receptor wells. Therefore, a hypothetical siting decision for purposes of this analysis is not recommended. The results of the analysis would be a direct reflection of the choice of location. Such a subjective location choice would produce a quantitative analysis that might mislead rather than inform.

To supplement the quantitative estimates of individual disposal risks presented in Sections 6.4.1.8 and 7.4.1.7 in Volume I, DOE performed statistical analyses of the site environmental characteristics. These analyses produced groupings of sites by relative vulnerability, rather than quantitative estimates of person-rem doses and cancer fatalities. Sections 5.4.1.2.3, 6.4.1.9, and 7.4.1.8 in Volume I and Appendix C in Volume III contain additional details about the methods and results of these analyses.

The evaluation of disposal in the WM PEIS is not limited to subsurface disposal (shallow land burial). For sites with relatively high water tables east of the Mississippi River, DOE's current and planned disposal facilities are aboveground engineered facilities such as the tumulus concept. The WM PEIS reflects DOE's practice and plans by assuming the use of engineered facilities east of the Mississippi River. In any event, the WM PEIS will not lead to a decision on disposal technologies. Disposal technologies will be selected only after sitewide or project-level NEPA studies are completed.

Comment (4544)
If cancer risks exceeding one in 1,000,000 could occur to the maximally exposed individual in the hypothetical farm family described in the Draft WM PEIS due to groundwater contamination, the extent and duration of such potential exposure should be determined over at least the 10,000-year period specified, assuming receptors could draw water from anywhere in the groundwater plume. Furthermore, the 10,000-year period might not be adequate. Risks should be evaluated at least until

the cumulative risk from direct exposure becomes less than one in 1,000,000 anywhere due to radioactive decay and chemical changes in the waste.

Response
The hypothetical farm family risks were calculated for a period of 10,000 years to conform with the analysis period generally used for the performance assessments required in DOE Order 5820.2A. The results of the farm family risk analyses for the disposal of low-level mixed waste (Section 6.4.1.8) and low-level waste (Section 7.4.1.7) indicate that the estimated maximum future radionuclide exposure at most sites would occur within the 10,000-year analysis period.

Comment (4545)
DOE should evaluate the long-term potential maximum impact from loss of containment of waste if institutional control for waste disposal sites is not maintained. The intruder scenario described in the Draft WM PEIS should include what would happen if the intruder (such as a construction company building a new barn, a shopping center with a basement, or a garden apartment) dug up the waste and exposed it at the surface, and users of the site then established farms in the waste. Risks to those on the intruding farms (or gardens), to nearby persons, to those eating food from the farm, and to the environment from the unconfined waste should be evaluated. Risks if high-density residential development occurred in the waste should also be evaluated.

Routes of exposure for unconfined waste include direct ingestion of contaminated soil (or the exposed waste), exposure from the inhalation of contaminated gases and dust, groundwater and surface water contamination, runoff, soil gas, dustfall, exposure to radiation, exposure from the ingestion of animals and plants exposed to the waste and contaminated soil and water, etc.

Response
The WM PEIS uses farm family and intruder scenarios to evaluate the potential public health risks from long-term exposure and accidental exposure, respectively.

The hypothetical "intruder" is an imaginary adult who drills a well directly through a low-level mixed waste or low-level waste disposal unit to the groundwater. As a result of the drilling, contaminated soil from within the unit is brought to the surface, where it mixes with the top layers of the surface soil. The exposure pathways for the intruder were inhalation of resuspended contaminated soil, and direct radiation from contaminated soil. Two hypothetical intrusions were assumed to occur: 100 years and 300 years after closure of the disposal facility. The intruder scenario is assumed to occur at a time in the future after the loss of institutional control.

Evaluating the potential risks to the hypothetical intruder is consistent with the analysis required for disposal facilities under DOE Order 5820.2A. However, it is important to note that the WM PEIS intruder scenario analysis assumes the use of generic disposal facilities and generic waste forms (e.g., grout or polymers), and that the entire inventory of waste will be disposed of (i.e., no exclusion of particular radionuclides or chemicals). The objective of the WM PEIS risk analyses is to provide a relative comparison among the waste management alternatives. In the actual design of a disposal facility at a particular location or a site, more detailed, site-specific data would be required. The objective of the analyses required by DOE Order 5820.2A, including the intruder scenario, is to design a facility that will satisfy the performance objectives (including the multimedia radiation exposure limits) specified in the Order. In practice, implementation of the requirement could involve modifying

5.2.2 Disposal Risks

the engineering design of the disposal facility (e.g., addition of a clay liner to increase adsorption or a concrete cap to reduce infiltration); modifying the form of the waste to be disposed of (such as changing to a vitrified waste form); and imposing waste acceptance criteria (i.e., restricting the amounts of radionuclides or chemicals allowed in a given waste disposal facility).

Therefore, although it might be possible to construct an alternative intruder scenario that would result in potentially higher exposures (by displacement of more waste from within the unit to the surface), the relative risks among the sites and alternatives evaluated in the WM PEIS are not expected to change, and the risks that are likely to result upon implementation of the disposal alternatives should still be included by the performance objectives specified in DOE Order 5820.2A. As stated in DOE's draft *Interim Policy on Basic Assumptions for Compliance with All-Pathways Performance Objective* in DOE 5820.2A, countless numbers of intruder scenarios can be proposed because all such scenarios are speculations about future human actions. Since it is not possible to authoritatively predict future human actions, social structures, or technologies, there is no way to authoritatively predict the effects an intruder might have on infiltration barriers and environmental pathways.

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Comment (563)
The NRC is currently revising its regulations for the transportation of radioactive material to make them compatible with International Atomic Energy Agency regulations. How would these revisions affect the results of the WM PEIS analysis?

Response
The NRC did revise its regulations (10 CFR 71) governing transportation of radioactive material to conform with International Atomic Energy Agency regulations. The final rule was published in the *Federal Register* on September 28, 1995, and became effective April 1, 1996. DOE has reviewed the revised rule and has determined that none of the changes affect the WM PEIS radiological transportation risk analysis.

Comment (564)
How were transportation accidents evaluated using RADTRAN?

Response
In the WM PEIS, the RADTRAN accident risk assessment accounts for accident rates, the spectrum of potential accident severities, and potential release rates from different types of shipping packages. Human exposure pathways include inhalation, external exposure from the passing radioactive cloud, external exposure from contaminated soil, and potential ingestion of contaminated foodstuffs. Volume IV, Section E.5.1.2.1, contains a more detailed explanation of the RADTRAN accident risk assessment. Section E.6 contains more on the relevant input parameters.

Comment (565)
Why didn't the WM PEIS transportation accident analyses include the potential risks from direct external radiation exposure from ground contamination and ingestion exposure pathways through food and soil contamination? These ingestion and direct radiation pathways could be more important than the inhalation pathway for transportation accidents occurring in agricultural areas.

Response
The WM PEIS radiological transportation accident risk analyses considered potential risks from external exposure to ground contamination and from ingesting contaminated foodstuffs. Volume IV, Sections E.5.1.2.1 and E.5.1.2.2, discuss relevant exposure pathways considered for the transportation accident risk and consequence assessments, respectively.

Comment (566)
What were the values of the food transfer factors (ACCDNT (6,k)) and soil transfer factors (ACCDNT (6,k)) and cleanup level following an accident (CULVL) used in the RADTRAN calculations? Please provide references in the Final PEIS. The cleanup criterion, which depends on the total radiation dose from all contributing nuclides in the shipment, should not be a fixed value. For example, using a high cleanup level would underestimate risks.

Response
As discussed in Volume IV, Section E.5.1.2.1, DOE derived the RADTRAN food transfer factors (ACCDNT(6k)) and soil transfer factors (ACCDNT(7k)) in accordance with the methods described in NRC Regulatory Guide 1.109. These State-specific transfer factors were derived using the transfer coefficients from NRC Regulatory Guide 1.109 and the State agricultural productivity data in *Data*

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Base of Accident and Agricultural Statistics for Transportation Risk Assessment (Argonne National Laboratory Report ANL/EAIS/TM-2). These references are listed in Appendix E in Volume IV of the Final WM PEIS.

To ensure the analysis did not underestimate risks, no credit was given for cleanup after potential accidents. The RADTRAN cleanup level input parameter (CULVL) was set *higher* than any ground concentration estimated from potential releases of the most severe accidents postulated in the WM PEIS. As a result, the RADTRAN program did not make any adjustments to lower the risk based on a cleanup level. If the cleanup level had been set lower than the estimated contaminant ground concentration, RADTRAN would calculate a lower risk using the cleanup level rather than the estimated contaminant ground concentration as input.

Comment (570)
DOE used only one weather condition in the WM PEIS transportation accident risk assessments, which underestimates, by several orders of magnitude, the potential risks (particularly noncancer and acute radiation effects) because the risks are very complicated functions of weather conditions. DOE should use all weather conditions based on STAR data weather categories to calculate transportation risks. The PEIS did not consider microclimates or waste shipments during changing or adverse weather conditions.

Response
Section E.6.7 in Volume IV of the WM PEIS describes the atmospheric conditions used in the accident analyses. Radioactive material released to the atmosphere is transported by the wind. The amount of dispersion, or dilution, of the radioactive material in the air depends on the meteorological conditions at the time of the accident. Because predicting the specific location of an offsite transportation-related accident is impossible, generic atmospheric conditions were selected for the accident risk and consequence assessments.

For the accident risk assessment, neutral weather conditions were assumed. Because neutral meteorological conditions constitute the most frequently occurring atmospheric stability condition in the United States, these conditions are most likely to be present if an accident occurs involving a waste shipment. On a yearly average, neutral conditions occur about half (50%) the time, while stable conditions occur about one-third (33%) of the time, and unstable conditions (Pasquill Classes A and B) occur about one-sixth (17%) of the time.

For the accident consequence assessment, doses were assessed under neutral atmospheric conditions and stable conditions. The results calculated for neutral conditions represent the most likely consequences, and the results for stable conditions represent a weather situation in which the least amount of dilution is evident with the highest air concentrations of radioactive material, producing maximum potential consequences.

In addition, stable weather conditions were used to estimate the most severe credible accidents. These conditions represent the worst weather conditions (potential for highest risk) considered in the accident consequence assessment.

Comment (1182)
Moving wastes by rail is too risky; there are many derailments and accidents every day.

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Response
Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

Truck and/or rail could be used for waste shipments between sites and the sites could choose the mode in their transportation plans. The WM PEIS explores ranges of transportation-related impacts for truck and rail transportation. The PEIS includes a detailed assessment of the risks of a complete range of credible accidents for both rail and truck transportation (see Volume IV, Appendix E), including low-probability/high-consequence and high-probability/low-consequence accidents.

Comment (1807)
The conservative risk analysis presented in the WM PEIS suggests that a combination of physical hazards and radiation exposures could cause as many as 65 fatalities from the transport and disposal of these waste types in Nevada. In addition to these wastes, as much as 85,000 tons of civilian spent nuclear reactor fuel could also be transported to Yucca Mountain. Yet the PEIS failed to provide any analysis of the resulting cumulative socioeconomic, environmental, or radiological risks associated with the transport of spent fuel to Yucca Mountain.

The analysis of significant socioeconomic risks associated with the transportation and disposal of large amounts of radioactive waste at NTS was simply not addressed in the document. While an accident involving radioactive waste might be a low probability event, the result of just one accident, regardless of its severity, could have profound negative economic and social consequences on this unique tourism-based economy.

Response
As indicated in Volume I, Section 9.1.1, the impacts of disposing of high-level waste in a repository are not within the scope of the WM PEIS, but will be analyzed in a subsequent DOE NEPA document relating to a geologic repository. The NEPA document for a geologic repository will address the cumulative socioeconomic, environmental, and radiological risks associated with the transport and disposal of DOE spent nuclear fuel, commercial spent nuclear fuel, and high-level waste.

DOE is committed to the continued safe transportation of its radioactive waste.

Only transport of high-level waste to Yucca Mountain was analyzed in the WM PEIS. Transportation accidents involving high-level waste are not likely to release cargo. This is because the transportation casks will be very robust before they are licensed by NRC. DOE agrees that a transportation accident that released spent nuclear fuel or high-level waste cargo to the environment would be a high-consequence event. However, such an event is no more likely to happen in Nevada than it is at any other location along the transportation route.

Chapter 11 in Volume I of the WM PEIS analyzes the cumulative impacts of all past, present, and reasonably foreseeable future actions at each site. DOE revised Section 11.20 to include combined trips for shipments of each waste type, as well as the maximally exposed individual doses at each site. Section 11.20 also summarizes the combined impacts that could occur nationally and regionally from

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the transport of waste management waste, including shipments of high-level waste if Yucca Mountain is found suitable for the emplacement of defense high-level waste. Table 11.20-4 includes shipments of commercial spent nuclear fuel to the candidate geologic repository at Yucca Mountain as reasonably foreseeable activities. Potential impacts from the emplacement of high-level waste in a proposed geologic repository for spent nuclear fuel and high-level waste are not included in the cumulative impacts analysis because that information is not yet available.

NEPA requires the analysis of potential impacts which are reasonably foreseeable. Potential impacts that are speculative are not considered reasonably foreseeable under NEPA. Although a NEPA document can--and the WM PEIS does--address human health and other environmental risks, how people might perceive those risks and how they might act in accordance with their perceptions is speculative. While DOE analyzed health and environmental impacts of an accident at NTS, DOE believes that the impacts of an accident on tourism in the NTS region are speculative and, therefore, did not analyze them in the PEIS.

Comment (2177)
The WM PEIS estimates that there will be 315 fatal cancers from DOE's movement of radioactive material. Twenty-two fatal cancers could occur because of the decisions in this PEIS. You should consider the cumulative impacts, where they occur, and the other 300.

Response
The WM PEIS addresses the cumulative impacts of transportation at the national level in Section 11.20 in Volume I. Table 11.20-4 summarizes potential cumulative transportation-related radiological collective doses and latent cancer fatalities. The commentor is incorrect in interpreting the cancer fatality data. Most fatalities are not a result of DOE's movement of radioactive materials. Over the 93-year period from 1943 through about 2035, the estimated total number of potential radiation-related cancer fatalities would be 315, or about 3 latent cancer fatalities per year on an average annual basis. However, within this cumulative total non-DOE shipments of radioactive material would account for approximately 252 radiation-related latent cancer fatalities. The total number of potential radiation-related latent cancer fatalities associated with the WM PEIS alternatives could be as high as 7% of the cumulative total, or as the commentor notes, 22 potential latent cancer fatalities out of 315 would be the result of WM PEIS decisions. Thus, the analysis does address the cumulative impacts of the doses from all radioactive materials transportation activities. These doses are spread over a large segment of the population along transportation corridors and at shipping points and among transportation workers. Therefore, there is no way to predict with certainty specific locations where the fatalities will occur.

The estimates for potential fatal cancers were calculated by developing the collective operational dose in person-rem and the collective general population dose in person rem for past and future DOE transportation activities. The dose is then used to calculate the total latent cancer fatalities. This is the dose given to all occupational workers and the general population during cumulative transportation activities. The total latent cancer fatalities developed from the dose are used for comparison of dose only. It is unlikely that 315 fatal cancer fatalities have resulted from cumulative transportation activities. The actual dose has been spread among all workers and to the population on the transportation route.

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Comment (2196)
The WM PEIS transportation analyses used improper accident rate assumptions from one of the reference sources. In addition, the transportation analyses did not deal with the issue of peak storm events, and the potential for difficult cleanups and high environmental damages after such events.

Response
The WM PEIS transportation risk analyses used accident rate statistics based on information from the U.S. Department of Transportation (DOT), as discussed in Volume IV, Section E.6.4. These accident rates are State averages based on historic commercial carrier performance with all types of cargo under all weather conditions. Actual accident rates are likely to be slightly lower because commercial carriers of hazardous and radioactive waste have a higher awareness of transportation risk and prepare their shipments accordingly, especially in relation to weather conditions.

Transportation packaging was designed to account for the shipment of wastes during changing or adverse weather conditions. The transportation packaging required is based on DOT and NRC requirements. The design of the packaging makes it unnecessary to review localized adverse weather conditions in the transportation analysis because the design already accounts for such conditions.

For the assessment of transportation accident risks, the PEIS assumed neutral weather conditions. Neutral conditions are the most frequently occurring atmospheric stability condition in the U.S. and, therefore, are the most likely to be present if an accident occurs. Accidents involving radioactive material would be handled by State and local officials in cooperation and compliance with the Federal Emergency Management Agency, DOE, DOT, NRC, and EPA. No transportation accident with a release has ever led to a measurable human health impact due to the radioactive nature of the cargo.

Comment (2230)
The PEIS does not analyze transportation risks for specific routes, such as Cabbage Hill and the Umatilla Reservation. In some cases, those rail routes are not safer than truck routes. The PEIS did not consider microclimates or waste shipments during changing or adverse weather conditions.

Response
Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

The transportation analysis is based on representative transportation routes in order to be consistent with existing routing practices. However, because the routes were determined for the purpose of risk assessment, they do not necessarily represent actual routes that would be used to transport waste in the future. Section E.4.2 details representative transportation routes. In some cases specific transportation issues, including the determination of transportation mode(s), will be addressed when actual waste management facilities are sited based on sitewide or project-level NEPA reviews. Within its analysis of risks to human health and the environment, the implementation of programmatic waste management decisions regarding actual transportation routes, modes, etc., will consider factors such as historical transport modes at waste management sites, existing infrastructures; emergency response training programs, practices, and management skills of local and regional officials, etc.

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Due to the programmatic nature of the PEIS, microclimates, or site-specific climatology, are not specifically addressed. However, the PEIS did consider waste shipments during different weather conditions. Radioactive waste transportation analysis in the PEIS considered waste shipments during both neutral and stable weather conditions to estimate accident consequence assessments. Hazardous waste transportation analysis considered waste shipments during neutral weather conditions. Neutral weather conditions occur about 50% of the time and are considered conservative. Stable weather conditions were used in the radioactive waste transportation analysis to represent the case producing maximum consequences. Therefore, risks resulting from adverse or changing weather conditions would be covered by the stable weather condition analysis. Further information on atmospheric conditions is found in Appendix E, Sections E.6.7 and E.16.4, in Volume IV.

Comment (2313)
The WM PEIS does not address the possible public dose due to traffic and accidents, such as when traffic is stopped, and the potential for public exposure.

Response
The transportation analyses in Appendix E in Volume IV examine the potential dose to the public from both normal operations and accidents. The analyses consider traffic patterns, including conditions where the vehicle is stopped in traffic.

Comment (2411)
There is a concern with regard to the many shipments of radiological materials, both to and from INEL and non-INEL-related shipments, across the State of Idaho. These shipments must be accounted for and given a comprehensive evaluation.

Response
Appendix E in Volume IV of the WM PEIS does provide for each alternative for each waste type the cumulative risks for a maximally exposed individual near a site entrance for the five sites with the maximum impacts, which includes the total number of shipments for the alternative. INEL is identified as a site with maximum impacts under each alternative for high-level waste (Table E-13) and for transuranic waste (Table E-25), and for the Centralized Alternative for low-level mixed waste (Table E-31).

Tables 11.20-1 through 11.20-4 in Volume I of the PEIS list information about the potential Department-wide impacts of transportation. This section addresses both the combined impacts of the transportation of all the waste types evaluated in the WM PEIS, and the cumulative impacts of transportation from other actions (e.g., shipments of spent nuclear fuel and naval reactor components).

Table 11.2-1 of the Final WM PEIS identifies other DOE EISs that analyze impacts of actions that were considered in the cumulative impacts analysis in Chapter 11. Table 11.2-1 identifies for each DOE EIS the sites analyzed in the WM PEIS that would potentially be affected by the impacts of the actions analyzed in the other EISs. The two EISs that analyzed actions with impacts that might affect INEL are the SNF/INEL EIS and the Foreign Research Reactor Spent Nuclear Fuel EIS. The SNF/INEL EIS analyzed impacts of shipping spent nuclear fuel to INEL, and the Foreign Research Reactor Spent Nuclear Fuel EIS analyzed shipment of foreign research reactor spent nuclear fuel to INEL.

Further analysis of shipments by State is not provided in the WM PEIS because, although the routes identified are representative, they might not reflect actual routes.

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Comment (2648)
Volume IV, Sections E.6.3 and E.16.2. Is the population density around the Hanford Site representative of all the sites?

Response
No, the population density around the Hanford Site is not representative of all sites. The commentor apparently has confused the two types of transportation risk assessments (onsite and offsite transportation) discussed in Appendix E.

Transportation risk was estimated for both the *onsite* and the *offsite* shipment of radioactive and hazardous wastes. Onsite transportation involves movement of waste between facilities located within the boundaries of a DOE site. Offsite transportation refers to the movement of waste between different DOE sites.

Section E.2.1 in Volume IV states that the human health risks associated with onsite transportation are generally much smaller than those from offsite transportation, largely because of the limited distances for onsite shipment, limited population densities along the routes, and limited average travel speeds. Accordingly, the impacts of onsite transportation are not likely to contribute significantly to differences among the alternatives being considered. Therefore, for purposes of the PEIS, the onsite risk assessment has been limited to one site -- Hanford. This site was chosen primarily because it is relatively large and conducts activities for managing all of the waste types considered in the WM PEIS. Transportation radiological risks are dominated by exposure during routine transport when compared to potential accident releases; routine transport risks are typically 100 to 1,000 times higher than accident transport risks. The Hanford Site carries out extensive waste management operations involving all waste types and often makes many shipments across a large area within the site. Therefore, it is not expected that any other DOE site has operations that would involve *onsite* transportation risks significantly greater than those at Hanford.

Section E.6.3 in Volume IV describes the population density zones used for the *offsite* transportation radiological risk assessment. Section E.16.2 provides similar information for the hazardous chemical risk assessments. Note that these population densities were used only in the *offsite* transportation risk assessments. They were not considered or used in the *onsite* transportation risk assessment.

Comment (2649)
Volume IV, Section E.7, states that worst-case waste (highest potential radiological risk) is used in the transportation accident consequence assessment. Section E.6.2.1 states that an external dose rate at the existing regulatory limit of 10 mrem per hour (at 2 meters) is assumed for all high-level waste shipments. Sections E.6.2.2, E.6.2.3, and E.6.2.4 state that average external dose rates are used in the routine transportation risk analysis. It is not clear why worst-case waste exposures are assumed for the transportation accident scenario when average dose rates and conservative dose rates at the regulatory limit (for high-level waste) are used in routine transportation exposure analyses.

Response
Volume IV, Section E.2.4, of the WM PEIS states that the impacts of transporting radioactive materials were evaluated for both routine transportation and for transportation accidents. The health risk associated with routine transportation results from the potential exposure of individuals to low levels of external radiation near the surface of shipments. The risk from transportation accidents involves the

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potential release and dispersal of radioactive material into the environment, with individuals exposed through a number of pathways, including inhalation and ingestion of contaminated food. The external dose rates summarized in Table E-5 were used in the calculation of routine transportation risks. Section E.6.2 describes the shipment external dose rates for routine transportation.

The transportation accident analysis is intended to provide an estimate of the maximum potential radiological impacts of a severe transportation accident. Historical information provides a more accurate analysis for the routine transportation risks. The highest radiological risk is obtained by screening the site-specific characteristics for radiological waste (that is, activity concentrations) developed for the PEIS, by taking into account the physical forms of the waste and the relative hazards of individual radionuclides, and selecting for analysis those wastes with the highest radiological risk. Section E.7 describes the results of the transportation risk assessment for radioactive waste.

Comment (2657)
Volume IV, Appendix E, Parts I and II, use different references for vehicle-related accident and fatality rates. The fatality rate used in the first part (for general trucking) is lower by about a factor of 5 than that quoted in the second part (for hazardous material trucking). A review of the fatality rates used might be appropriate, since vehicle fatalities are significant for some alternatives for some waste types.

Response
The fatality rates in Part I of Appendix E are for the use of heavy-haul combination (tractor-trailer) trucks for the shipment of large volumes of radioactive wastes. The hazardous waste shipments discussed in Part II of Appendix E tend to be small shipments using smaller single-unit trucks. The accident rates used reflect the differences in the two truck types.

Comment (2660)
Volume IV, Section E.8.1. Was the uncertainty in any site's waste inventory "large as compared with other site inventories?" A statement to the effect that "this was not so" needs to be incorporated into the text (if, in fact, this is true). Otherwise, the impact of incorporating this uncertainty into the relative risk comparisons needs to be better explained.

Response
As stated in Section E.8.1 in Volume IV, DOE assumes the uncertainty in each site's inventory to be reasonably consistent across sites. This approach is expected to limit the overall uncertainty in the data and the likelihood that the level of uncertainty varies significantly among sites.

Comment (2662)
Volume IV, Section E.12.4. The statement, "the potential for the public's exposure by inhalation of particulates is considered to be much lower than that for inhalation of vapors or gases because... (3) acute toxicity of inhaled particulate is low" is a non sequitur.

Response
DOE has revised this text to state that the acute toxicity of inhaled particulates is lower than that of inhaled vapors or gases for the same quantities released in the DOE shipments.

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Comment (2663)
Volume IV, Page E-114, Paragraph 1 states that some solids (e.g., sodium cyanide, sodium azide) generate highly toxic (airborne) gases in contact with water and others (e.g., phosphorus) generate toxic fumes in contact with air. Arsenic forms arsine gas in contact with sulfuric acid or when aqueous arsenical solutions come into contact with reactive metals (iron, aluminum, zinc). Lindane decomposes to hydrogen chloride and phosgene when heated (in a fire). Have these types of reactions been considered? Were any solids or nonvolatile liquids discounted that could release hazardous substances in a transportation accident? Is there a list of the substances that were not assessed because of their physical state?

Response
Chemical compounds in DOE waste that could produce significant amounts of toxic gases upon reaction with water ("water reactives") were assessed in the hazardous waste transportation risk assessment. The potential risk from water-based (i.e., spills into waterways adjacent to truck routes) accidents associated with these "water reactives" was found to be extremely small (less than 1% of the risk associated with land-based accidents).

In general, secondary chemical compounds formed by chemical transformation of reactive chemicals in the atmosphere or generated from fires in accidents involving flammable compounds were not specifically assessed in the transportation risk assessment. Because of the relatively dilute concentrations of chemical compounds considered poisonous by inhalation or producing other adverse health effects in DOE hazardous waste, the concentrations of transformation products from these substances are likely to be of lesser significance from a health risk prospective.

Most of the compounds that were not considered in the PEIS transportation risk assessment are low volatility (vapor pressures less than 10mm Hg) liquids or solids. There is no list of substances because any commercial chemicals with these physical properties could potentially be found in DOE hazardous waste or mixed waste.

Comment (2667)
Volume IV, Section E.16.4. Shouldn't the last sentence of this section read, "This position was also adopted for modeling *atmospheric conditions* in this assessment?"

Response
The sentence, as written, conveys what was intended. Atmospheric conditions are input to the consequence assessment modeling that was used in estimating chemical exposures.

Comment (2668)
Volume IV, Section E.16.5.1.1. The toxicity data references contain data that are generally not regarded as having been peer reviewed. How were true LC_{50} and representative non-human LC_{LO} values selected?

Response
The LC_{50} values were obtained from laboratory animal experiments that were extrapolated to humans. The LC_{LO} values were obtained from animal tests or from events involving accidental human exposures. Because of the limitations of both the human LC_{LO} values and the LC_{50} values, a

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conservative approach was taken in selecting the chemical-specific toxicity values. The approach adopted is discussed in Section E.16.5.1.1 and in further detail in Hartmann, et al., 1994.

Comment (2669)
Volume IV, Section E.16.5.1.3. Shouldn't a universal scaling assumption have been applied in deriving PLC values?

Response
The issues involved in deriving potentially life-threatening concentration (PLC) values are discussed in detail in the technical report cited in E.16.5.1 and included in the references for Appendix E, and summarized in Section E.16.5.1.

The procedure followed in scaling PLC values from the experimental exposure times to the estimated duration of exposure was to use either a linear or an exponential function, whichever resulted in the lower PLC value. The time dependence of dose response relationships is chemical-specific; with appropriate experimental data, the correct assumption (linear or exponential relationship) for each chemical could be ascertained. However, these data are available for only a few chemicals in the literature. Due to the large number of chemicals assessed for the WM PEIS transportation analysis, it was necessary to make the simplifying (yet conservative) assumption that the time-dependence relationship resulting in the lower PLC value was correct for each chemical. Applying either the linear or exponential assumption universally could have resulted in underestimation of toxic effects for some chemicals; therefore, this was not done.

Comment (2670)
Volume IV, Section E.16.5.2.1. Were *absorbed dose* or *administered dose* reference doses/reference concentrations *or both* used?

Response
In general, the reference concentrations reported in EPA's Integrated Risk Information System (IRIS) database are expressed as the administered dose, but adjusted from animal experiments to equivalent human doses on the basis of comparative physiological considerations (e.g., ventilatory parameters, regional lung surface areas). These adjustments make it appropriate to use the reference concentrations directly as reference values for comparison with air concentrations, because air concentrations are effectively administered doses.

Comment (2672)
Why are traditional 10-factor uncertainty factors used in Section E.16.5.2.2, when factors of 3 (logarithmic mean of 1 and 10) are used in Section E.16.5.1.2?

Response
The uncertainty factor of 10 was used in both cases. Section E.16.5.1.2 explains that values for LC_{50} or mammalian LC_{LO} were reduced by an uncertainty factor of 10.

Comment (2673)
Volume IV, Section E.16.5.3, states that several inorganic and organic substances were not evaluated for cancer risks. Were these substances evaluated for noncancer endpoints or just eliminated?

Response
The WM PEIS evaluates hazardous waste transportation risks due to air exposure based on three health endpoints, potential lethality, any adverse effects and potential for increased cancers. The substances evaluated as carcinogens would typically not be evaluated for two of the endpoints, unless these substances also met the health criteria for evaluation as a potential lethality (e.g., meets the criteria for designation as a U.S. Department of Transportation poison by inhalation chemical) or any adverse effect chemical (e.g., EPA published inhalation reference dose).

Comment (2675)
Volume IV, Section E.17.1.3.3. Is the distribution of the various classes of carcinogens (e.g., confirmed human carcinogens such as benzene and vinyl chloride) similar across all of the complex's waste shipments for all alternatives under consideration? If not, then equal cancer risks for alternatives might not be representative of human cancer epidemiology.

Response
For analysis purposes, the source term for hazardous chemicals used in the transportation risk assessment, including carcinogens, was assumed to be similar for all of the waste shipments across the complex under all of the proposed waste management alternatives.

Comment (2676)
Volume IV, Section E.18, states that, in principle, one can estimate the uncertainty associated with each model input data parameter, each model empirical parameter, and each model theoretical assumption, and predict the resultant uncertainty in each set of calculations. The text goes on to discuss input parameter uncertainty in detail. But where is the overall uncertainty in the risk assessment presented? This whole section leads the reader to believe that a probabilistic risk analysis, with distribution of uncertainty, was to be undertaken when, in fact, it was not.

Response
Transportation risk estimates presented in Volume IV, Appendix E, are single-value or "point" estimates. Each of these point estimates does not have an associated error band (i.e., plus/minus value) because a general quantitative uncertainty analysis was not included in the evaluation of transportation risks. As described in Section E.18, conducting a full-scale quantitative uncertainty analysis is often impractical because the lack of data does not permit the development of the probability distributions needed to quantify uncertainty in every parameter.

DOE revised Section E.18 of the PEIS to address the overall uncertainty in the transportation risk estimates. Using a model that provided both single point estimates (i.e., deterministic estimates) and range estimates (i.e., probabilistic estimates) of risk, the single point estimate values were found to correspond to the upper end (i.e., 99th percentile) of the probability distribution of risk value outputs. This analysis suggests that the point estimate outputs of the transportation risk models are conservative and are not expected to underestimate potential transportation risks. A reference for the paper that provides additional details about this analysis has been added to Section E.18.

Comment (2677)
Volume IV, Section E.18. How does summing the risk from many routes result in cancellation of errors?

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Response
The total risk calculated for a specific alternative (and health endpoint) is actually the sum of the risk values computed for each of the many 1-mile segments encompassing the many routes and chemicals included in the risk analysis. There is some error in the risk predication for each mile. There would be some degree of cancellation of errors during this risk summation process (risk for some miles being overestimated and for others being underestimated), unless there is a systematic overprediction or underprediction of the risk at each mile. DOE has revised Section E.18 to more fully explain this.

Comment (2679)
Volume IV, Section E.18.1. It is not clear what is implied by the statement, "In this summation process for each mile, the interaction among all the previous uncertainties occurs, and errors cancel out." This vague statement is not supported by an example of how such "summation" reduces uncertainty. An example should be given. How did DOE arrive at the combined error estimate of plus or minus one order of magnitude for the total risk numbers?

Response
The referenced text in Section E.18.1 was deleted, and new text was added for clarification. In summary, there is some error in the risk prediction for each mile; some miles were over-estimates and other miles were underestimates. There would be some cancellation of errors during this risk summation process.

Comment (3110)
Referring to Section C.4.3.4, a commentor stated that long-term impacts to water quality from transportation accidents are not the only possible impacts from transportation accidents; therefore, short-term impacts and air quality impacts should be considered.

Response
Potential short-term transportation accident impacts to water quality and aquatic ecological resources are addressed in Sections 6.7.5, 7.7.5, 8.7.5, 9.7.4, and 10.7.5 in Volume I of the WM PEIS. Section C.4.2.1.2.1.3 identifies the transportation source assumptions for air quality impacts used in the environmental impacts analysis methods. Section E.5.1.2.1 describes the radiological accident risk assessment, which accounts for exposure pathways such as the internal exposure from inhaling airborne contaminants in an accident. There would be no long-term impacts to air quality from transportation accidents; therefore, the WM PEIS does not discuss this issue.

Comment (3121)
A commentor expressed appreciation for the thorough transportation analysis and commended DOE's inclusion of dose estimates for Category VIII accidents.

Response
Thank you for the comment.

Comment (3122)
The much higher population doses associated with low-level waste and transuranic waste severe accidents compared to the high-level waste accident, is surprising. If one assumes that the major factor driving the differences relates to Table E-8, "Aerosolized and Respirable Material Releases," the

assumptions used to categorize waste inventories and to apply the factors in Table E-8 need to be discussed (perhaps by expanding the "sensitivity analysis" in Section E.8.4).

Response
As suggested, the differences between the high-level waste severe accident estimates and the low-level waste and transuranic waste accident estimates are mainly due to the fraction of the released material that becomes aerosolized following a potential accident. Specifically, postulated severe high-level waste accidents result in lower consequences than postulated severe low-level waste and transuranic waste accidents because the high-level waste is in a vitrified form and is not readily dispersed to the environment. As discussed in Volume IV, Section E.6.6, the aerosolized fraction of the released fraction is the amount of the material originally in the shipping package that is dispersed in the air after release to the surrounding environment. DOE revised Table E-7, footnote "a" to state that the values must be multiplied by the aerosolized and respirable fractions in Table E-8 for the various waste forms in order to determine the amount of material dispersed in the environment. DOE revised Table E-8 to reflect the waste types for the values used.

Comment (3125)
Section E.2.4 should explain short-term effects from doses to individuals due to severe accidents. For example, are the acute doses in some cases sufficiently high that there are predictable effects (i.e., doses of 300 to 500 rem).

Response
As stated in Volume IV, Section E.2.4, transportation-related operations for all waste types are not expected to cause acute (short-term) radiation-induced fatalities or to produce immediately observable effects in individuals. No severe accident analyzed for the WM PEIS is expected to cause any one individual to receive a 50-year committed effective dose equivalent of more than 34 rem (remote-handled transuranic waste accident, Table E-27). A 34-rem dose over 50 years is not expected to cause any observable effects. Section E.2.4 has been revised to further clarify this result.

Comment (3126)
Two assumptions made in Appendix E probably do not affect the relative impacts of alternatives within each waste category, but likely would affect the overall levels of risk/safety achieved. By making them, the WM PEIS is less useful for making programmatic decisions between modes of transport. One is the assumption that wastes carried by rail will not use special or dedicated trains. This is a conservative assumption, in that risks to both transportation workers and to the public near stops and railyards can be reduced by dedicated trains (since the use of dedicated trains would reduce the length of time of each shipment). Dedicated train use would increase the lower-risk advantage of rail over highway transport. The assumption of no intermodal transfers is convenient for consistency in comparisons, but probably not realistic. Clearly, intermodal containerized shipment is increasingly common. Its risk implications are not clear, but deserve to be explored.

Response
Dedicated trains are an acceptable transportation mode for DOE waste shipments. Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process described in Section 4.3.10, in Volume I of the WM PEIS. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large

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shipping campaigns to ensure that safe routing alternatives and safe havens are utilized. A site may choose to use dedicated trains based on the transportation analysis conducted in the WM EIS. DOE has used dedicated trains in the past including during shipments of foreign research reactor spent nuclear fuel from Charleston, South Carolina, to the SRS in 1994 and 1996, and when shipping low-level waste from FEMP to the Envirocare Site in Utah. The decision to use dedicated trains would be addressed during the transportation planning process at each site.

Based on the amount of time spent in railyards for general freight and dedicated trains, the normal routine radiation exposure of the railyard workers and train crew is approximately a factor of 10 lower for dedicated rail than for general freight. However, the use of a dedicated train is cost-effective only when there are large amounts of material to ship. Many sites are not expected to generate enough waste on an annual basis to fill even a single railcar. Moreover, the dominant risk for rail transportation of DOE wastes is from physical injuries of the type associated with any rail accident. The accident fatality rates used in the WM PEIS are based on single railcars (as opposed to entire trains); therefore, the use of dedicated trains compared to general freight will not make more than a factor of 2 difference for shipments with the highest allowable external dose rates. For example, the estimated fatalities from external radiation exposure and from physical trauma from accidents are roughly the same; if the external dose rate impacts decreased by a factor of 10, the overall number of estimated fatalities would only decrease by approximately a factor of 2. DOE revised Section E.2.6 to clarify this.

Waste to be shipped by rail might require additional handling and preparation, especially for sites lacking rail access, which will contribute to the overall risk. (A review of the transportation facilities at 35 DOE sites indicated that 25 have direct rail access onsite, an additional 12 have access within 10 miles, and 8 have access between 10 and 100 miles.) Secondly, a number of other factors could make rail shipments less desirable than truck shipments. Rail shipments would likely require a large inventory of waste to be shipped in order to be cost-effective, and rail operations are not very flexible or responsive to individual site needs. Volume IV, Section E.8.5, describes uncertainties in the comparison of truck and rail transportation modes. However if a site without rail access does choose to use rail transportation, additional transportation analyses might be required. The WM PEIS analysis assumed there would be no intermodal transfers during rail shipments for sites that do not have rail access onsite. The risk from intermodal transfer is expected to be small.

Comment (3128)
The statement that the radiological accident risk assessment uses route specific information on population density and accident rates derived from individual States is misleading. The population densities are route-specific by State only insofar as the routes are divided into rural, suburban, and urban. The average density data used for these three categories are not route-specific or State-specific data.

Response
For the transportation risk assessment in the WM PEIS, route-specific information on population density was used to determine the fraction of travel in each of the rural, suburban, and urban population zones in each State for each shipment route. However, as stated in the comment, average densities are used for these three zones. The wording in Appendix E, Section E.5.1.2.1, has been revised for clarity.

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Comment (3130)
DOE should explain whether there are any data to corroborate or alter NUREG 0710, which is almost 20 years old, in terms of the fractional occurrences by accident severity category.

Response
DOE is not aware of any comprehensive study that has been conducted since NUREG-0170 to dispute or alter the numbers presented. However, what has come to be known as the Modal Study (NUREG/CR-4829) was performed less than 10 years ago and defined 20 "categories" of accident severity related to spent fuel casks. These were categorized by slightly different variables than those used in NUREG-0170 and are not directly comparable for the different types of shipping packages used for the wastes analyzed in the WM PEIS.

Comment (3131)
Do rail calculations consider the additional risks of those alternatives that result in significant shipments in corridors where commuter rail service exists, or is passenger rail density averaged for urban and/or suburban links?

Response
The additional risks in corridors where commuter rail service exists are not considered in the WM PEIS transportation risk analysis for rail transport. The length of travel in these areas is short compared to the overall shipping distances of waste and not expected to contribute significantly to the overall risk. The on-link commuters for rail shipments would not be expected to be the dominant exposure group even if commuter trains passed a shipment frequently. In addition, most commuter rail service is only significant during peak rush hour periods, further limiting the opportunity for exposure.

Comment (3140)
The description of INTERLINE in Section E.4.2.1.2 is inadequate because it does not indicate the factors that actually determine routing.

Response
The description of INTERLINE in Volume IV, Section E.4.2.1.2, is not intended to provide all the information required to determine a rail route. The basic algorithm used by the program is one that determines the shortest route, as discussed in the text. More detailed information can be obtained from the INTERLINE manual, which is referenced in Section E.4.2.1.

Comment (3206)
Section 4.3.10. The transport models do not adequately consider the route-specific hazards for access to the Hanford Site through Oregon. Interstate 84 crossing northeastern Oregon is one of the major routes. This section of Interstate 84 has two particularly dangerous stretches, through Ladd Canyon and over Cabbage Hill, which necessitate specific modeling, and route restrictions during inclement weather.

Response
As discussed in Section E.4.2.1 in Volume IV of the WM PEIS, transportation risk analyses used representative routes. These routes are deemed representative because they are consistent with current routing practices, but might not be the routes actually used if shipping activities were to occur in the future. In addition, the risk over the entire transportation route is generally not dominated by one

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specific local hazardous area. Therefore, analysis of specific local hazards on hundreds of routes is neither practical nor necessary for the purposes of the WM PEIS. The accident rates used in the transportation analyses are averages over several years in all weather conditions; thus, all types of weather conditions were considered. Also, hazardous and radioactive waste carriers are more conscious of the risks involved in transport and prepare their shipments accordingly, including the avoidance of transport under severe weather conditions. DOE will work with State, local, and Tribal officials prior to waste shipments to deal with site-specific transportation routing issues. Transportation planning is described in Section 4.3.10 in Volume I and Appendix E.9 in Volume IV.

Comment (3208)
The rail lines across northeastern Oregon run through a canyon across the lands of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and are difficult to access. Accidents there would be difficult to respond to and would impact the CTUIR. The WM PEIS does not consider the potential for impacts to the CTUIR.

Response
As discussed in Section E.4.2.1 in Volume IV of the WM PEIS, transportation risk analyses used representative routes. These routes are deemed representative because they are consistent with current routing practices, but might not be the routes actually used if shipping activities were to occur in the future. In addition, the risk over the entire transportation route is generally not dominated by one specific local hazardous area. Therefore, analysis of specific local hazards on hundreds of routes is neither practical nor necessary for the purposes of the WM PEIS. The accident rates used in the transportation analyses are averages over several years in all weather conditions; thus, all types of weather conditions were considered. Also, hazardous and radioactive waste carriers are more conscious of the risks involved in transport and prepare their shipments accordingly. DOE will work with State, local, and Tribal officials prior to waste shipments to deal with site-specific transportation routing issues. Transportation planning is described in Section 4.3.10 in Volume I and Appendix E.9 in Volume IV.

Comment (3210)
Volume IV, Section E.2.4, states that for some severe accident scenarios analyzed, it is possible that doses to individuals would have short-term effects but that these effects have not been assessed. This needs elaboration. If some accident scenarios could result in exposures high enough to result effects such as temporary sterility and changes in blood chemistry, there needs to be a better explanation of why this is not considered in this PEIS.

Response
As stated in Volume IV, Section E.2.4, transportation-related operations for all waste types are not expected to cause acute (short-term) radiation-induced fatalities or to produce immediately observable effects in individuals. No severe accident analyzed for the WM PEIS is expected to cause any one individual to receive a 50-year committed effective dose equivalent of more than 34 rem (remote-handled transuranic waste accident, Table E-27). A 34-rem dose over 50 years is not expected to cause any observable effects. Section E.2.4 has been raised to further clarify this result.

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Comment (3215)
Volume IV, Section E.6.5. The Draft PEIS states that no Category VIII accidents are expected to occur. However, if the chance of a Category VIII accident is greater than zero, the assumption should be one accident rather than none.

Response
Section E.6.5 discusses the conditional probabilities used in the transportation accident risk assessment. These are the probabilities of occurrence of a particular accident severity given an accident has taken place. The accident *risk* estimated in the WM PEIS takes into account all accident severity categories. The risk is determined by multiplying the *consequence* (the impact estimate assuming an accident of a given category has taken place) by its conditional probability, summing these products for all accident severity categories and then multiplying the sum by the accident rate. Also, the WM PEIS presents *consequences* for the most severe accidents for each waste type to give the reader an estimate of what could happen in the worst type of accident. As stated in the same paragraph as the statement in question, for the accident consequence assessment, the doses were assessed for populations and individuals by assuming an accident of severity Category VIII. However, as discussed in the accompanying text, the probability of such an accident is on the order of 10^{-12} per mile of travel and the largest estimated shipment mileage in the WM PEIS is on the order of 10^8 miles. These numbers suggest that the mileage traveled is four orders of magnitude less than what might be expected before an accident of severity Category VIII would occur.

Comment (3304)
The estimates of truck transport accident risks use "statewide averages." For example, they do not reflect estimates of current traffic volumes on segments of Interstate 15 and U.S. Route 95 in Nevada. In addition, they do not reflect the levels of service on specific routes, such as those in Nevada, which are projected to decline from Bs and Cs to Ds, Es, and Fs over the next 20 years (see *NTS Transportation Study*). Also, would the analysis be significantly affected by factoring in recently increased speed limits in Nevada and other States?

Response
The WM PEIS analyzes representative routes for truck and rail. Appendix E in Volume IV describes the radioactive waste transportation risk assessment. Methods and assumptions used in the transportation-related radiological risk assessment were selected to ensure meaningful comparisons of among programmatic alternatives. Estimates of current traffic volumes on specific segments of highways were not used because a detailed consideration of every possible waste shipment would be impractical for a programmatic EIS. Transportation computer models are updated periodically to account for changes in routes, speed limits, and other factors.

Comment (3394)
Volume I, Section 10.4.2. The 50% figure is not justified. Why do worst case scenarios have to involve chemicals that contribute over 50% of the adverse health risk? Consequently, the 2/100th of 1% quantity might be an underestimate. Please explain.

Response
All waste shipments in the hazardous waste inventory were considered in the transportation risk assessment. Approximately 17% of the hazardous waste shipments (285) under the No Action Alternative would contain chemicals that have an "any adverse effect" health endpoint. Thirty-six of

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these shipments (13%) would contribute over 50% of the risk associated with waste shipments containing "any adverse effect" chemicals.

Comment (3566)
Wastes will be transported across Native reserve lands and boundaries where the regulations of the Native Nations must be obeyed. If there is a release of any kind, the potential of migration across reserve boundaries is very high. Would DOE comply with Tribal regulations?

DOE has a history of ignoring the sovereignty of Native Nations when it comes to transporting wastes through Native Nations. One major accident on a reservation could mean disaster for a Native Nation. Native Nations cannot simply go somewhere else. Will DOE arrange for dealing with such issues (e.g., guarantee additional reserve lands)?

Warning and accurate characterization of Native Nation's unique rights and needs must be heard and integrated in DOE's analysis on impacts on Native Nations. The crucial question is, what if one major accident occurs? What is the Nation to do? Will there be new trust lands, assuming of course the Nation is willing to relocate?

Response
DOE must comply with the standards of all applicable Federal and State environmental and transportation laws and regulations, and must fulfill its trust and treaty obligations, including Tribal lands, as part of the government-to-government relationship between the U.S. Government and Tribal Governments. Consultation with Federally recognized Tribes is an integral part of compliance with several environmental and cultural resource statutes. Section 1.4.5 in Volume I was added to discuss DOE's consultation activities with Tribal Governments and groups.

DOE has a comprehensive emergency management system in place, as described in DOE Order 151.1. In the event of an operational emergency, offsite authorities, including Tribal Governments, will be notified. If there is an actual or imminent catastrophic reduction of facility safety with potential for the release of large quantities of radioactive material such that Protective Action Guides could be exceeded beyond the site boundary, then a General Emergency will be declared. Protective Action Guides, which are limits that, if exceeded, trigger the recommendation to take protective actions, are found in the *Manual of Protective Action Guides and Protective Actions for Nuclear Accidents*, EPA 400-R-92-001 (May 1992). Protective actions are classified as early, intermediate, and late, and depend upon the pathway, either inhalation or ingestion. Early protective actions include sheltering, evacuation, control of access, and ingestion of potassium iodine to block uptake of radioiodine by the thyroid. Intermediate and late protective actions include relocation, food and water controls, and decontamination of land and property.

DOE is concerned with health and safety and the need for emergency preparedness. DOE participates with other Federal, State, Tribal Nations, and local authorities to sponsor and occasionally fund various radiological emergency response training courses throughout the United States. These courses are usually provided for the benefit of local, State, and Tribal authorities responsible for public safety and emergency response to natural disasters or man-made accidents. Funds for these training sessions come from Federal grants or direct allocation of tax dollars.

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The PEIS includes a detailed assessment of the risks of a complete range of credible transportation accidents for both rail and truck transportation, including low probability/high consequence and high probability/low consequence accidents. Transportation related impacts are discussed in Sections 6.4.2, 7.4.2, 8.4.2, 9.4.2, and 10.4.2 in Volume I, and in Appendix E in Volume IV. The transportation routes analyzed are representative routes chosen for analytical purposes.

Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

The issue of guaranteeing additional trust lands in case of an accident is out of scope in this PEIS. Compensation may be sought under the applicable law.

Comment (3578)
The limitation of 50 miles within the site and only .5 miles of transportation routes is insufficient as an accurate analysis of risks and potential impacts on minority and low-income populations. To begin the .5 mile limitation ignores basic weather influences such as rain and wind on an accidental release. Are we to assume transportation will take place only during good weather? Also, the .5 mile limit ignores the prominent occurrence of major transportation routes (both rail and roadways) to cut through lower income and minority populations, putting such populations at higher risk than non-minority and higher income persons. More importantly, the WM PEIS supplies no maps or figures of the potential routes and populations along the routes.

Response
The WM PEIS risk assessment results indicate that risks from routine shipments would be low to persons exposed near the routes and to populations along the routes within .5 mile of the road or rail line. Risks to individuals or populations at greater distances would be negligible. The .5 mile limit conservatively includes the transportation collective population risk and is described in Volume IV, Section E.5.1.1.1. The risk from exposure due to accidents is also analyzed in Sections E.5.1.2 and E.15.1.2. The accident risk assessment uses route-specific information and accident rates derived for individual States.

The WM PEIS does not include maps of transportation routes because the document does not analyze specific routes. The routes considered in the analysis are representative for risk assessment purposes, but are not necessarily the actual routes that would be used to transport waste in the future. Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

Comment (3579)
We would like to point out the potential risks to Native Nations is disproportionately high in regard to transportation issues. This is based on simple historic influences. During the process of creating rail lines and encouraging growth of this industry in the West, the Federal Government was exceptionally

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intrusive on Native reserves, withdrawing unceded treaty lands for land grants to the railways. Thus, railways tend to cut through a great majority of Native reservations in the West. We have analyzed the potential impacts on Native Nations from transportation accidents, and have found that transportation routes (both rail and road) cut through 60 Native Nations. What is particularly important to keep in mind, is that each Nation is unique as a Nation and as a culture. It would only take *one* major accident to irreparably impact a Nation.

Response
DOE recognizes the unique status of Tribes and the government-to-government relationship between the Federal Government and Tribal Governments, as discussed in Section 1.4.5 in Volume I of the WM PEIS. DOE is also concerned with health and safety and the need for emergency preparedness. DOE analyzed the accident risks along representative routes using route-specific data. A description of the analysis is contained in Volume IV in Sections E.5.1.2 and E.15.1.2, and the results are presented in Sections E.7 and E.17. Based on mileage alone, risks of accidents on Native American lands would be lower than risks on non-Native American lands because the overwhelming majority of the transportation route mileage is through non-Native American lands.

DOE participates with other Federal, State, and local authorities to sponsor and occasionally fund various emergency response training courses throughout the United States. These courses are usually provided for the benefit of local, State, and Tribal authorities responsible for public safety and radiological emergency response to natural disasters or man-made accidents. Funds for these training courses come from Federal grants or direct allocation of tax dollars. In addition, DOE sites have emergency plans and equipment to respond to accidents and other emergencies. DOE provides for Radiological Assistance Program teams consisting of trained experts equipped and prepared to respond to an accident involving a shipment of radioactive materials and assist local emergency response personnel, if requested. State and local authorities are required to develop response plans to deal with any emergency situation. The PEIS includes a detailed assessment of the risks of a complete range of credible transportation accidents for both rail and truck transportation, including low-probability/high-consequence and high-probability/low-consequence accidents.

Comment (3595)
DOE's evaluation of the management of transuranic waste must be completely re-done because of the assumption that WIPP will open, and for the following reasons: unresolved, incomplete and unfinished EPA disposal standards; unresolved gas and oil leases under the WIPP site; unanswered questions about the gas generation from the drums once inside the repository; concerns about the canceled test phase at WIPP; unanswered questions about the hydrology of the WIPP site, such as water intrusion, well-injection and water moving faster than calculated in early WIPP scientific reports; transportation concerns, including safety of TRUPACT containers, emergency response capabilities of communities along the routes, RADTRAN and HIGHWAY incomplete, and omissions of relevant and important transportation factors; concerns about a catastrophic transuranic waste hoist accident.

Response
The WM PEIS examines reasonable alternatives for treatment and storage of transuranic waste. For purposes of analysis, DOE assumes that WIPP will become operational. The No Action Alternative evaluates for the period of analysis (i.e., 20 years) the impacts if there is a delay in the receipt of transuranic waste at WIPP and waste continued to be stored at the generating sites. The impacts of storage beyond 20 years are analyzed as part of the No Action Alternatives in the WIPP SEIS-II. The

decision whether to operate WIPP as a transuranic disposal facility, and the environmental impacts associated with its operation (including hydrology, transportation, and accidents) are evaluated in the WIPP SEIS-II.

The WM PEIS also conducted an analysis of potential risks from routine shipments of wastes, as well as accident scenarios, using representative routes and route-specific data. The actual routes would not be determined until a specific action has been selected. The WM PEIS analysis of risks from routine shipments indicated that risks to persons exposed near the routes and to populations along the routes within 1/2 mile of the road or rail line would be low. This analysis is described in Volume IV, Section E.7.3.2.

The PEIS also includes a detailed assessment of the risks of a complete range of credible transportation accidents for both rail and truck transportation, including low probability/high consequence and high probability/low consequence accidents.

DOE is concerned with health and safety and the need for emergency preparedness. DOE participates with other Federal, State, and local authorities to sponsor and occasionally fund various radiological emergency response training courses throughout the United States. These courses are usually provided for the benefit of local, State, and Tribal authorities responsible for public safety and emergency response to natural disasters or man-made accidents. Funds for these training sessions come from Federal grants or direct allocation of tax dollars.

Comment (3612)
How exactly, was offsite transportation minimized? Were computerized routing models used? Applicable U.S. Department of Transportation (DOT) regulations? There is basically only one way to go from Washington or Idaho or Colorado to WIPP while following applicable DOT regulations--that is staying on the interstates. Is this the "minimization" factor?

Response
Section E.4.2.1 describes the HIGHWAY computer program used for selecting highway routes for transporting radioactive materials within the United States by truck, as well as the INTERLINE computer program used for selecting railroad routes. Offsite transportation was minimized because routes are calculated within the model by minimizing the total impedance between the origin and the destination. The impedance is basically defined as a function of distance and driving time along a particular highway segment. One of the special features of the HIGHWAY model is its ability to identify routes that maximize the use of interstate highways, thereby conforming to DOE routing regulations and results in minimization of transportation, as discussed in Volume IV in Section E.4.1 of the WM PEIS.

Comment (3634)
The risks to the truck drivers who will transport the waste are not adequately addressed; neither are they addressed for those who come within the health risk range of the trucks along the transportation routes or in stopping places. The health risk to those who live along the transportation routes should be accounted for as well. The analysis of the health risks to the noninvolved workers and workers, as well as those outside the 50-mile radius is cursory at best.

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Response

DOE did address potential risks from transportation to all of the individuals mentioned, including truck drivers, persons at truck stops, persons living along transportation routes, and noninvolved workers. Summary information on radiological and nonradiological health risks from transportation is presented in Sections 6.4.2, 7.4.2, 8.4.2, 9.4.2, and 10.4.2 in Volume I. The details of the analyses are presented in Appendix E in Volume IV.

Truck drivers are trained to establish an exclusion zone around trucks when parked at stopping places. The zone is set up by placing orange cones and signs around a 50-foot perimeter of the truck to warn members of the public to keep back.

The analysis of health risks within a 50-mile radius is only relevant to risks associated with waste treatment facilities or transportation accidents and not routine transportation. The 50-mile radius was used to be consistent with the standard practice for assessing health risk for releases at nuclear facilities.

Comment (3666)

Analysis of DOE records shows 173 accidents occurred between the Fall 1975 and December 1987, or approximately 14 per year. Most were minor incidents in parking lots (*Deadly Defense*, page 36). By changing the definitions of onsite, offsite, and normal facility operations, DOE reduces/manipulates the number of accidents the nuclear and hazardous waste trucks are involved in. This is not acceptable.

Response

The WM PEIS does not reduce the potential number of transportation accidents in its analysis. Commercial truck accident rates are used for estimating risks for transportation between sites, as discussed in Volume IV, Section E.6.4. These rates are generally higher than those experienced by carriers of radioactive materials due to their higher awareness of the risks involved and associated driver training programs and vehicle maintenance.

The WM PEIS onsite transportation assessment used the accident rates for Hanford since Hanford manages all five waste types and the number of shipments within the boundaries of the site are the highest compared with other major sites. The accident rates for Hanford include *all* truck or rail accidents within the boundaries of that site. Transfers of waste within a specific facility constitute very short distances compared to the onsite shipment distances analyzed and any risks incurred are negligible compared to the onsite transportation impacts presented.

Comment (3668)

Why are population densities modeled as being uniformly distributed when that is not an accurate reflection of the population distribution?

Response

The approach for offsite transportation risk assessment is summarized in Figure E-3 and described in detail in Section E.5.1 in Volume IV of the WM PEIS. Both the HIGHWAY 3.1 (Section E.4.2.1.1) and INTERLINE 5.0 (Section E.4.2.1.2) computer programs were used to predict routes for waste shipments between sites. The computer model characterizes population information in rural, suburban, and urban densities. The fraction of travel is then computed for each zone. Once the routes are determined, the population densities are input for risk assessment using the RADTRAN 4 computer model described in Sections E.5.1.1.1 and E.5.1.2.1. The population densities for each population zone are identified in Section E.6.3. Thus, the population densities are not assumed to be uniformly distributed along the entire shipment route. These population densities might differ from the actual population at a specific location on a route; however, on average the densities are included in the transportation analysis.

Comment (3669)
DOE chose the Hanford Site as the onsite risk assessment model for transportation. Hanford is not a "typical" representation of accidents at DOE sites. In fact, Washington State, the site of Hanford, is not even listed for transportation accidents between Fall 1975 and December 1987 in Figure 7, Department of Energy, Transportation Accidents. Using Hanford as the model is misleading and is not acceptable.

Response
Section E.2.1 in Volume IV of the WM PEIS states that the human health risks associated with onsite transportation are generally much smaller than those from offsite transportation, largely because of the limited distances for onsite shipment, limited population densities along the routes, and limited average travel speeds. Accordingly, the impacts of onsite transportation are not likely to contribute significantly to differences among the alternatives being considered. Therefore, for purposes of the PEIS, the onsite risk assessment has been limited to one representative site - Hanford. The Hanford Site was chosen primarily because it is relatively large and conducts activities for managing all of the waste types considered in the WM PEIS. It should be noted that the transportation radiological risks are dominated by exposure during routine transport when compared to potential accident releases, typically 2 to 3 orders of magnitude higher for the routine risks. The Hanford Site carries out extensive waste management operations involving all waste types evaluated in the WM PEIS and often makes many shipments across a large area within the site. Such activity greatly increases the transportation risk. Therefore, it is not expected that any other DOE site has operations that would have onsite transportation risks significantly greater than those at the Hanford Site.

Comment (3670)
Why it was necessary to separate the vehicle-related risks from the cargo-related risks.

Response
Vehicle-related risks are separated from cargo-related risks because of the differences in the health endpoint (fatalities) considered and the models used to estimate these risks. For example, estimating traffic fatalities from the physical trauma related to an accident has much less uncertainty than estimating potential cancer fatalities due to radiation exposure from a passing shipment. Even estimated fatalities associated with diesel exhaust (vehicle-related) are highly uncertain and are presented separately from vehicle-related accident fatalities in the tables found in Volume IV, Appendix E. Section E.8.4 discusses the uncertainties associated with the calculation of radiation doses, and DOE added a paragraph on some of these uncertainties to Volume I, Section 5.4.1. Thus, vehicle-related risks are concerned with the truck or rail car being driven and cargo-related risks are based on the waste type in the truck or rail car.

Comment (3671)
How are the "road-related" risks included in your calculations? We describe "road-related" risks to include driver fatigue, the weather (temperature, wet, dry, snow, snow tires on the trucks in winter,

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ice, visibility), deer or elk on the roadway at night, the condition of the highway surface (asphalt, road construction), as well as situations around the country such as and similar to Raton Pass on the Colorado/New Mexico border or the incident on the interstate 25 (prior to 1988) where the southbound lane gave way (as a result a portion of the interstate was closed).

Response
Road-related risks are accounted for by the accident rates used. The WM PEIS transportation risk analyses used accident rate statistics based on information from the Department of Transportation as discussed in Section E.6.4 in Appendix E, Volume IV. These accident rates are multiple-year State averages based on historical commercial carrier performance with all types of cargo under all driving conditions. Actual accident rates are expected to be slightly lower since commercial carriers of hazardous and radioactive waste have a higher awareness of transportation risk and prepare their shipments accordingly, especially with regard to such factors as driver preparedness and weather conditions.

Comment (3673)
We are concerned that no attempt has been made (even in cases where both radioactive and hazardous components are present in the same materials) to add or compare the estimated risks for the two classes of contaminants. We are extremely concerned because of (1) the synergistic effects of the radioactivity and the hazardous components on each other, and (2) for the purposes of the WM PEIS analysis, DOE analyzes all TRUW *as if it were mixed waste*. If DOE sets the stage for analysis, then DOE should go forward with the entire act, in essence, and not put the public and the environment at risk for not completing the analysis.

Response
Section D.2.5.1, Appendix D in Volume III, states that the risks from enhanced or diminished toxicity from interactions among components of a contaminant mixture (termed "synergy" and "antagonism," respectively), or the effects of multiple chemical forms of the same atom ("speciation") or combination of atoms ("complexing") were not evaluated because not enough information exists on these effects.

Section D.2.6.3 in Volume III, states that the risk of cancer fatality was calculated for radionuclides but not for chemical carcinogens. This is because research and epidemiological studies have provided enough information to develop risk factors for both cancer incidence and fatality caused by radionuclides; however, there is not yet enough information to develop risk factors for cancer deaths resulting from chemical exposures. These differences between the amounts of information available about cancers associated with chemical and radionuclide exposures have another implication: The risk of cancer incidence from exposure to hazardous chemicals is not, strictly speaking, directly comparable to the risk of cancer incidence from exposure to radionuclides (this becomes an issue only in the risk analyses for transuranic waste and low-level mixed waste, which contain both radionuclides and hazardous constituents). Readers should bear this in mind when assessing the risk analysis results.

Comment (3675)
Volume IV, Appendix E, Foreword, footnote b, Endpoints Used for Human Health Effects: WM PEIS Transportation Risk Assessment, assumes that "no public exposure to the hazardous waste occurs during routine transportation." What if there is an accident?

Response
"Routine" transportation means transportation during which no accidents occur. The Foreword of Appendix E states that in contrast to radioactive materials, hazardous chemicals do not pose cargo-related risks to humans during routine transportation-related operations. Waste transportation operations are generally well regulated with respect to packaging, such that small spills or seepages during routine transport are kept to a minimum and do not result in exposures (for example, containers of liquids are surrounded by absorbent overpacking). Potential cargo-related health risks to humans can occur only if the integrity of a container is compromised during an accident (that is, a container is breached). Under such conditions, some toxic chemicals (such as chlorine gas) may cause an immediate health threat to exposed individuals. The table referred to in the comment shows that, although no public exposure to hazardous waste occurs during routine transportation, exposure was analyzed for accidents. Section E.17 in Appendix E, Volume IV, presents the risk assessment results for transportation, including accidents.

Comment (3693)
The WM PEIS should not conclude that rail transport is "significantly less risky" than truck transport (PEIS Summary) and thereby appear to preselect a particular transportation mode, because (1) on an absolute basis, risks for both truck and rail transport are negligible; (2) even assuming that the risk factors for trucking wastes are four times greater than those for the rail mode (as found by the WM PEIS), on a probabilistic basis, this factor of four, vis-à-vis absolute risks that are negligible, is irrelevant; (3) since transportation of radioactive and hazardous wastes is regulated by DOT, EPA, and NRC (and not by DOE), individual competitive circumstances (as determined by DOE in consultation with the private sector) should drive the selection of transportation mode; and (4) the DOE Organization Act charges DOE with ensuring competition and maximum use of the private sector.

Trucks are easier to stop, start, reroute, inspect, weigh, and book than trains, which facilitates implementation of shipment tasks and lowers shipping costs.

Response
Actual transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process described in Volume I, Section 4.3.10. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

As shown in Volume I, Section 11.20 of the WM PEIS, shipping waste by truck would result in a combined total of between 12 and 69 potential fatalities from shipping low-level mixed waste, low-level waste, transuranic waste, and hazardous waste over the next 20 years, and for shipping high-level waste over the next 40 years, as shown in Volume IV, Appendix'E, and Section 11.20. Shipping low-level mixed waste, low-level waste, transuranic waste, and high-level waste by rail, and hazardous waste by truck would result in a combined total of between 2 and 6 potential fatalities over the same periods. It is important to recognize that, although rail shipments appear to result in a lower number of expected fatalities compared with truck shipments, in general, the risk of transportation operations are relatively small for both modes, given the total number of shipments and miles driven. Volume IV, Section E.8.5, describes uncertainties in the comparison of truck and rail transportation modes.

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As stated in Section E.2.4 in Appendix E (Volume IV) of the WM PEIS, transportation operations for all waste types are not expected to cause acute (short term) effects in exposed individuals. Vehicle related risks from emissions and accidents are also assessed and are presented as estimated fatalities for each alternative. Vehicle and cargo related risks are approximately the same for both truck and rail. Radiological impacts would be less for rail because there would be fewer shipments by rail.

Comment (3695)
The WM PEIS fails to consider in its transportation analysis the long experience and exceptional performance history of companies specializing in the transport of radioactive and hazardous materials. Thus DOE's projections of incident frequency conflict with documented actual historical frequencies. For example, while general trucking has a DOE reportable accident rating of 1.4 accidents per million miles, some commercial trucking companies have never had any incident involving release of radioactive materials.

Response
The reportable accident rating of 1.4 accidents per million miles for general trucking represents a national average. Thus, there may be companies with better ratings and incident records and some with worse ratings. The WM PEIS, however, does emphasize the exceptional transportation record of DOE programs in terms of their safety, for example, in Section 4.3.10 in Volume I of the WM PEIS.

Comment (3698)
The WM PEIS quantitative comparisons of rail versus truck transport accident risks (see Sections E.7.1.4, E.7.2.4, E.7.3.4, and E.7.4.4) are not supportable because they fail to account for the following benefits of truck over rail transport: (1) trucks are much easier to reach in the case of an accident, which lowers the response time in the event of a release; (2) train wrecks tend to be catastrophic accidents; (3) shipment by train increases the number of handling transactions (e.g., trains often load from and unload to trucks), thus potential occupational radiation exposure and incident probabilities; (4) truck shipments take less time per shipment-mile, thus lowering radiological and accident risks; and (5) truck shipments tend to occur on interstate highways, while train shipments run directly through cities, thus exposing a larger population in the event of an accident and raising political opposition and environmental justice issues.

Response
Both truck and rail modes of transport have their benefits and drawbacks. The WM PEIS transportation risk analysis strives to provide conservative estimates of (all truck transport vs. all rail transport) risk as discussed in Section E.2.6 in Volume IV of the WM PEIS. The methodology used is based on historical practice. Total transportation risks are dominated by physical trauma from accidents (not from radioactive releases). As to the specific points in the comment: (1) The reason that trucks are much easier to reach in the case of an accident is because they are much closer to the public in general than are trains. Response time may be lowered, but more people are nearer to the truck shipments and also are more likely to be injured in the case of an accident. However, the major radiological risk is not from potential accidents, but from routine transport, where there is much higher risk of exposure to the public who are much closer to truck shipments than to rail shipments along the transport route. (2) Most train accidents are derailments with little damage to railcars and cargo. It is true that a severe train accident could result in larger impacts than a truck accident due to a larger payload. On the other hand, for the same reason, there are fewer rail shipments required for the same amount of material and, therefore, there is less chance of an accident. (3) Shipment by train only

increases the number of handling transactions when the shipping or receiving site does not have direct rail access. Most of the large DOE sites that would have bulk shipments suitable for rail transport do have direct rail access. (4) The input parameters used in the WM PEIS transportation risk analysis reflect the fact that truck shipments take less time per shipment mile. (5) Train shipments going directly through cities do not necessarily expose a larger population in the event of an accident. On the interstate highway system, trucks must often travel in heavily populated areas on beltways around a city's central location. The trucks are generally in much closer proximity to the public (i.e., fellow motorists) than freight trains operating on a private right-of-way. Environmental justice issues are not relegated to the inner city. Volume IV, Section E.8.5, further describes uncertainties in the comparison of truck and rail transportation modes.

Comment (3993)
How can the agency reasonably foresee incident-free transportation of low-level mixed waste? (Chapter 6)

Response
The WM PEIS analysis of transportation-related impacts considers risk to worker and general populations from both routine operations (characterized as incident-free operation) and potential accidents. Because the risk assessments for each are fundamentally different, the analysis addresses them separately. The analysis of incident-free transportation is not intended to imply that a determination has been made that all transportation will be free of accidents, but that this portion of the analysis addresses only those risks associated with exposure from routine operations. (See Volume IV, Appendix E, Section E.5.1.1). The probability of accident and the associated risks, both from radiological exposure and from vehicle-related, nonradiological exposure are addressed separately. (See Appendix E, Section E.5.1.2.)

Comment (4006)
DOE cannot reasonably expect risk of accident to the public during transport to cease to occur because DOE did not foresee accidents during transport as a problem. Transportation accident and incident of release rates, historically, are based upon number of miles traveled, not the types of material being transported.

Response
The EIS transportation risk analysis in Appendix E (Volume IV of the WM PEIS) shows that accident rates for nonradiological accidents (generally considered traffic accidents) are driven by miles traveled as the commentor stated. Appendix E of the WM PEIS contains a detailed transportation risk assessment.

Radiological and nonradiological causes contribute to the overall transportation risk. In general, the radiological risks from waste shipments (i.e., risks associated with the radioactive nature of the waste) tend to be less than or equal to the nonradiological risks (i.e., risks from traffic accidents, unrelated to the radioactive cargo). For high-level waste, the radiological and nonradiological risks are roughly equal. For the other wastes types, radiological risks are less than the nonradiological risks.

With respect to the radiological risk, by far the dominant component is exposure to external radiation during routine conditions. The accident component of the radiological risk (which takes into account probability and consequence) is generally very small. Accident risks are small because accidents are

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rare in general; most accidents would not involve significant releases of radioactive material; and the consequences of most accidents would not be severe.

Even though the overall accident risks are small, the consequences of the most severe credible transportation accidents (assuming one has occurred)--which are of very low probability--have been presented in the PEIS for each waste type to give the reader an indication of the maximum foreseeable accident.

Comment (4446)
No evidence was provided in the Draft PEIS Summary document to indicate whether or not the current actual locations of people in relation to waste transportation routes were considered in DOE's modeling. Along transportation routes around some sites, people might be located closer to roads, rail lines or pertinent service areas than at others. DOE should consider this site-specific information in evaluating the alternatives.

DOE should also summarize how risks to persons who may be driving in the same lane behind waste transportation trucks were evaluated, as well as exposure to people at rest stops, vehicle refueling facilities, etc., and the basis for the associated assumptions and their accuracy and conservatism.

Mitigating measures, such as dedicated, automated refueling, service and rest areas in isolated locations versus the use of existing areas should also be evaluated.

Response
As discussed in Section E.4.2.1 in Volume IV, representative routes (those consistent with current routing practices) are used for the transportation risk assessment because an actual determination of the route to be used could not be made until shipping plans can be prepared to accommodate such considerations as future road repair and construction. This WM PEIS could not provide an exhaustive examination of all potential locations of persons along the hundreds of routes analyzed. The range of potential exposure scenarios described in Section E.6.9 in Volume IV can be used to approximate such specific concerns as driving behind a shipment and people located at rest stops or refueling facilities.

As discussed in Section E.3.1 in Volume IV, the shipping packages used for radioactive materials are highly regulated in order to minimize risks to the public from external radiation and accidental releases. The external dose rates selected for use in the PEIS provide reasonable estimates for future shipments. They are based on historic data, where possible, as a function of waste type and packaging.

Routing regulations used to select representative shipment routes direct shipments away from highly populated areas to minimize exposure. Current practices are used in the analysis to provide the best risk estimates for the different alternatives. To provide conservative estimates of risk, the analysis does not take credit for mitigative measures, such as dedicated refueling stops. However, such measures would be considered and implemented, if appropriate, during the actual transportation of waste.

Comment (4476)
In Section 9.2 of the Draft WM PEIS Summary document, differences in cumulative fatalities for train versus truck transportation should be delineated, along with cancer risks to the maximally exposed individual in the general public, waste workers, and noninvolved workers.

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Response

Section 9.2 in Volume I of the WM PEIS Summary document has been revised to provide additional information about the estimated combined impacts of waste transportation. As shown in Volume I, Section 11.20 of the WM PEIS, shipping waste by truck would result in a combined total of between 12 and 69 potential fatalities from shipping low-level mixed waste, low-level waste, transuranic waste, and hazardous waste over the next 20 years, and for shipping high-level waste over the next 40 years, as shown in Volume IV, Appendix E, and Section 11.20. Shipping low-level mixed waste, low-level waste, transuranic waste, and high-level waste by rail, and hazardous waste by truck would result in a combined total of between 2 and 6 potential fatalities over the same periods.

Section 11.20 in Volume I of the WM PEIS provides details on the results of the cumulative impacts analysis for transportation. Table 11.20-1 lists combined impacts for the transportation of WM PEIS wastes by truck; Table 11.20-2 lists combined impacts for transportation by rail. The PEIS did not analyze rail transportation further because, historically, DOE has shipped most of its wastes and radioactive materials by truck.

The cumulative impacts analysis includes the transport of wastes and nonwaste radioactive materials. Table 11.20-4 lists the occupational and general population doses for the actions considered in the cumulative impacts analysis for transportation. The table also lists the total cumulative dose and total latent cancer fatalities for all actions.

For each waste type and alternative, Appendix E in Volume IV of the WM PEIS contains cumulative transportation risks to the public, to workers, and to maximally exposed individuals for both truck and rail transportation.

Comment (4486)

The only valid conclusion made on the basis of the analysis of impacts in the Draft WM PEIS is that trains should be used instead of trucks to transport radioactive waste, a finding that is not given the emphasis that it deserves.

Response

Although rail shipments appear to result in a lower number of expected fatalities in comparison to truck shipments, in general the risks from both types of transportation are small. Moreover, even though the estimated risks for rail transportation are lower than those estimated for truck transportation, there is no significant difference in the radiological risks between the two transport modes because of the uncertainties involved in the calculations. "Roadside residents" are not expected to receive a higher exposure for truck transport than for rail transport because most truck transportation is expected to occur over the interstate highway system where large setbacks from the roadside exist. On the other hand, the motoring public might receive a higher exposure from truck shipments than members of the public sharing the rail transportation routes. The risks of physical trauma fatalities directly related to traffic accidents suggest rail transport maybe slightly less hazardous than truck transport. Section 7.4.2 in Volume I of the WM PEIS was revised to incorporate this information. In addition, Volume IV, Section E.8.5, describes uncertainties in the comparison of truck and rail transportation modes.

5.2.4 Facility Accidents Risks

Comment (568)
The models used to estimate facility accident population risks might be inadequate for estimating acute fatalities from severe accidents that result in large releases of radioactivity. Depending on the assumptions used, doses to potential receptors could be overestimated or underestimated.

Response
Volume IV, Appendix F, of the WM PEIS provides detailed descriptions of methodologies used to estimate facility accidents. The facility accident analyses performed for the WM PEIS emphasized risks to public health from severe accidents. The first set of postulated initiating events included process operation failures leading to fires or vessel ruptures due to overpressurization. The next set, which are generally more dominant in terms of potential consequences, were so-called external events that could lead to fires and overpressurizations accompanied by breach of containment. The releases involved were sufficiently low and site boundaries sufficiently far that acute (sudden) offsite fatalities would not be likely. Therefore, only latent (effects not immediately visible that could appear later) were considered with GENII, one of the industry standard codes for atmospheric dose calculations that was used for the analyses. GENII is described in Table 5.1-1 in Volume I, Chapter 5, of the WM PEIS.

Severe accidents could lead to releases high enough to cause high radiation doses to site personnel close to the accident. However, operational fires and overpressurization events probably would be contained initially in the DOE Hazard Category 2 facilities assumed for treatment; therefore, workers would be shielded. Although breach of containment was assumed for many of these operational event sequences, the breach probably would occur sufficiently long after the initiation of the event that site personnel could take actions to protect themselves from exposure to radiation.

In the case of external events, the most serious potential acute fatality threat to site personnel would be the initiating event itself. While in theory high radiation doses could occur, emergency procedures would be implemented immediately and acute fatalities from radiation exposure would not be likely. Therefore, only latent cancer fatality calculations were performed.

Comment (569)
Facility accident health risks should address acute fatalities (e.g., resulting from injury to bone marrow, gastrointestinal tract, lungs) and latent cancer fatalities from short-term exposure to the released plume, and latent cancer fatalities from long-term exposure to deposited materials.

Response
DOE used conventional risk assessment methods to evaluate health risks associated with treatment facility accidents. The analysis did not predict any acute fatalities from radiological exposure for the facility accidents analyzed, with the exception of the transuranic waste treatment facility accident at WIPP under the Centralized Alternative, in which, as described in Section 8.4.3, waste management workers would be likely to receive acutely lethal doses of radiation. The analysis of latent cancers from acute exposures estimated offsite population and potential worker fatalities at the Hanford Site under the Centralized Alternative and for the offsite population of LANL and LLNL under Regionalized Alternative 2 for low-level waste (Section 7.4.3). Potential offsite population and worker fatalities at LANL under Regionalized Alternative 2 and potential worker fatalities at the Hanford Site, INEL, and WIPP for the Regionalized and Centralized Alternatives for transuranic waste

(Section 8.4.3) were also evaluated. Appendix D in Volume III and Appendix F in Volume IV present additional information on both acute and long-term exposure risks.

Comment (572)
It is possible that the PEIS facility accident and transportation accident analyses significantly underestimate risks because they consider potential exposure only through inhalation of small respirable particles. The dose contribution due to the larger dispersible particles (i.e., particles larger than 500 microns) from direct ingestion (through nose and mouth breathing), external radiation, and ingestion of foods (through soil and food contamination) has been shown to be substantially greater than those from small respirable particles under various release and exposure conditions.

Response
Although the commentor is theoretically correct, several factors mitigate the effects of such contamination:

- The terminal velocity of a particle 500 micrometers (Aerodynamic Equivalent Diameter [AED]) is approximately 7 centimeters per second; it would remain airborne 1.67 minutes and travel 7 meters. Particles in this size range could pose an inhalation hazard to those within the immediate vicinity of the event, but would not be likely to leave an intact structure.

- Although not anticipated under normal conditions, particles of this size range entering the respiratory system would be lodged in the upper tract, and action by the cilia would move them to the gastrointestinal tract. In fact, EPA no longer regulates particulate concentrations for sizes greater than 10 microns aerodynamic equivalent diameter due to the lack of health impacts. EPA focuses on sizes 10 microns or less for regulatory scrutiny. If the material were extremely soluble (probably passes through the gastrointestinal tract within 24 to 48 hours), the material could enter the circulatory system.

- Particles in the immediate vicinity of the event would be detectable and personnel would be aware of the event quickly. Appropriate emergency procedures and actions to mitigate or remediate the effects (such as fixation and removal) would be implemented within a short period. Access would be restricted. Those injured by the event would be evacuated as soon as possible and treated away from the event.

The material of concern must be soluble to enter the food chain. Most materials that present a significant biological hazard (e.g., oxides of heavy metals) are insoluble when released. Furthermore, food crops are not grown on DOE sites. For particles larger then 10 micrometers AED but less than 100 micrometers, transport distances of a kilometer or so are possible and deposition from the plume could result in surface contamination. At most DOE facilities involved with radioactive materials, the site boundaries are farther away than 1 kilometer. Diffusion or dispersion would significantly dilute the concentration and reduce the direct radiation hazard before the material of concern reaches the site boundary. The WM PEIS radiological transportation accident analysis takes more than the inhalation pathway into account, including external radiation and food ingestion, as described in Volume IV, Appendix E, Sections E.5.1.2.1 and E.5.1.2.2.

5.2.4 Facility Accidents Risks

The hazardous chemical accidents do not deal with particulates. The primary hazard is from vapors that deposit little, if any, on vegetation or the ground. Further, any vapor that does deposit will most likely evaporate over time before consumption becomes an issue.

Thus, although the commentor is correct with respect to the potential radiological hazard of larger particles, the actual hazard is much less due to the factors described above. With the high level of conservatism of the assumptions used to arrive at the source terms from the postulated events, DOE believes that it has not underestimated the risk from waste management facility accidents.

Comment (1550)
The bounding accident scenario associated with incineration is not believable.

Response
Chapters 6, 7 and 8 in Volume I present information about treatment facility accidents. Further details about the treatment facility accident scenarios are presented in Appendix F (Volume IV). The incineration technology used in the WM PEIS is conceptual. Incineration has a potential for accumulations and leaks of combustible gas, with a possibility for explosions. Although the explosion scenario is unlikely to occur, DOE used the conservative assumption that dispersion of radionuclides via an incinerator explosion could occur and, therefore, includes other credible accident scenarios.

Comment (2031)
The analysis should include a “worst case scenario” involving “risk of upset” by earthquake and or fire.

Response
Human health risks due to accidents caused by seismic events (earthquakes) and fires at conceptual facilities are evaluated in the WM PEIS in Sections 6.4.3, 7.4.3, 8.4.3, 9.4.3, and 10.4.3. Appendix F in Volume IV describes the accident analysis performed for the PEIS. DOE examined a full range of accidents, including accidents initiated by earthquakes and fire.

Comment (2136)
If nuclear waste were to spread as a result of an accident at BNL, people would not be able to escape it by leaving Long Island because the only escape routes are a road to the west, or by boat or plane.

Response
The WM PEIS evaluated the potential health risks resulting from a low-level mixed waste treatment facility accident at BNL. As discussed in Volume I, Section 6.4.3.2, releases of radionuclides for this accident scenario were estimated to produce a dose to the maximally exposed individual of the offsite population of 0.002 rem. This exposure is estimated to produce a risk of excess latent cancer fatality of about 1 in 1 million. The estimated collective dose to the offsite population living in the BNL 50-mile-radius region of influence was 20 person-rem. Less than one excess latent cancer fatality was estimated to result from this exposure. Additional details of the facility accident analyses are provided in Appendix F in Volume IV. Note that there are no credible waste management facility accident scenarios that would require the evacuation of Long Island.

To assure health and safety and emergency preparedness, DOE sites have emergency plans and equipment to respond to accidents and other emergencies. DOE requirements for emergency response preparedness are contained in DOE Order 151.1. DOE provides for Radiological Assistance Program teams consisting of trained experts equipped and prepared to quickly respond to an accident and assist local emergency response personnel, if requested. Emergency response plans are required by State and local authorities to deal with any emergency situation. DOE, the U.S. Department of Transportation, and the Federal Emergency Management Agency can assist in review and modification of these plans if necessary. Anyone interested in knowing the details of the plan should contact DOE representatives at the site.

DOE participates with other Federal, State, and local authorities to sponsor and occasionally fund various radiological emergency response training courses throughout the United States. These courses are usually provided for the benefit of local, State, and Tribal authorities responsible for public safety and emergency response to natural disasters or man-made accidents. Funds for these training sessions come from Federal grants or direct allocation of tax dollars.

Comment (2203)
The PEIS should be revised to list all accident occurrences at Hanford over the past years.

Response
DOE considered past accidents in developing the accident scenarios and frequencies used in the WM PEIS analysis and used existing facility documentation and accident data for general guidance in developing source terms. DOE also used site-specific documentation to help identify the frequencies and potential risk importance of accident initiators affected by site characteristics. However, providing a complete list of past accidents involving waste management facilities, operations, or processes was beyond the scope of the facility accident analysis.

Appendix F in Volume IV of the WM PEIS provides a detailed explanation of the accident analysis performed for the PEIS. The facility accident analysis was performed in compliance with the most recent DOE guidance, considering the spectrum of accident sequences that could occur during activities covered by the PEIS and used a graded approach emphasizing the risk-dominant scenarios to facilitate discrimination among the PEIS alternatives.

Comment (2565)
Volume IV, Section F.2.6.1. How were the "relative treatability category inventories" weighted? Are there tables or references available?

Response
The paragraph in question has been revised to say, "The physical composition of MAR in storage was defined by volume weighting the treatment category inventories at each site." Further information is contained in the three volume technical report *Analysis of Accident Sequences and Source Terms at Waste Treatment and Storage Facilities for Waste Generated by U.S. Department of Energy Waste Management Operations*, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2566)
Volume IV, Section F.6.2.2, states that site waste inventories are expected to increase, or at least, not decrease over the next 10 years. Wouldn't selection of an alternative affect inventories?

5.2.4 Facility Accidents Risks

Response
Complex-wide treatment of waste would not begin until the end of the 10-year period assumed to be needed to conduct any additional sitewide and project-level NEPA analyses necessary, to design and construct or modify facilities, etc. (referred to in the PEIS as the 10-year construction period). During this time, site inventories are expected to remain the same or increase.

Comment (2567)
Volume IV, Section F.7.2, states that the hazardous waste constituents of concern were chosen from toxicological analyses. What types of toxicological analyses?

Response
DOE has revised Section F.7.2 to explain that the hazardous waste constituents of concern were chosen from the U.S. Department of Transportation list of poison inhalation hazards and from toxicological analyses for the determination of chemical wastes representative of potentially life-threatening health effects. Further detail on the toxicological analyses can be found in the report by Hartman, et al., which is referenced in Section F.7.2.

Comment (2573)
Please explain the following sentence, which appears on Page 20 of the Draft PEIS Summary document: "Since significant incineration data are available, public interest is heightened, and accidents were considered representative and bounding of other treatment processes."

Response
This passage was not intended to be a sentence, but appears to be one because of an editorial error. DOE corrected the error and the sentence in the Final WM PEIS (see Section 3.2.1, Summary document) clearly explains DOE's reasons for selecting thermal treatment for the facility accident analyses for four of the five waste types.

Comment (2608)
Why are there no storage facility accident analysis data for INEL (storage of canisters at INEL is a part of all but the No Action Alternative)? As many as 8,500 canisters will be produced and stored at INEL until a repository is opened.

Response
The basic decision in the WM PEIS concerning high-level waste is whether storage facilities for treated high-level waste should be constructed at the four high-level waste sites or whether larger storage facilities should be built at fewer sites. Under all alternatives, the treated high-level waste at INEL remains onsite. Storage facility accidents for INEL's immobilized high-level waste were not included because they would not differentiate between the different high-level waste alternatives.

Accidents involving high-level waste treatment and storage were analyzed in the SNF/INEL EIS, Volume II, Part A, Section 5.14.3. An updated analysis of storage facility accidents will be provided in the High-Level Waste Management EIS, scheduled to be completed by the end of the year 2009, per the agreement between the State of Idaho and DOE.

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Comment (2618)
Accident analyses were done only for the Regionalized Alternatives, with very significant consequences from low probability worst-case accidents. If similar analyses had been done for the other alternatives, it might have helped to discriminate between the alternatives.

The risk analysis of worst-case scenarios for hazardous waste storage facility accidents *under the Regionalized alternatives only* may not provide an accurate representation of true risk. It neglects important input parameters such as flight paths, population densities, prevailing meteorological conditions, seismic event frequencies, etc.

Response
Section 10.4.3 in Volume I of the WM PEIS describes the results of the hazardous waste storage facility accident analyses. As explained in this section, facility accidents were analyzed only under the Regionalized Alternatives because these alternatives have the largest estimated inventories of waste and, therefore, the largest potential consequences following an accident. DOE believes that analyzing only these alternatives should provide a screening-level estimate of the upper bound of potential risks under all alternatives.

Comment (2623)
Volume I, Chapter 11. Accidents with a common initiator, such as an earthquake, are not considered in this EIS and were not considered in the INEL Site Wide EIS. This needs to be done.

Response
The WM PEIS did consider accidents with a common initiator, such as a natural phenomenon, in the individual waste-type chapters (see, for example, Section 6.4.3) and in Appendix F (Volume III).

The WM PEIS did not consider the potential impacts of facility accidents with common initiating events in the combined and cumulative impact analysis presented in Chapter 11, because the impacts would not be additive and/or are too speculative (with regard to future accidents) to provide a meaningful analysis.

Comment (2647)
Is the supplemental analysis of transuranic waste treatment-related accidents available yet? (See Volume III, page D-223, paragraph 3.)

Response
The transuranic waste treatment facility accident analyses are included in Section 8.4.3 in Volume I, Appendix D in Volume III, and Appendix F in Volume IV of the Final WM PEIS.

Comment (2680)
Volume IV, Section F.2.2.1. What was the reason for removing storage of high-level waste from consideration in the analysis when it could cause immediate and appreciable effects?

Response
Section F.2.3.1 in the Final WM PEIS was revised to indicate that the only reasonable threats that could cause immediate and appreciable effects via nonairborne pathways are criticalities involving the

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various waste types, not stored volumes of high-level waste. DOE has restricted analyses of high-level waste accidents in the PEIS to those dealing only with interim storage of high-level waste canisters.

Comment (2683)
Just because all sites will achieve their maximum waste inventory, independent of the waste management alternative selected, does not mean that the nature (i.e., chemical and radiological composition) of such waste will be similarly unaffected (see Volume IV, Section F.2.2.3). Nor does it mean that the time to attainment of maximum inventory is independent of the alternative selected. Because the composition of the waste and the time-to-attainment of maximum inventory could have significant implications for the health-risk analysis, the discussion of the impact on material at risk from not analyzing storage prior to treatment (current storage) should be broadened. Will the uncertainties in the data that are reflected in estimates of absolute risk still cancel each other out in estimates of relative risk to provide "a sufficient and scrutable basis for discriminating among alternatives," as stated in Section F.1.1?

Response
It is true that the composition of waste and the time to attainment of maximum inventory could have some health-risk implications. However, these health risk implications might occur regardless of the waste management alternative DOE selects.

The WM PEIS assumes that all sites will store their wastes onsite for 10 years, during which time the construction of any required treatment or disposal facilities would have been completed. The amount of waste in storage at any given time is the sum of the waste that has been stored prior to the present, plus any waste generated up to the time in question, minus any waste sent offsite, treated, or disposed of. Therefore, the maximum amount of waste in storage occurs at the time immediately before any waste was sent offsite, treated, or disposed of (i.e., 10 years). This maximum storage volume is, therefore, independent of any alternatives, and analysis of current storage accidents was judged not to be relevant to the WM PEIS decisionmaking process. Therefore, uncertainties of the absolute risk from current storage will not provide a basis or measures for discriminating among the WM PEIS alternatives.

Comment (2685)
Volume IV, Section F.2.4.1.1. The assignment of damage fractions depends on the chemical forms of the material at risk. To include current storage wastes [wastes stored prior to treatment] could impact the calculation of the source term release fraction.

Response
DOE assumed that all sites will store their wastes and reach their maximum storage capacities before Department-wide treatment begins. Storage conditions are the same for all alternatives. As indicated in Section F.2.2.3, storage accidents are discussed (separately from treatment accidents) in each of the Volume I waste-type chapters based on information from recent safety analysis reports and NEPA documents.

Comment (2686)
Volume IV, Section F.2.4.1. The possibility of chemical-chemical interactions and/or the health effects of hazardous decomposition products do not appear to have been addressed.

Response
Waste decomposition products, including chemical-chemical interactions, were considered in the accident screening process. Section F.2.7.2.2 in Volume IV of the WM PEIS states that explosion scenarios for packaged wastes can be postulated for low-level mixed waste, transuranic waste, and hazardous waste. Most low-level mixed waste accident analyses focus on storage of miscellaneous organic liquid waste, where blankets of inert gas serve to preclude ignition and detonation. Most transuranic waste analyses focus on the accumulation of hydrogen or methane from radiolysis of organics, with subsequent ignition and detonation. Inadvertent chemical reactions are considered for hazardous waste, but should be unlikely because waste sorting and segregation at the point of generation act to preclude combining reactive materials and oxidants. Post-processing storage is less of a problem than pretreatment storage because of the greater stability of the final forms (for example, grout).

Comment (3081)
In Table 7.4-15, under Centralized Alternative 5, at Hanford an offsite population dose of 0.1 person-rem is predicted to cause five cancer fatalities, while a worker dose of 1,500 person-rem is predicted to cause only 0.6 cancer fatality. Please explain.

Response
Table 7.4-15 in the Draft WM PEIS is now Table 7.4-16, Volume I, in the Final WM PEIS. DOE corrected the table to show that under Centralized Alternative 5 for Hanford, the offsite population dose would be approximately 10,000 person-rem [1E + 04].

Comment (3258)
The analysis of risks from the incineration of low-level waste and low-level mixed waste does not include the risks due to upset conditions. Upset conditions at incinerators are the largest contributor to risks and are common occurrences. There is also no analysis of the health impacts of the formation of products of incomplete combustion or metals emissions.

Response
Upset conditions are generally not considered accidents; they are considered "abnormal events," because their occurrence is expected during the life of the facility, and they usually do not result in substantial onsite or offsite consequences. DOE implements physical and administrative controls on facility operations and activities to minimize the likelihood and impacts of these events. Personnel are trained and drilled on how to respond to and mitigate potential releases during upset conditions.

A review of the various accidents associated with incineration is provided in Appendix C of the technical report *Analysis of Accident Sequences and Source Terms at Waste Treatment and Storage Facilities for Waste Generated by U.S. Department of Energy Waste Management Operations*, which is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final PEIS. This appendix indicates that incineration process upsets that have occurred historically did not result in substantial onsite or offsite impacts.

DOE also evaluated the effects of emissions from the incineration of hazardous waste, including those of combustion products. Section D.3.3.2 in Volume III describes special assumptions used in the hazardous waste risk analysis. This discussion notes that the source term for chlorinated organics, metals, and combustion products emitted in incinerator flue gases was developed from a set of RCRA

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trial burn data from a commercial facility that currently processes similar DOE-generated hazardous waste. Table D.3.3-2, which lists the constituents of the hazardous waste source term, includes dioxins and metals.

Comment (3388)
Volume III, Section D.3.3.8.1. Why does the earthquake accident scenario contain only noncarcinogens? Why would carcinogens (e.g., cadmium) be released in an airplane impact and *not* in an earthquake scenario or in the incinerator explosion scenario?

Response
The statement in Appendix D, Section D.3.3.8.1, that no carcinogens are assumed to be released in earthquake scenarios involving hazardous waste was inaccurate, and has been deleted from the PEIS. Carcinogens as well as noncarcinogens are assumed to be released.

Comment (3389)
Volume III, Section D.3.3.8.7. Why is there no cyanide in the incinerator explosion source term? Where (reference) is this scenario modeled?

Response
DOE revised Section D.3.3.8.7 to clarify why cyanide was not included in the incinerator explosion accident source term for hazardous waste treatment. During explosions, cyanide is converted to cyanate, which is less toxic. The incinerator explosion accident scenario is modeled in Appendix F in Volume IV. Additional supporting information is presented in *Analysis of Accident Sequences and Source Terms of Waste Treatment and Storage Facilities for Waste Generated by DOE Waste Management Operations*, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3674)
What is DOE's basis for stating that "the treatment of carcinogenic effects of exposures resulting from accidental chemical releases has added uncertainty because the carcinogenic risk is estimated for short-term (1-hour) exposures." A cleanup crew might have an exposure for well over 1 hour.

Response
The carcinogenic risk to an individual due to an accidental release of chemicals represents risk due to a once-in-a-lifetime exposure. There are no generally accepted values for carcinogenic risk due to acute exposures of that kind where the exposure might last on the order of minutes or hours or even days. Estimates in this WM PEIS of such acute carcinogenic risk are developed from established values accepted by EPA for long-term chronic exposure (resulting from exposures of many years). This extrapolation of health effects estimates from chronic exposures to acute exposures is controversial and adds additional uncertainty to the risk assessment.

In addition, the emergency responders who would clean up any spill would be trained and equipped to deal with any carcinogenic risk from chemicals resulting from the spill.

Comment (3779)
DOE needs to consider potential tornadoes in its facility design.

Response
The WM PEIS is a national and programmatic study to assist DOE in formulating and implementing a strategy to manage its radioactive, mixed, and hazardous wastes. Due to its programmatic nature, the document assumes generic facility designs. The WM PEIS facility accident analyses described in Appendix F in Volume IV consider accidents caused by natural phenomena, including earthquakes and tornadoes. Questions of actual facility design relating to a specific site or project, and the potential impacts of natural phenomena (such as tornadoes) on those facilities, will be addressed in sitewide or project-level NEPA reviews.

Comment (3909)
DOE needs to explain the worst-case accident scenario, and if such an event were to occur, how the public would be notified.

Response
Section 6.4.3 in Volume I presents the summary results of a low-level mixed waste treatment facility accident. Maximum consequence accidents were investigated with details of the accident scenario, and the results of the analysis being presented in Appendix F. Determination of a maximum consequence requires assessment of both the likelihood and the severity of plausible accident scenarios that could present a significant health hazard to either the workforce or the public. The spectrum of accident scenarios includes all accidents important to risk, from low-frequency events with potentially high consequences (as typified by accident sequences associated with severe natural phenomena, such as earthquakes) to relatively high-frequency events with very low consequences (as typified by routine industrial accidents). Emergency response plans and procedures currently in place at the DOE sites would be updated if new waste management facilities were to be built.

Appendix F describes the analytical approach to treatment and storage facility accidents. The process used to develop maximum consequences is addressed in Section F.2.4 in Volume IV of the WM PEIS. Section E.5.1.2 describes the accident assessment method for transportation activities.

When events occur that represent a specific threat to workers or the public due to the release or potential release of significant quantities of radiological or hazardous material, an Operational Emergency is declared and classified as either an Alert, Site Area Emergency, or General Emergency, in order of increasing severity. Alert is the lowest classification of an Operational Emergency. As such, the minimum criteria for declaring an Alert represents the threshold level of radioactive release for which notifications of Operational Emergencies are required.

An Alert is declared when the radiation dose exceeds either "the applicable Protective Action Guide... at or beyond 30 meters from the point of release to the environment OR a site-specific criterion corresponding to a small fraction of the applicable Protective Action Guide...at or beyond the facility boundary or exclusion area boundary," and "it is not expected that the applicable Protective Action Guide...will be exceeded at or beyond the facility boundary or exclusion zone boundary" (see DOE Order 151.1, Chapter V, Section 3.a).

Increasing in severity, exceeding the Protective Action Guide at or beyond the facility boundary or exclusion zone boundary will result in the declaration of a Site Area Emergency and corresponding notifications to State and local emergency response organizations (see DOE Order 151.1, Chapter V, Section 3.b). Similar notifications are made when Protective Action Guides are expected to be

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exceeded at or beyond the site boundary resulting in the declaration of a General Emergency (see DOE Order 151.1, Chapter V, Section 3.c).

Protective Action Guides for releases of radioactive materials are specified in the EPA's *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents* (EPA 400-R-92-001, October 1991). Notifications of Operational Emergencies involving releases of radioactive materials are made to State and local emergency response organizations within 15 minutes of the declaration of the emergency (see DOE Order 151.1, Chapter VIII, Section 4.a). The State and local emergency response organizations notify the public accordingly. DOE does not typically directly notify the public of radioactive releases, but notifies the public indirectly through notifications to State, Tribal, and local organizations. Additional guidance concerning emergency notifications is available in the Emergency Management Guide, *Interim Guidance for Notification* (7/18/92), which is currently being revised to correspond to DOE Order 151.1.

DOE does, however, recognize the need to provide accurate, candid, and timely information to site workers and the public during all emergencies, and requires the establishment of an Emergency Public Information Program. Requirements for this program are described in DOE Order 151.1, Chapter IX. Additional information concerning emergency public information is available in the Emergency Management Guide, *Guidance for Public Information* (6/26/92), which is currently being revised to correspond to DOE Order 151.1.

Comment (4002)
I do not wish to imply that the agency cannot and should not manage the waste management and environmental restoration of former nuclear defense sites scattered nationwide. DOE is the only agency with collective information from a forty year history that would allow accurate site characterization from past and present activities. DOE is inclined to be much more information friendly to the public than private corporations can reasonably be expected to be. Most importantly, DOE is the only Federal agency with extensive information and guidance procedures, when implemented, to effectively manage the total energy needs of the Nation for the present and future.

Response
Thank you for your comment.

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Comment (37)
The statements regarding air quality impacts in Section 4.3.2 of the Summary document are contradictory.

Response
Section 4.3.2 of the WM PEIS Summary document discusses two general categories of air pollutants: criteria air pollutants and hazardous air pollutants. As discussed in Section 4.3.2 in Volume I, criteria air pollutants are carbon monoxide, sulfur dioxide, particulate matter, ozone, nitrogen dioxide, and lead. Hazardous air pollutants include radionuclides, and toxic air pollutants such as mercury, and beryllium. The statements in the Summary document that seem contradictory refer to different categories of air pollutants. The emissions of hazardous air pollutants are estimated to be below standards at every candidate waste management site. Emissions of certain criteria air pollutants could cause adverse air quality impacts at some sites.

Comment (512)
Concerning the Centralized Alternative for transuranic waste treatment at WIPP, the negative air impacts from incineration need to be reviewed, and the assumption(s) used clarified.

Response
Under the Centralized Alternative for transuranic waste, DOE assumed that all contact-handled transuranic waste would be sent to WIPP for thermal treatment to meet RCRA land disposal restrictions, and that remote-handled transuranic waste would be treated at the Hanford Site and ORR prior to shipment to WIPP for disposal. The air quality impacts (emissions) estimated for WIPP can be traced to two problematic waste streams: (1) the isotope americium-241 received from LANL and (2) plutonium-238 received from SRS. Both of these sites would experience similar impacts if transuranic waste is treated at their facilities. Discussions of the selection of transuranic waste treatment sites and details of the air quality analysis are contained in Volume I of the WM PEIS, Sections 8.3.5 and 8.5, respectively.

Comment (579)
There should be a concern about air emissions from nuclear materials until all positive controls and monitors are established and work effectively.

Response
DOE is committed to managing its nuclear materials and wastes to protect human health and the environment, which includes controlling air emissions from these materials. Air emissions data presented in WM PEIS Volume I, Table 4-4, for each candidate site indicate that the radiation dose from airborne radionuclides to a maximally exposed individual and to the population around each site are well within regulatory limits.

When DOE is constructing specific facilities, it would institute administrative controls and install state-of-the-art pollution control and monitoring equipment to limit air emissions from nuclear material.

Comment (1553)
The air quality section of the WM PEIS needs to examine airborne dust and emissions specific to the dry climate of New Mexico.

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Response
The WM PEIS evaluates air quality impacts for criteria pollutants, radionuclides, and other hazardous and toxic air pollutants. The WM PEIS does not evaluate fugitive dust emissions from construction and operation activities. These potential impacts are best evaluated sitewide and project-level NEPA analyses.

Comment (1720)
Volume I, Section 4.4.9. These pages state that the Eastern Tennessee-Southwestern Virginia interstate air quality region is an attainment area per EPA classification. For the hazardous waste treatment plans, what incremental impact would be experienced in air emissions because of increased incineration under the Decentralized and Regionalized Alternatives? (Table 10.3-3 and 10.3-7). Has the situation been studied to ensure that this region will still stay an attainment area for the alternatives considered. What would be the incremental increase in the cost structure, in equipment and employee training, to adequately prevent/contain additional emissions from incineration? Also, [the commentor does] not concur with the statement that the primary source of radionuclide emissions is the Toxic Substances Control Act Incinerator for the ORR. Please correct this statement.

Response
DOE is committed to managing its wastes to protect human health and the environment, including the regional air quality surrounding the Oak Ridge Reservation (ORR). Volume I, Section 10.5.2, of the WM PEIS addresses potential emissions impacts of criteria air pollutants from the operation of a treatment facility. Estimated emissions from the treatment facilities at ORR under the Regionalized Alternatives would be only slightly more than 10% of the PM_{10} air quality standard. The PM_{10} air quality standard would not be exceeded by this incremental increase.

Table 11-18 in Volume I indicates that projected air quality impacts from the combined waste management actions at ORR would require new permits for nitrogen dioxide, PM_{10}, and vinyl chloride emissions. Increases in these air pollutants would not change the attainment status of the region.

The statement, "...the primary source of radiological emissions is the Toxic Substances Control Act (TSCA) Incinerator," applies to the K-25 Site and is referenced from Volume 1 of the Oak Ridge Reservation Environmental Report for 1992, pp 3-13 and 3-14.

Comment (1745)
ORR shows an exceedance of 10% of the National Ambient Air Quality Standards (NAAQS) for and according to the text in Section 6.5.2. Table 6.5-3 lists PM_{10} and NO_2. This needs to be clarified.

Response
DOE corrected the text in Volume I, Section 6.5.2, of the WM PEIS. This section now states that no site was estimated to equal or exceed 10% of the National Ambient Air Quality Standards.

Comment (1750)
Volume I, Section 10.5.3. Vinyl chloride would exceed the EPA ambient air concentration guideline by 322% for ORR. Please address how Regionalized Alternative 2 for hazardous waste (could remain a viable alternative) given these numbers.

Response
The WM PEIS assumed the use of a number of generic technologies for the treatment of hazardous waste, which are described in Volume I, Section 10.2.2. The results of the hazardous waste air quality impact analysis listed in Table 10.5-3 indicate that the estimated emissions of vinyl chloride at ORR would be more than three times the standard under Regionalized Alternative 2. If DOE selected this alternative for the management of hazardous waste, it would ensure the use of a treatment system tailored for ORR that included additional control measures to reduce actual emissions of vinyl chloride to acceptable levels.

Comment (1775)
Section 5.3.2 of the Draft WM PEIS Summary document states that emissions of radionuclides were estimated to be below the applicable standards at every site. The same paragraph previously states that adverse air quality impacts could result at two facilities (PGDP and NTS), which appear to have less low-level waste than Hanford. Whose standards is DOE referring to and will air quality be impacted? Why will the standards be violated more at NTS and PGDP than at Hanford, which has more low-level waste?

Response
Section 5.3.2 of the Summary document was revised and now states that the management of low-level waste does not affect the air quality at most sites. However, decentralized treatment and disposal at BNL, decentralized or regionalized treatment and disposal at PGDP, or centralized disposal at NTS could cause adverse air quality impacts requiring additional emission control measures for criteria pollutants. Emissions of radionuclides were estimated to be below the applicable standards at every site.

Section 7.5 in Volume I describes the applicable standards used for air quality for the PEIS analysis. These standards would not be exceeded at Hanford because the region around the site is in an attainment area and, therefore, has less stringent emission standards.

Comment (1824)
Not enough information is provided on air quality impacts. Section 3.2.2 in the Summary document states that DOE evaluated impacts at each site, but no data are given. There are no emission levels or impacts given. Also, there are no details given on the new facilities or modifications to existing facilities that would be required for each alternative.

Response
The Summary document should have said that DOE evaluated impacts at each *major* site. The PEIS does not report potential impacts at nonmajor sites because they would be small. The focus of the PEIS is on major sites, as explained in the Summary document (Table 1.4-1) and in Volume I, Table 1.6-1.

Although the detail requested by the commentor is not included in the Summary document, for major sites, Section 5.4.2 in Volume I and Section C.4.2 in Volume III, describe the methods used to estimate potential impacts to air quality. Sections 6.5, 7.5, 8.5, 9.5 and 10.5 in Volume I and the Site Data Tables in Volume II describe the potential impacts from alternatives for the management of low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste. Chapter 11 in Volume I describes the potential combined and cumulative impacts on air quality. Additional detail is

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included in supporting technical reports. These technical reports are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2451)
A commentor provided the following comments with respect to Prevention of Significant Deterioration (PSD) and State of Idaho air pollution regulations.

Many PSD requirements were not specifically addressed in the EIS. For example, under the Centralized Alternative, incineration of all wastes might require a PSD permit. In that case, Best Available Control Technology (BACT) has to be considered in addition to incremental analysis, ambient monitoring, Air Quality Related Values (AQRVs) issues, Class I impact assessment, and analysis of the impact of growth in the area where the major facility would be located, etc. In Volume II, when comparing with a standard (Table II.1-13), National Ambient Air Quality Standards (NAAQS) might be the controlling factor at many sites; however, if PSD is triggered in any area, the most stringent standards are defined as PSD increments developed by EPA for Class I, II, and III areas for PM_{10}, sulfur dioxide, and nitrogen dioxide (PSD has been triggered at INEL).

In determining the PSD increment consumed (after the baseline date), the State of Idaho includes cumulative and contemporaneous emissions over the last 10 years from minor sources or area sources, in addition to major sources. If only cumulative and contemporaneous emissions from major sources (after the baseline date) are utilized, the PSD increment consumption will be underestimated.

The word "net" is missing from the description of emissions when a PSD analysis is performed. If the sum of contemporaneous emissions from modifications exceeds the significant level, a PSD review is required.

INEL has triggered PSD baseline dates for NO_x, SO_2, and particulate emissions. PSD regulations limit cumulative air quality degradation after the baseline date. The baseline conditions have not been analyzed and quantified. Therefore, analyses of impacts from proposed options were not prepared in a manner in which they can be compared with the applicable regulatory requirements.

DOE needs to address the impact on AQRVs in the Final PEIS. DOE should contact the National Park Service in identifying potential AQRVs.

All emission sources must comply with the visible emissions standards in Idaho in accordance with IDAPA 16.01.01.625.

The PEIS should include previous analysis of consumed increments at Craters of the Moon Wilderness Area. PSD baseline dates date back to 1981 for SO_2 and particulate emissions, and 1992 for NO_x.

Response
The reviewer's comments in regard to how and why PSD impact analyses are performed are correct. However, the actions discussed in the WM PEIS are programmatic in nature and are meant to be used as a screening-level analysis for determination of potential adverse impacts. The PEIS air quality analysis was meant to establish a baseline for comparison of all the DOE facilities for which actions are considered and to identify the sites and facilities that have potential areas of air quality concern.

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DOE revised Volume III, Section C.4.2.1.3.1.1, to indicate that the air quality analysis should not be viewed as a refined PSD analysis, and that such an analysis is site-specific and would be performed prior to implementation of any waste management activity at a potential PSD site. DOE will comply with all applicable laws and regulations, including permitting requirements, in implementing its waste management activities.

Comment (2454)
The WM PEIS should analyze deposition-based pathways for emissions from technology alternatives, such as incineration. The effect, for example, of an incinerator on the ambient atmosphere is subject to emissions, stack parameters, and local meteorological conditions. These variables should be considered in the analysis. Modeling at the boundary of INEL instead of at grazing sites within INEL (and at other sites) would potentially lead to an underestimation of impacts from deposition-based pathways. This is an even greater potential problem when the Land Use Plan is considered and the site boundary shrinks.

Response
The WM PEIS used a deposition-based exposure analysis for human health risk analysis, in addition to an analysis of exposure based on inhalation. Volume I, Table 5.4-1, provides the exposure pathways for affected populations and individuals for air emissions from treatment activities and Figures 5.4-1 through 5.4-4 do the same for different receptor groups. Details are provided in Section D.2.4 in Volume III. The modeling used for the human health risk analysis was based on a number of factors, including those mentioned in the comment. Section D.2.7 in Volume III describes the modeling in greater detail.

Currently, grazing is allowed within the site boundary at some sites, but only in accordance with strict guidelines. For example, INEL allows sheep and cattle to graze within the site boundary, but to avoid the possibility of milk contamination, does not allow dairy cattle to graze. The grazing programs are strictly controlled and monitored to ensure the safety of the ranchers and livestock. At INEL, livestock are not allowed to graze within two miles of a nuclear facility.

Although impacts to grazing livestock were not specifically analyzed in the WM PEIS, impacts to an indicator mammal were included in ecological impacts analyses. These analyses found that major impacts to the indicator species from air deposition of contaminants are unlikely. Therefore, major impacts to other mammals, including livestock, are unlikely.

Impacts due to changes in the site boundary in association with implementation of the site land use plan would be evaluated in site-specific NEPA documents.

Comment (2455)
It is not clear whether background levels were considered in the analysis of air quality modeling for specific activities in the alternatives. Each site has a background air quality value and any additional activity should meet the Federal and/or State standards by summing up the ambient impact of the activity and the background.

Response
The air quality analysis was performed at a programmatic level, which is a less detailed level of analysis than suggested by the commentor. The goal of the analysis was to screen for major impacts and provide a means to compare air quality impacts across alternatives. Background levels were not considered in the

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presentation of the impacts analysis results. Background-level data are presented for each site, however, in the WM PEIS Affected Environment Technical Report, which is available in DOE public reading rooms listed in Volume I, Section 1.9, of the Final PEIS. Due to the variability of data (differences in concentration periods, or lack of comparable data), DOE did not add background values to impact values in the belief that sites with data would be unfairly penalized over sites with no background data.

The analysis performed for the WM PEIS used trigger levels for permitting review for criteria pollutants, comparison to NAAQS concentrations (without background) for criteria pollutants, comparison to the 10 mrem per year NESHAP for radionuclides (without consideration of other DOE facilities), and comparison to the hazardous air pollutants and toxic air pollutants standards (without background). Impacts to air quality that include consideration of background conditions and other actions at the site are included in the combined and cumulative impacts section (Chapter 11 in Volume I of the WM PEIS).

Comment (2456)
If a facility cannot comply with the specific air quality regulatory standards and requirements, that alternative cannot be selected, despite any advantages of that facility over another facility. This would affect the other facilities and sometimes, a combination of alternatives would be the choice.

Response
The WM PEIS analysis is not intended to determine whether an action can or cannot comply with all applicable air quality regulations. The analysis only predicted areas of potential impact. There was no analysis of pollution control options or process parameter changes for the purpose of meeting regulations. The type of refined analysis necessary to determine compliance with regulations would be performed for a sitewide or project-level study.

Comment (2457)
Air quality and risk assessment have been evaluated together in the description in Volume III, Section C.4.2.1.2.1.2. The term "MEI" is used in radiological dose assessments; however, for hazardous air pollutants, it is not widely used.

Response
The air quality and health risk impacts assessments conducted for the WM PEIS used the concept of the maximally exposed individual (MEI) as one of the parameters evaluated to estimate potential impacts. The MEI is the hypothetical individual within the offsite population who has the highest exposure to airborne contaminants released from treatment and storage facilities. The MEI is assumed to be located at the point of maximum concentration of contaminants 24 hours a day, 7 days a week for the 10- to 20-year period of treatment operations analyzed in the WM PEIS. The MEI concept is used in regulatory reporting of radionuclide releases by DOE. It is also used by EPA in its NESHAPs regulations (40 CFR 61) to evaluate potential exposure from releases of hazardous air pollutants including radionuclides.

Comment (2458)
The behavior (transport, reaction, deposition, etc.) of hazardous air pollutants in the atmosphere is different than the behavior of radionuclides. Therefore, receptor locations for radionuclides would be different than those for hazardous air pollutants. Also, the synergistic effect of these materials must be considered.

Response
The MEI concept is used in regulatory reporting of radionuclide releases by DOE. It is also used by EPA in its NESHAP regulations (40 CFR 61) to evaluate potential exposure from releases of hazardous air pollutants including radionuclides. The WM PEIS acknowledges the differences between radionuclide and chemical exposures and discusses these differences in Volume III, Section D.2.6.3.

The WM PEIS used air dispersion models to estimate the environmental fate of radionuclides and hazardous air pollutants released from waste management facilities. Volume I, Section 5.1.2, contains a short description of the models used. GENII was used to evaluate radionuclide fate and transport and ISC2 was used to evaluate hazardous air pollutants. Table 5.1-1 contains brief descriptions of these models; additional details are presented in Section D.2.7.1 in Volume III.

The transport and transformation of radionuclide and hazardous chemical contaminants in the atmosphere is based on the physical and chemical properties of each contaminant. The models used conservatively estimate potential exposure in that they do not account for degradation of chemical contaminants (e.g., volatile organic compounds, chlorinated organics) in the atmosphere. Although the behavior of individual contaminants will differ based on their properties, these differences are likely to be small given the conservative and simplifying assumptions used in the analyses.

The health risk impacts analysis did not consider the potential synergistic or antagonistic effects of exposure to both radionuclides and hazardous chemicals, because not enough information exists on these effects. For purposes of analysis, the carcinogenic effects of exposures to more than one radionuclide were assumed to be additive across radionuclides, and the effects of exposures to different potentially carcinogenic chemicals were assumed to be additive across chemicals.

Comment (2459)
In the air quality discussion, only boilers and incinerators were discussed. If there are other technologies being considered, the emission rates from these operations should be identified.

Response
The WM PEIS analysis was based on the uniform application of currently available treatment, storage, and disposal technologies at each of the 17 major waste sites. Thermal treatment (incineration) was used as a generic technology in the WM PEIS analysis to allow a relative comparison of potential impacts across sites. Other technologies could be considered at each of these waste sites. For potential offsite impacts, emissions from boilers and incinerators were considered to have the greatest potential for adverse impacts. Other treatment technologies such as solidification, compaction, and aqueous treatment do produce emissions. However these emissions would be low and would not distinguish among the WM PEIS alternatives.

The specific technologies used at a site to implement an alternative will depend on a number of factors that will be further evaluated at the site and project level.

Comment (2460)
The State of Idaho toxic air pollutant rules are based on annual and 24-hour concentrations. There is no indication whether these or other State concentration standards were used in the analysis.

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Response
As stated in Section 5.4.2 in Volume I of the WM PEIS, the estimated concentrations of toxic air pollutant concentrations were compared to applicable EPA or State ambient concentration guidelines. Section C.4.2.1.2.2.2 in Volume III provides further detail on the comparison process. The WM PEIS did not identify individual State regulations in the air quality impacts sections. The Idaho air toxics regulations are referenced in the WM PEIS Affected Environment Technical Report, but are not presented in table format due to the extensive list of compounds in the regulation.

At the time the Draft WM PEIS air quality analysis was conducted, the IDAPA 16.01.01.586 regulations were proposed and not yet final. Therefore, they were not used in the analysis. DOE recognizes that the regulations have now been accepted and are final. The impacts results in Sections 6.5.3, 8.5.3, and 10.5.3 in Volume I in the Final WM PEIS reflect comparison of air quality to the concentration limits in the final regulations.

Comment (2465)
The descriptions of meteorological data available for modeling, and how the data were used in air pollutant and radionuclide dispersion modeling are incomplete and inadequate. Historic DEQ critique and the Tiger Team report have documented that upper air data necessary to support dispersion modeling are not available from the INEL vicinity. The sources and uncertainties of upper air meteorological data used for modeling should be identified.

Response
The GENII model requires data concerning the direction, frequency, and stability of winds, as well as release parameters such as stack height, flow rate, and exit temperature. Upper atmosphere meteorological data are not required for the model. The joint frequency data used in the WM PEIS are documented in the PEIS Site Descriptions Technical Report, which is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final WM PEIS.

Comment (2468)
The discussion of cumulative effects of airborne radiological and non-radiological emissions should include visibility impacts and the additive nature of dose impacts from radionuclide sources.

Response
The WM PEIS air quality analysis was performed at a programmatic level, which is a less detailed level of analysis than would be performed for a site-specific NEPA analysis. The goal of the analysis was to provide a means to compare air quality impacts across alternatives for the major sites. DOE revised Volume I, Sections 6.5.2, 8.5.2, 9.5.2, and 10.5.2 of the WM PEIS to indicate that potential waste management activities at sites within 100 kilometers (62.5 miles) of a Class I area were analyzed to determine whether there could be impacts on visibility from site emissions. Class I areas are national parks, recreational and wilderness areas, and other locations that have excellent air quality. Visibility impacts are not considered major impacts for all of the 17 major sites. DOE understands that all sources at INEL must comply with the applicable visibility standards. Sitewide or project-level NEPA reviews would include analyses of impacts to visibility, where appropriate.

Volume I, Chapter 11, presents the cumulative dose impacts for airborne radiological emissions and air quality impacts from waste management activities and other activities at the sites.

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Comment (2469)
Fugitive dust modeling impacts should differentiate between fugitives from temporary activities (generally not subject to air quality impact limits other than reasonable controls) and permanent fugitive sources or those subject to air quality impact limits.

Response
Impacts from fugitive dust emissions from temporary activities such as construction were not considered as part of the WM PEIS analysis. Fugitive dust emissions from soil disturbance would be site-specific. These emissions would be related to the size of the area disturbed, soil type, meteorological conditions, and soil moisture. These types of emissions are typical of large construction projects and can be readily controlled by standard erosion control measures. Therefore, fugitive dust emissions from construction are best evaluated in sitewide or project-level NEPA analyses.

Comment (2470)
All air transport and diffusion modeling was prepared with models using the gaussian plume dispersion method. This assumption is not appropriate for long transport distances or in situations where the flow direction changes. Gaussian models can seriously underestimate impacts in these scenarios. Applications of wind flow models such as MESODIF imply that gaussian model predictions tend to underestimate impacts at INEL boundary locations.

Response
The modeling techniques used for INEL and each of the major waste management sites were general in scope and were not intended to represent exact conditions at individual sites. The GENII and ISC2 models used for simulating atmospheric dispersion in the WM PEIS have been extensively tested and used in the field of risk assessment. The programmatic nature of the PEIS precludes the use of site-specific, data-intensive atmospheric models. If INEL is selected as part of an alternative action, DOE will perform site-specific refined modeling, including the use of a wind flow model.

Comment (2471)
With regard to air quality, impact and dose assessment methodology does not provide enough information to verify the accuracy and representative nature of predicted impacts or doses. Descriptions and efficiencies of air pollution control systems should be documented. Sample calculations on how the emission rates were estimated should be included or referenced.

Response
Additional information on the impact assessment methodologies, including the impact methods and results, is presented in the supporting technical reports. These technical reports are listed in Section 15.2 in Volume I and are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. Pollution control assumptions for each waste type are also documented in the technical reports.

The sources used in estimating emissions in the WM PEIS include *Compilation of Air Pollutant Emission Factors, Volume II, Mobile Sources*, and the EPA-approved vehicle emissions models Mobile5a and PART5. These sources are cited in Section C.4.2.1.2.2 in Volume III, in which emissions estimation techniques, specific EPA models, and technical reports for calculating emission rates are described. Additional detail on the calculation of emissions from waste management facilities and transportation vehicles is included in the Impacts Methods and Results Technical Report.

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Comment (2481)
Volume I, Section 4.3.2, discusses compliance with primary and secondary national and State ambient air quality standards (AAQS) and lists the AAQS for criteria pollutants. In accordance with IDAPA 16.01.01.577, the State of Idaho has defined fluorine as a criteria pollutant, which is not addressed in the NAAQS in 40 CFR 50. Fluorine emissions are not quantified in Volume I, Section 4.3.2, or in Volume II, Table II-6.5-7.

Fluoride is a criteria pollutant under the State of Idaho Rules (IDAPA 16.01.01.577); this pollutant is not listed under criteria pollutants in Volume III, Section C.4.2.1.1.

Response
Section 4.3.2 in Volume I of the WM PEIS discusses the general approach to air quality and the affected environment. This section discusses only Federal criteria air pollutants, which are regulated at all the WM PEIS sites. State-established criteria pollutants, including Idaho's, are presented in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. DOE has modified the text of Section C.4.2.1.1 in Volume III to indicate that these are Federal criteria pollutants and that the State criteria pollutants are identified in the WM PEIS Affected Environment Technical Report.

There are no Idaho criteria pollutant standards for fluorine. However, fluoride is a State of Idaho regulated criteria pollutant and is listed as such in the WM PEIS Affected Environment Technical Report, in Volume I, Table 2.3-5. The compounds presented in Table II-6.5-7 in Volume II of the WM PEIS are those for which estimated emission rates were provided. No emissions of fluoride were identified during evaluation of the generic treatment facilities. Therefore, air quality impacts for fluoride were not estimated and are not presented.

Comment (2483)
The WM PEIS states that a region of influence (ROI) with a 50-mile radius was considered for analyzing potential air quality impacts. 40 CFR 52.21 states that no source may adversely impact the visibility in a Class 1 area. A source could be outside the 50-mile ROI radius and still adversely impact the visibility of a Class 1 area. Therefore, the analysis within the 50-mile ROI radius may not verify there is an absence of any adverse visibility impact in a Class 1 area.

In addition, the PEIS states that Class I areas are of special concern due to their proximity to national parks, wilderness areas, etc. Class I areas *are* national parks, recreational and wilderness areas, and other locations that have excellent air quality.

Response
DOE revised Volume I, Sections 6.5.2, 7.5.2, 8.5.2, 9.5.2, and 10.5.2 of the WM PEIS to indicate that potential waste management activities at sites within 100 kilometers (62.5 miles) of a Class I area were analyzed to determine whether there could be impacts on visibility from site emissions, as required by the regulations.

DOE also revised Volume I, Section 6.5.2, 7.5.2, 8.5.2, 9.5.2, and 10.5.2 to correct the definition of Class I areas.

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Comment (2484)
Model receptor grid spacing is very large. Please consider more dense grid spacing in areas where high impacts are predicted.

Response
The air quality analysis was performed at a programmatic level, which is a less detailed level of analysis than would be performed for a project-level NEPA analysis. The goal of the analysis was to screen for major impacts and provide a means to compare air quality impacts across alternatives. DOE believes the receptor grid spacing is adequate for the nature of the analyses that were performed.

Comment (2501)
Volume I, Section 5.4, describes adverse air quality impacts. Because it is not clear if adverse air quality impacts are defined as a violation of an air quality standard, further clarification is required.

Response
Volume I, Section 5.4, states that compliance with regulatory standards is not necessarily an indication of the significance or severity of the environmental impacts. It goes on to explain that DOE chose a 10%-of-standard threshold to highlight the sites where criteria air pollutants could result in adverse air quality impacts. The discussion details DOE's rationale for doing so.

Section 5.4.2 discusses the WM PEIS air quality impacts analysis methodology. Additional details of the air quality impacts methodology are in Section C.4.2 in Volume III.

Comment (2516)
Volume I, Table 5.4-2, states that emissions of the hazardous and toxic air pollutants are negligible. For hazardous and toxic air pollutants emissions to be considered negligible, there must be verification that the toxic air pollutant standards in IDAPA 16.01.01.585 and .586 are not exceeded.

Response
The hazardous and toxic air pollutants considered negligible were from construction emissions, national transportation corridor emissions, and total national emissions. The types of air pollutants emitted during construction are generally particulates and emissions from construction vehicle engines, which are not hazardous and toxic air pollutants. If the construction area were contaminated, it is possible that there might be emissions of hazardous and/or toxic air pollutants. However, in the WM PEIS, precise locations of facilities are not considered. DOE assumes that the precise facility locations would be chosen to avoid contaminated areas.

Emissions along national transportation corridors and total national emissions are from transport vehicles. These are emissions of criteria pollutants and not hazardous or toxic air pollutants.

For operations and maintenance emissions, which might be significant, Volume I, Table 5.4-2 of the WM PEIS indicates that concentrations of hazardous and toxic air pollutants were compared to applicable State ambient concentration guidelines, including those mentioned by the commentor. DOE will comply with all applicable State regulations when implementing its waste management activities.

The Idaho air toxics regulations are referenced in the WM PEIS Affected Environment Technical Report, but are not presented in table format due to the extensive list of compounds in the regulation. At the time

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the WM PEIS air quality analysis was conducted, the IDAPA 16.01.01.586 regulations were proposed and not yet final. Therefore, they were not used in the analysis. DOE recognizes that the regulations have now been accepted and are final. The impacts results in the Final WM PEIS reflect comparison of air quality to the concentration limits in the final regulation. The WM PEIS Affected Environment Technical Report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2517)
Construction activities that result in fugitive particulate emissions from paved and unpaved roads are not addressed. Only emissions from fuel use (transportation, incineration, etc.) are estimated.

Response
The WM PEIS evaluates air quality impacts for criteria pollutants, radionuclides, and other hazardous and toxic air pollutants. The potential impacts of fugitive dust emissions from construction activities are best evaluated in sitewide or project-level NEPA analyses. While it is true that fugitive dust generated by construction activities would vary from site to site, these impacts can be readily mitigated and, therefore, would not play a significant role in DOE's decisionmaking process.

Comment (2518)
The WM PEIS states that the focus of the air quality analysis was on estimating potential emissions of criteria air pollutants. Does "emissions" refer to predicted concentrations or emission rates utilized in the analysis?

Response
In the WM PEIS, criteria air pollutant emission rates for construction, operation, and transportation were compared to applicable emission rate increments, which have the potential to trigger prevention of significant deterioration permitting. In addition, criteria air pollutant concentrations for operation were compared to the applicable National Ambient Air Quality Standards.

Comment (2519)
It is not clear whether the potentially detrimental effects of building downwash were included in the WM PEIS air quality analysis.

Response
The effects of building downwash were not addressed, as this would require more detailed information about the facility, particularly its precise location. This type of detailed analysis would be more appropriately addressed in sitewide or project-level NEPA reviews.

Comment (2520)
Volume I, Section 5.4.2, states that a distinction between prevention of significant deterioration (PSD) increment limits and significant emissions rates should be made. The former are what the predicted impacts should be compared to in order to ensure that PSD standards are met; the latter help determine, by a comparison with actual or proposed emissions, whether PSD review is required.

Response
DOE revised the text in Section 5.4.2 in Volume I to clarify the difference between PSD increments (concentration based values) and PSD significant emission levels (emission rates in tons per year).

Comment (2521)
Volume I, Section 5.4.2, states that the stratospheric ozone analysis was carried out at the alternative level. The definition of the specific alternative level should be included.

Response
DOE revised the text in Volume I, Section 5.4.2, to indicate that an analysis of impacts to the stratospheric ozone layer was performed using estimates of total emissions of ozone-depleting substances for each alternative.

Comment (2523)
In Volume I, Section 5.4.2, the NO_2 ambient air quality standard (and also possibly the PSD regulations) is based on health effects of NO_2, not on potential ozone formation; compliance with the NO_2 standard does not guarantee compliance with the ozone standard.

In addition, in Volume III, Section C.4.2.1.3.4: For ozone analysis, what model was used for the estimation of NO_x and VOC emissions?

Response
The PSD and General Conformity Rule regulations for volatile organic compounds are for control of ozone and it is the combination of volatile organic compounds and NO_x, not just NO_2 by itself, that forms ozone. DOE assumes that if volatile organic compounds and NO_x each meet their respective PSD, General Conformity Rule, and NAAQS levels, then it can be reasonably assumed that ozone production would be minimal. The statement in Section 5.4.2 of the WM PEIS is not meant to "guarantee" compliance with the standard, but only to demonstrate that the possibility of exceeding the standard should be minimal.

In addition, no model was used to predict ozone levels for the WM PEIS. DOE used estimated emissions of volatile organic compounds and NO_x from proposed actions as a qualitative tool to estimate compliance with the ozone standards.

Comment (2531)
Because New Source Performance Standards are cited on page 5-41 of the Draft WM PEIS, 40 CFR 60 should be referenced following 40 CFR 52.21.

Response
DOE added the requested reference to Volume I, Section 5.4.2.

Comment (2536)
Volume I, Section 6.5, seems to imply that only PSD regulations apply in attainment areas. In attainment (and unclassified) areas, PSD issues might or might not apply. PSD review is required:

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- If an operation defined as a designated facility is listed among the Designated PSD Source Categories in 40 CFR Part 52 and emits or has the potential to emit, after controls, equal to or more than 100 tons per year of any air pollutant;

- If an operation emits or has the potential to emit, after controls, equal to or more than 250 tons per year of any air pollutant.

PSD review is also required if proposed emissions from a modification to an existing major source are greater than the significant emission rates listed in 40 CFR 52.21 (b) (23).

Response
DOE revised Section 6.5 in Volume I to clarify that PSD regulations *might* apply in attainment areas, and that this would be determined by the PSD review process. The PSD review process would occur after waste management sites are selected and in parallel with sitewide or project-level NEPA analyses.

Comment (2538)
Volume I, Section 6.10.2.4.1. For adverse air quality impacts from ANL-E, restricting use during periods of stagnant meteorological conditions is mentioned. What is the definition of these stagnant conditions? For example, what meteorological variables, such as wind speeds and stability categories, are used to define stagnation events?

Response
Emissions from the operation of low-level waste and low-level mixed waste facilities at ANL-E would not exceed air quality standards. Mitigation measures, possibly including use restrictions during stagnant conditions, would be implemented for adverse air quality impacts. Stagnant meteorological conditions might include, for example, low wind speeds and strong atmospheric instability. However, because the analysis showed that operation of waste management facilities for low-level waste and low-level mixed waste would not exceed the applicable standards under any alternative at ANL-E, no mitigation measures are discussed specifically for that site.

Comment (2549)
Volume II, Table II.1-14. Dioxins and furans are significant hazardous air pollutants. These chemicals are not addressed in the WM PEIS. These hazardous air pollutants are formed during incineration, which is selected as a treatment method for managing wastes. Incinerators are also regulated by New Source Performance Standards. Also, what is the selection process for hazardous and toxic air pollutants in this table?

Response
Hazardous and toxic air pollutants included in Volume II, Table II.1-14, are those modeled to remain in the treatment plant emissions after destruction by the treatment process. As described in the supporting technical reports, dioxins and furans were included in the source terms for low-level mixed waste, transuranic waste, and hazardous waste because these waste types include hazardous constituents. Therefore, dioxins and furans are included in the health risk estimates for these waste types. Because specific molecular forms of the contaminants were not known, hexachlorodibenzo-p-dioxin and hexachlorobenzofuran were used as surrogates for all dioxins and furans. The technical reports are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

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Comment (2550)
Volume II, Table II-6.1-9, states that when emissions are below 1%, the quantity of zero is listed. It is not clear if the 1% for a specific emission is referenced to total emissions. If so, further clarification is necessary. Also, benzene emissions might be less than 1.0%; however, the emission limit, in accordance with IDAPA 16.01.01.586, is 8.0E-4 pounds per hour. Therefore, an emission rate listed as less than 1% could still exceed the emission rate listed in IDAPA 16.01.01.585 for that specific chemical.

Response
As described in the technical report *Waste Management Environmental and Socioeconomic Impacts Methods and Results*, the maximum offsite concentration for benzene was 1.32E-07 milligrams per cubic meter. This is less than 1% of the 3.8E-02-milligrams-per-meter standard. Table II-6.1-9 compares predicted concentrations to concentration standards, not emissions standards.

Comment (2556)
In Volume III, Section C.4.2.1.2.1.1, for nonattainment, the General Conformity Guidelines were considered. For permitting purposes, the most stringent standard is a significant contribution factor in the State of Idaho rules. Also, State rules require consideration of the application of the Lowest Achievable Emission Rate for major source/major modification.

Response
The goal of the WM PEIS air quality analysis was to screen for major impacts and provide a means to compare air quality impacts across alternatives. Sitewide and project-level NEPA analyses will consider specific State air quality rules and regulations. DOE will meet all applicable permitting requirements when implementing waste management decisions.

Comment (2557)
Volume III, Section C.4.2.1.2.2.2. New Source Performance Standards could be applicable for specific types and capacities of boilers. Also, in addition to criteria pollutant emission estimates, emissions of hazardous and toxic air pollutants must be estimated to verify compliance with IDAPA 16.01.01.585 and .586.

Response
New Source Performance Standards could be applicable to boilers that exceed a certain size or heat input rating. Emissions of hazardous and toxic air pollutants were estimated for incineration, but not from fuel use for boilers. The programmatic air quality analysis conducted for the WM PEIS is not meant to replace or represent the type of refined analysis required by New Source Performance Standards regulations. The air quality analysis was performed at a programmatic level, which is a less detailed level of analysis than would be performed for a site-specific NEPA analysis. The goal of the WM PEIS was to screen for major impacts and provide a means to compare air quality impacts across alternatives. Because the discussion cited by the commentor applies to all sites, individual States' requirements are not included. However, Section C.4.2.1.2.2.2 states that State guidelines were used, where appropriate, to compare estimated emissions of hazardous and toxic air pollutants from incinerators.

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Comment (2558)
Volume III, Section C.4.2.1.2.2, states the emission factors were derived from the third edition of AP-42. Two other editions, containing additional and updated emissions factors, have been published since the third edition of AP-42.

Response
The AP-42 referenced in the Draft WM PEIS is the fourth edition, not the third. The most recent fifth edition was not officially published by the EPA until after the WM PEIS air quality analysis had been completed. A review of the fifth edition indicates that there have been no changes to the emission rates used in the WM PEIS from the fourth to fifth editions.

Comment (2559)
Volume III, Table C.4-5. The values in the table are defined under "significant." If a facility exceeds the limit indicated in the table as a net emissions increase (actual emissions), the facility has to be permitted under major modification and is subject to PSD permitting. In the table, particulate (TSP) is incorrect. It should be particulate matter, which is defined as smaller than 100 micrometers in 40 CFR 51.100. For ozone, the 40 tons per year limit is controlled through volatile organic compounds.

Response
DOE corrected Table C.4-5 in response to this comment.

Comment (2560)
Volume III, Section C.4.2.1.3.1.2. All sources (new and modified) have to abide by NSPS whether or not they are located in nonattainment areas.

Response
Section C.4.2.1.3.1.2 pertains to nonattainment areas and is not meant to imply that these standards do not apply in attainment areas.

Comment (2574)
The Summary and Volume I state "The management of LLMW [or LLW or TRUW] does not affect the air quality at most sites." These absolute statements should be qualified, for example by inserting the word "significantly" or "appreciably," since treatment options, at least for low-level mixed waste and transuranic waste, are likely to include incineration, with non-zero air quality impact.

Response
The absolute statements in Sections 4.3.2, 5.3.2, 6.3.2, and 8.3.2 of the Summary concerning air quality impacts have been qualified to read, "The management of LLMW (or LLW, TRUW, or HW, respectively) would not cause the air quality limits to be approached or exceeded at most sites."

Sections 6.5, 7.5, 8.5, 9.5, and 10.5 in Volume I were revised to state "The management of LLMW (or LLW, TRUW, HLW or HW, respectively) would not appreciably affect the air quality at most sites."

Comment (2597)
Volume I, Section 4.3.1; Volume II, Table II-6.5-7. Volume I discusses National Emission Standards for Hazardous Air Pollutants (NESHAPs). The only NESHAPs addressed in Volume I or Volume III,

are radionuclides, while asbestos, beryllium, and mercury (other NESHAPs in 40 CFR 61) are not addressed.

Response
As reported in the WM PEIS Low-Level Mixed Waste Technical Report, emissions of mercury were included in the emissions source terms that were used in the WM PEIS air quality and health risk analyses. Emissions of asbestos and beryllium were estimated to be very low and, therefore, were not included in the air emissions estimates. Therefore, air quality and health risk results for asbestos and beryllium are not available. The text in Volume I, Section 5.4.2, and Volume III, has C.4.2, has been revised to clarify this. The Low-Level Waste Technical Report is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final PEIS.

Comment (2818)
Referring to Section 4.3.2 of the Draft WM PEIS Summary document, a commentor stated, "It should also be noted that the management of low-level mixed waste (LLMW) via thermal treatment or incineration may impact air quality at the Idaho National Engineering Laboratory."

Response
Volume I, Section 6.5.2 of the WM PEIS, the maximum impact to air quality from low-level mixed waste management at INEL would be 45% of the PSD permitting increment for PM_{10}. Only sites that exhibit values near or exceeding 100% of the limits are discussed in the Summary document.

To make this clearer, DOE has revised the text in Section 4.3.2 of the Summary document. The text now states that the management of low-level mixed waste would not cause the air quality to approach or exceed the PSD permitting limit at most sites. Similar changes were made to Sections 5.3.2 and 6.3.2 of the Summary document.

Comment (2844)
According to Volume I, Table 5.4-3, radionuclide emissions were not evaluated for high-level waste. High-level waste air emissions should be included.

Response
Only storage of vitrified high-level waste canisters is within the scope of the WM PEIS. As indicated in Volume I, Sections 9.4.3 and 9.5, DOE expects that during normal storage operations there would be no emissions from high-level waste vitrified and stored in sealed stainless steel canisters. In addition, a high-efficiency particulate air filtration system would be used to filter the air from the storage building to ensure minimal releases of particulate radioactivity. Therefore, analysis of air quality impacts from emissions of hazardous air pollutants from high-level waste is not warranted. DOE modified the footnote to Table 5.4-5 to state that emissions of radionuclides and other hazardous constituents from the storage of vitrified high-level waste are assumed to be negligible.

Comment (2904)
The Air Quality portion in Volume I, Section 4.4.2, states that prevailing winds at BNL were from the south and southwest with a frequency of 12%. However, this gives the false impression that prevailing winds are from the south and southwest only. This is not the case. In fact, BNL's own 1993 Site Environmental Report states on page 5 that prevailing ground-level winds are from the southwest during the summer, from the northwest during the winter and "...about equally from these two

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directions during the spring and fall." Accordingly, the statement in the WM PEIS must be corrected to account for this information. Furthermore, the most recent site data, as noted in the 1993 report, should be utilized.

Response
The WM PEIS provides the annual prevailing wind direction. Prevailing winds can also be calculated for other time periods including daily, monthly, and seasonally. The level of detail requested by the commentor is not required in a programmatic EIS, since this information is unlikely to significantly enhance decisionmaking. DOE used a single averaging period for all sites, to ensure consistency of analyses across sites.

Section 4.4.2 in Volume I is a summary of a more detailed information contained in Section 15.2 of the WM PEIS Affected Environment Technical Report. The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2996)
Volume I, Section 7.5.2, notes a number of sites that would have low-level waste activities within 62 miles of a PSD Class I area. However, the discussion fails to include BNL, which is well within 62 miles of several significant Federal areas including the Fire Island National Seashore, Wertheim National Wildlife Refuge, Morton National Wildlife Refuge and the Federally designated Peconic Estuary. The discussion should make note of these facts.

Similarly, Section 6.5.2 in Volume I states that eight sites are located within 100 kilometers of a PSD area due to proximity of features including a national park, seashore, wildlife refuge, etc. This section also mistakenly omits BNL.

Response
Sections 6.5.2 and 7.5.2 of the WM PEIS were revised to include BNL as a site that might have low-level mixed waste and low-level waste activities within 62 miles of a PSD Class I area. Section 4.4.2 was revised to note that BNL is located within the Peconic Estuary System.

Comment (3025)
Exceeding regulatory limits for air quality, as stated in the WM PEIS, is not an acceptable option. Major waste management facilities and operations will have to file Notice of Construction and/or Prevention of Significant Deterioration permit applications before startup. These processes assure acceptable air quality levels to protect the public, even if facilities have to be redesigned.

Response
The WM PEIS used generic technologies to analyze potential environmental impacts at the sites. The application of generic technologies and simplifying operating assumptions resulted in the prediction of potentially significant impacts at some sites. This analysis is useful because it highlights potential problem sites, sites where mitigation might be required, or sites where construction and operation of waste management facilities could be more costly.

DOE will comply with all applicable environmental laws and regulations in constructing and operating its waste management facilities. Therefore, the discussion of air quality impacts in the Final WM PEIS acknowledges that air quality standards would not be exceeded under any circumstances.

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Comment (3061)
Volume I, Section 5.1.2, does not consider the air contaminant contribution that could result from actually remediating waste.

Response
As explained in Section 1.7.1 in Volume I, environmental restoration activities are outside the scope of the WM PEIS. Site-specific analyses will determine potential environmental and health effects of environmental restoration activities at each site. To the extent possible, the impacts of environmental restoration activities have been considered in the cumulative impacts analysis in Volume I, Chapter 11, of the WM PEIS.

Comment (3103)
Section C.4.2.1.2.2.2 does not clarify if DOE assumed that all the sites use natural gas and fuel oil, or if the analysis used the type of fuel available at each site. Hanford, for example, does not use natural gas.

Response
The availability of fuels at the sites was not considered. Volume III, Section C.3.1.1.2, states that "Fuel, Natural Gas or Liquid Propane Gas (in pounds)" represents the fuel needed to heat the building for one year, and was assumed to be natural gas. "Fuel, liquid (in gallons)" represents the fuel required to operate specific pieces of process equipment for one year. The fuel assumed for these calculations was standard diesel oil.

Comment (3104)
Section C.4.2.1.2.2.2 presents an inequitable comparison of worker vehicle use. It suggests that Hanford is more desirable for accepting wastes due to employees' efforts to reduce environmental impacts, e.g., by carpooling (decreasing worker trips by 19%). Also, the mileage figures (40 miles round trip) are too low for Hanford.

Response
The 40-mile per day round trip was assumed for every site. The one-way distance from the center of Richland to the center of the Hanford Site 200 Areas is approximately 20 miles. The reduced number of worker trips for Hanford was not meant to imply that Hanford is a more desirable site for waste management facilities. It was identified merely for purposes of providing an estimate of emissions. It would be preferable to include estimates of ridesharing for all DOE sites, but firm estimates for this type of activity were not available for sites other than Hanford.

Hanford is in an attainment area for all criteria pollutants. Therefore, under the applicable regulatory requirements, emissions from worker vehicle trips at Hanford and other DOE sites in attainment areas do not factor into the impacts analysis.

Comment (3192)
For low-level waste treatment and disposal under the Decentralized or Regionalized Alternatives, the potential adverse air quality impacts indicate that PGDP is not an appropriate treatment and disposal site.

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Response
As shown in Tables 7.5-2 and 7.5-3 in Volume I, the air quality impacts from waste management operations and maintenance at PGDP are estimated not to exceed applicable standards. The greatest air quality impacts at PGDP would occur during construction, and would result from construction equipment emissions of NO_2. If PGDP were chosen as a treatment or disposal site for low-level waste, proper maintenance and elimination of unnecessary equipment idling could reduce these effects.

Comment (3857)
DOE needs to supply more information about vapor releases and particulate emissions at ANL-E. There could be a problem with particulates drifting through the communities. A resident of Downers Grove Township is concerned about breathing the air downwind of ANL-E, and the effects of contaminated particulates.

Response
The impacts of increased emissions of both criteria and hazardous air pollutants (including radionuclides) are estimated in the WM PEIS, as described in Section 5.4.2 in Volume I and Section C.4.2 in Volume III. The impacts of increased emissions of particulates were also evaluated.

As described in Sections 6.5, 7.5, and 8.5 in Volume I, the WM PEIS analysis finds no major adverse air impacts due to potential waste management actions at ANL-E. Actual waste management facilities would be equipped with the appropriate air pollution control equipment and would be constructed and operated in compliance with all applicable regulations.

Section 11.3 in Volume I describes combined and cumulative impacts at ANL-E. This section states that the radioactive releases from waste management and other future actions would not measurably increase the current levels of risks from radioactive releases. ANL-E would continue to be below the EPA standard of 10 millirems per year to the maximally exposed offsite individual. This section also states that while the expected atmospheric emissions of particulates and ozone-producing contaminants under the alternatives would increase the levels of these emissions, the increases would be below the regulated levels in the nonattainment region.

Comment (4450)
DOE should evaluate hazardous waste and high-level waste in the WM PEIS because hazardous waste and the electricity needed to treat, cool, and store high-level waste generate criteria air pollutants.

Response
The WM PEIS evaluated the impacts of criteria pollutant emissions from fuel burning for heating buildings, from incineration, from construction equipment, and from waste transport vehicle emissions.

The evaluation does not include emissions from the process of treating high-level waste because high-level waste treatment is outside the scope of the WM PEIS. However, to the extent possible, these emissions were considered in the cumulative impacts analysis for the appropriate sites (see Volume I, Chapter 11).

Criteria pollutant emissions from electric power generation were not included because electric power at the sites is supplied by commercial utilities. Indirect impacts from commercial power generation are not evaluated for many of the same reasons that impacts of commercial management of hazardous waste were not analyzed. DOE assumed that, if power is available from the utility, the utility has taken the appropriate steps to supply the power, including the preparation of environmental permits and impact reports. Impacts to the power generation infrastructure were evaluated in the WM PEIS.

Comment (4455)
DOE's assertion that emissions of hazardous air pollutants, including radionuclides, were estimated to be below applicable standards at every site is inadequate because (1) the standards exclude radon, (2) they do not cover all toxic substances, and (3) the radionuclide standards are extremely loose in terms of the radionuclide exposures allowed (compared to standards that would limit cancer risks from all airborne exposures to less than one in one million, which happens to be a trigger value for reevaluation of regulatory limits for air toxics in the Clean Air Act of 1990). A 10 millirem limit would allow cancer risks of one in one thousand from a lifetime of exposure.

Furthermore, stating in the WM PEIS that emissions from certain alternatives could cause adverse air quality impacts does not provide enough information to understand the nature of the adverse impacts, differences in the probabilities, or degree of impacts among the alternatives. DOE should include details on what the adverse impacts are and how much adverse impact is expected.

Response
The comparison of estimated emissions to applicable standards is an established practice that is common in a variety of site assessment applications, including risk assessments for cleanup and NEPA reviews. The comparison of emission estimates to applicable standards is useful to give the public and decisionmakers a context for judging the significance of potential impacts. Additional details about potential adverse impacts associated with the exceedance of an existing standard would have been considered in the development and promulgation of the standard. The WM PEIS considers potential health and ecological risks associated with airborne releases from waste management facilities in the Health Risks and Ecological Resources Impacts sections of the waste-type chapters.

The air quality analysis evaluates compliance with standards for constituents regulated under air quality statutes. Unregulated constituents do not have emission or concentration limits and, therefore, DOE could not evaluate them for air quality impacts, although it did evaluate these constituents in terms of health risks if appropriate dose conversion or toxicity factors were available. Details about potential air quality impacts are provided in Chapters 6 through 10 in Volume I of the WM PEIS. Any sitewide or project-level NEPA documents would also evaluate air quality impacts.

Comments about the relative degree of protectiveness of existing standards are outside the scope of the WM PEIS.

Comment (4461)
How could transuranic waste be managed so that it would not affect the air quality at most or all sites? Which standards were exceeded at LANL and WIPP for treatment to land disposal restrictions, and by how much? What mitigating measures were considered to prevent such exceedances, and what were their impacts? If mitigation was not evaluated, DOE should evaluate it as part of the WM PEIS.

Response
As described in Section 8.5.3 in Volume I, the standard that DOE predicted transuranic waste treatment could exceed at LANL and WIPP is the 10 mrem per year NESHAP standard. This section also states

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that treatment of transuranic waste would require additional control measures to reduce emissions to acceptable levels. Potential mitigation measures that DOE could implement to control or reduce human health risks and environmental impacts at each site are summarized in Chapter 12 in Volume I. These measures would be considered in greater detail in sitewide or project-level NEPA reviews conducted prior to decisions to construct waste management facilities at particular locations at DOE sites. The extent to which risks and impacts can be reduced or eliminated depends on conditions at individual DOE sites.

Treatment of transuranic waste to land disposal restrictions produced the greatest impacts to air quality of the three treatment options evaluated (WIPP waste acceptance criteria, reduced gas generation, and land disposal restrictions) due to the use of thermal treatment (incineration) for volume reduction and destruction of hazardous constituents. Incineration does not destroy radionuclides. The other treatment methods were not predicted to exceed air quality standards.

Comment (4516)
The 10% thresholds used by DOE to determine if air quality impacts could be significant seem to be based on an arbitrary percentage; this is not a well thought out method to reliably screen out insignificant impacts from further analysis.

EPA procedures for determining when detailed air quality impacts analysis is required are in the October 1990 EPA (Draft) *New Source Review Workshop Manual*, and should be used for this purpose instead of the 10% threshold. The draft manual includes guidance on prevention of significant deterioration (PSD) and nonattainment area permitting, and is published by the EPA Office of Air Quality Planning and Standards. Although the manual is labeled a draft, it is the procedure actually being used by EPA and many State agencies.

The manual includes specific procedures for determining when emissions are low enough to not cause significant environmental impacts and require further analysis.

The procedures used in the WM PEIS should be documentably consistent with (or more conservative than) the procedures in applicable EPA regulations and guidelines. The Draft WM PEIS fails to provide an adequate analysis of the reliability of the 10% of threshold procedure for screening out insignificant impacts, without also inappropriately screening out what could be significant impacts.

Response
The analysis in the WM PEIS was performed to obtain a relative comparison of air quality impacts from the various alternatives, rather than to determine compliance or develop operational plans and procedures. Before the approval of any waste management facility, detailed air quality analysis would be performed in which individual criteria air pollutant concentrations from the facility would be calculated for comparison with the National Ambient Air Quality Standards, using approved methods.

Section C.4.2 in Volume III of the WM PEIS describes the methods that DOE used in the air quality impact analysis.

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Comment (4542)
In addition to prevention of significant deterioration (PSD) increments, DOE should consider in the WM PEIS limits on impacts in EPA regulations (especially in areas exceeding the standards), along with emission offset requirements.

Response
The air quality analysis in the WM PEIS compared emissions in attainment regions to the PSD increments, and compared emissions in nonattainment regions to general conformity rule *de minimis* levels.

Emission offsets would be evaluated in sitewide or project-level NEPA documents if air quality standards are predicted to be exceeded.

Comment (4543)
DOE should justify the assumption in Section 5.4.2 of the Draft WM PEIS that transportation would not significantly contribute to hazardous air contaminants during routine operations. Drums of hazardous waste are often not properly sealed (rates of improper sealing around 1% have been reported).

Response
Significant emissions of hazardous air pollutants from improperly sealed drums during transport are unlikely. An improper sealing rate of 1% would mean that 1 hazardous waste drum in 100 was improperly sealed. Most drums contain chemicals that are not volatile. In an entire year (fiscal year 1992), only 63 shipments contained chemicals that were poisonous by inhalation (i.e., volatile and toxic). Slow leaks of such chemicals would have very small hazard zones because the leak rates would be very low. The scenario of a leak is more akin to an accidental release scenario, in which the concern is for human health risk and not air quality. The transportation and facility accidents analyzed in the WM PEIS address the impacts of such leaks.

Comment (4549)
DOE should evaluate the impacts of dust, radionuclides, and vapors from material handling and disposal of waste.

Response
According to the resource use estimates prepared to support the WM PEIS, significant quantities of hazardous materials would not be handled as part of the waste management activities. DOE would perform any materials handling that does occur in accordance with Occupational Safety and Health Administration requirements and manufacturer recommendations. Therefore, the air quality impacts of emissions from materials handling are likely to be of lesser significance. Human health impacts from materials handling are evaluated in the health risk section of each waste-type chapter (Chapters 6 through 10) in Volume I.

Fugitive dust would be generated during land clearing. This dust would be minimized by the implementation of standard dust suppression measures. Impacts from fugitive dust would be similar to impacts from commercial activities that involve clearing land (e.g., road construction, construction of housing developments, etc.). These impacts would be site-specific and, therefore, are not appropriate for programmatic decisionmaking.

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Low-level mixed waste would be treated to remove, destroy, or immobilize hazardous constituents before they are sent to the disposal facility. In addition, most low-level mixed waste and low-level waste would be grouted or polymerized before disposal. Therefore, there would be no significant air emissions of radionuclides or hazardous constituents from the disposal facility.

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Comment (155)
The assumption made for Hanford that the only significant exposure pathway is through surface water is wrong. The main pathway for exposure is groundwater.

Response
As stated by the commentor, the primary water-borne pathway for the movement of contaminants at Hanford is through groundwater. However, this groundwater eventually discharges to the Columbia River, where exposure to the public can also occur. As described in the Draft and Final WM PEIS in Volume I, Section 5.4.1.3, and Volume III, Appendix D, the primary exposure pathway analyzed for a disposal unit is the groundwater pathway. Health risks were estimated for a hypothetical farm family living 300 meters (984 feet) downgradient from the disposal facility.

Comment (166)
Failure of old storage tanks could be a much worse hazard to streams and groundwater than the incinerator accident that was the focus of the WM PEIS analysis.

Response
DOE assumes that the commentor is concerned about low-level mixed waste or low-level waste storage, since the storage of liquid high-level waste is outside the scope of the WM PEIS, there is little liquid transuranic waste stored at DOE sites, and hazardous waste is accumulated for no more than 90 days before being processed for treatment or disposal.

There are several reasons why storage tank failure was not specifically modeled in the WM PEIS risk analysis. First, as stated in Volume I, Section 6.4.3, the PEIS does not analyze accidents for current waste storage because the maximum waste volumes would accumulate (leading to a maximum potential accidental release) independent of alternatives. Therefore, releases due to storage facility accidents would not help to discriminate among PEIS alternatives. Second, the PEIS addresses the issue of risks due to groundwater contamination in Volume I, Sections 6.4.1.8 and 6.4.1.9. In the groundwater scenario, the likely source for groundwater contamination is failed waste disposal cells. The failure of low-level mixed waste storage tanks (most stored liquid radioactive waste is low-level mixed waste) is a less likely cause of groundwater contamination because low-level mixed waste tanks are typically inside secondary containment structures and are regularly inspected, in accordance with RCRA requirements. Potential environmental impacts from waste storage accidents are provided in sitewide or project-level safety analysis reports or NEPA documentation.

Comment (374)
I am very concerned about what BNL is dumping into the Peconic River right now. Any release of wastes from BNL could “wreak environmental havoc” on the Peconic River and other water resources.

Response
The current conditions at BNL are summarized in Volume I, Section 4.4.2, of the WM PEIS. Additional details are presented in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. Section 2.15.2.1 of the WM PEIS Affected Environment Technical Report states that BNL has five National Pollutant Discharge Elimination System (NPDES) permitted outfalls to recharge basins and one NPDES permitted outfall to the Peconic River. Wastewater is discharged at an average rate of 3.8 million liters (1 million gallons) per day. Permit compliance for all NPDES outfalls was 99.9% in

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1991. Discharges to the Peconic River met all radioactive discharge limits. Only iron, pH, and 1,1,1-trichloroethane exceeded permit limits on a few occasions.

More recently, in 1995 BNL implemented a new State Pollutant Discharge Elimination System (SPDES) Permit that provides for additional monitoring and more stringent discharge standards. During 1995, BNL's compliance record was similar to that of 1991. They exceeded their permit requirements on several occasions. The majority of these exceedances were due to failure to reduce biological oxygen demand and total suspended solids by 85%. The effluent concentrations of these parameters complied with discharge standards. This was a result of the dilute nature of BNL's sewage influent to their sewage treatment plant. The new SPDES Permit reduced the silver limit from 50 micrograms per liter to 15 micrograms per liter. Two exceedances of the silver limitation occurred in March 1995 (17 micrograms per liter) and November 1995 (15.2 micrograms per liter). BNL has taken actions to reduce silver bearing wastes by replacing photo-developing operations in two buildings with digital photographic equipment.

In addition to outfall monitoring, the Peconic River is monitored for radioactive and nonradioactive parameters at three onsite and four offsite locations. Carmans River is also sampled as a background location. In 1991, all radionuclide concentrations were within applicable limits and did not exceed 10% of the State and Federal Drinking Water Standards. All nonradioactive analyses were consistent with the offsite control location and with historical data except for toluene, 1,1,1-trichloroethane, and xylene. The exceedances for toluene and xylene are probably associated with a non-BNL source.

So far as new waste management facility discharges are concerned, DOE did not attempt to evaluate the potential effects of waste management facility effluents on surface water quality and aquatic ecosystems at any site in the WM PEIS because any credible analysis would require knowing exactly where on the site the waste management facilities would be located and where effluents would discharge, and the specific locations of the facilities are not being determined in the PEIS. Sitewide and project-level NEPA reviews would address the potential for those effects.

Comment (410)
It is not acceptable to me or my family that drinking water could be contaminated with radioactive waste.

Response
DOE agrees that contamination of drinking water resulting from WM PEIS decisions would be unacceptable. DOE would construct and operate its proposed waste management facilities in compliance with applicable regulations, minimizing the potential for contamination. Before disposing of these wastes at any site, DOE would perform detailed sitewide or project-level NEPA analyses of potential effects of disposal to human health and the environment.

Comment (1323)
The protection of water resources is of great importance. Groundwater impacts need to be considered in the WM PEIS.

Response

The environmental impacts described in this PEIS address the range of natural and human resource issues pertinent to the alternatives under consideration in this PEIS. This includes evaluating impacts to water resources.

Impacts evaluated for water resources include impacts on water availability due to water use and wastewater discharge from managing low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste and impacts from disposal of low-level mixed waste and low-level waste on groundwater quality. The WM PEIS evaluates impacts to groundwater quality caused by the migration of radionuclides and other hazardous chemicals that could leach from disposal facilities over time. The PEIS employed several analytical models to gauge the impacts on groundwater at a hypothetical well 300 meters (984 feet) from the center of the disposal facility. Estimated concentrations of groundwater contamination generated by the models were then compared to standards for drinking water. Section 5.4.3 in Volume I and Section C.4.3.4 in Volume III also provide a qualitative discussion of other potential impacts to water resources.

The Final WM PEIS has been revised to incorporate air analysis of the potential for collective risk from waste disposal. Section 5.4.1.2.3 in Volume I of the WM PEIS describes the methodology used in the analysis, which involves consideration of a number of site-specific parameters. The results of this risk vulnerability screening analysis for low-level mixed waste and low-level waste disposal are presented in Volume I, Sections 6.4.1.9 and 7.4.1.8, respectively.

Comment (1822)

We have no comments or concerns for water quality impacts in relation to the generalities of this project; however, a more detailed EIS addressing the specific impacts to the Norfolk Naval Shipyard would allow for specific comments.

Response

If the decisions described in the WM PEIS Record of Decision would substantially change the way low-level mixed waste is managed at the Norfolk Naval Shipyard, additional NEPA reviews would be necessary. Site-specific water quality issues would be considered during such reviews.

Comment (2528)

Volume I, Section 5.4.3.3, states, "Process waste waters from waste treatment facilities would be discharged to existing wastewater treatment facilities, where possible." This sentence doesn't make sense.

Response

DOE revised the sentence in Section 5.4.3.3 in Volume I to state that aqueous wastes from the waste treatment facilities would be conveyed to existing wastewater treatment facilities, where possible.

Comment (2864)

The WM PEIS must do more than identify sole-source aquifers. It must discuss in greater detail the potential impact on such aquifers. State designations of wild and scenic rivers also should be included.

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Response
The water quality analysis in the WM PEIS compares predicted contaminant concentrations from waste disposal to drinking water standards or their equivalent. This is a conservative approach and is done regardless of whether the groundwater is a current or potential source of drinking water. Comparison to drinking water standards would be protective of sole-source aquifers, since EPA guidance requires that contamination in a sole-source aquifer not exceed drinking water standards. In any event, if disposal over a sole-source aquifer is required, DOE would meet all requirements for such disposal.

DOE would conduct sitewide or project-level NEPA reviews before constructing any disposal facility. In addition, a detailed disposal performance assessment would be prepared that would evaluate the performance of the disposal facilities over time, and would assist DOE in complying with all applicable regulations, including those pertaining to waste disposal over a sole-source aquifer.

State designations of wild and scenic rivers were included in the WM PEIS analysis.

Comment (2940)
The logic that since groundwater is used as the source of water and, therefore, surface water resources are not affected, is flawed. Volume I, Section 5.4.3, states that groundwater is used as the source of water supply at BNL and, therefore, surface water resources would not be affected by water withdrawals at this site. Using groundwater as a source of water can indeed influence surface-water bodies, where the aquifer(s) in question are shallow (as at BNL). Many of the surface waters on Long Island are groundwater fed and significant drawdown of the water table by pumping operations for public water supply, sewage treatment, and other purposes has in many cases resulted in the drying of streambeds or the alteration of streamflow. In addition, due to the nature of the Snake River Plain Aquifer, with discharge from the aquifer forming a major source of water in the Snake River at points in the south-central portion of Idaho below Milner Dam, any and all groundwater usage at INEL results in some impact to surface waters. Since surface water and groundwater are interconnected, explain how any action that affects one would not affect the other. This impact might or might not be small, but it should not be disregarded.

Response
Section 5.4.3 in Volume I of the WM PEIS lists several assumptions used in evaluating potential impacts to water resources. These assumptions include the relationships of surface water and groundwater withdrawals at various sites for water use requirements. Although it is true that at many sites surface water and groundwater are interconnected, impacts to groundwater resources are likely to be small as a result of surface water withdrawals at these sites, and vice versa. The text in question was revised to recognize the interconnection of the groundwater and surface water resources.

The WM PEIS Environmental and Socioeconomic Impacts Methods and Results Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS, provides more information on potential impacts to water resources at the sites.

Comment (2950)
Without a complete discussion of the "hypothetical" technologies involved, the veracity of the water resources analysis is impossible to ascertain.

Response
The generic technologies used in the WM PEIS analysis of impacts from waste management activities are described in a series of technical reports. These technical reports are listed in Section 15.2 in Volume I, and are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2951)
At BNL, it is becoming more apparent that discharges to the Peconic River, a discharging stream at many times and for some distance beyond the site boundaries, has caused a portion of the site's environmental contamination. Because a stream or river has the potential for much quicker transport than groundwater, with concurrently much less degradation of radionuclides or organics, it seems reckless to so readily discount this mode of transport (given at least one site with high groundwater where stream transport has caused environmental contamination beyond the site boundaries).

Response
Section 5.4.3 in Volume I of the WM PEIS states that seepage of contaminated groundwater from disposal facilities could contaminate surface water. This would be expected to occur at sites with shallow groundwater, and surface water bodies that are fed by groundwater discharge (springs). Where contaminated groundwater discharges to the surface, dilution in "clean" surface waters would cause concentrations of contaminants in surface water to be lower than concentrations in groundwater. Therefore, the groundwater pathway was assumed to be the major pathway for movement of contaminants beyond the disposal facility boundary, and was the pathway that was examined in detail.

The analysis was performed using a hypothetical well located 300 meters (984 feet) downgradient from the center of the disposal facility. Since the 300-meter well would be located between the disposal unit and any surface water discharge point, contaminants would reach the well in less time and at higher concentrations than at a surface water spring. Therefore, a farm family using groundwater from the 300-meter well would have a greater risk of adverse health effects than a family using surface water.

Section 5.4.3 in Volume I and Section C.4.3.4.10 in Volume III have been revised to provide a more detailed discussion of the potential vulnerability of sites to surface water impacts from waste management actions. DOE believes that because specific locations of waste management facilities on the sites will not be selected based on the WM PEIS, a detailed surface water quality analysis is more appropriate in sitewide or project-level NEPA reviews.

Comment (2980)
As construction activities for a sewage treatment plant upgrade at BNL have called for the dewatering of over 1 million gallons per day of organics and tritium contaminated groundwater, the WM PEIS analysis does not fully anticipate all possible water resource impacts from construction activities. Section 5.4.3 and Tables 6.6-1 and 7.6-1 and underlying analyses should be adjusted for possible dewatering activities.

Response
BNL no longer plans to conduct dewatering for construction of improvements at the sewage treatment plant. Note, however, that the quality of the water that would have been discharged by dewatering would have met all applicable effluent quality standards.

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Comment (3106)
The fifth assumption in Section C.4.3.3 (fifth bullet) is not valid for the Hanford Site because (1) existing sanitary treatment plants do not have the capacity to treat additional sanitary waste; (2) existing process treatment plants might not be able to treat the wastewater generated by these treatment facilities; and (3) State regulations are not considered.

Response
The WM PEIS does not include sanitary wastewater treatment capability in the waste management facilities that could be constructed at each site. Therefore, it was assumed that sanitary wastes would be discharged to existing treatment facilities. Impacts to sanitary wastewater treatment plants at the sites are evaluated in Volume I, Sections 6.12, 7.12, 8.12, 9.12, and 10.12. These sections note that Hanford has little excess wastewater treatment capacity.

The WM PEIS assumes that additional process wastewater treatment capability will be included in the waste management facilities that could be constructed at each site such that effluent will comply with all applicable Federal and State regulations. Existing sanitary or process wastewater treatment facilities will be used if capacity is available.

This clarification of the WM PEIS treatment of sanitary wastewater plants and process wastewater plants was added to Section C.4.3.3 in Volume III.

Comment (3107)
The eighth and tenth assumptions in Section C.4.3.3 suggest that wastewaters would not be discharged to surface water or groundwater. However, since the construction of evaporation facilities is not mentioned, it appears these discharges were inadvertently ignored.

Response
DOE corrected Section C.4.3.3 in Volume III to say that surface water resources would not be affected by effluent discharges at Hanford, INEL, LANL, LLNL Site-300, NTS, Pantex, or WIPP, because generally, wastewaters are discharged to dry stream beds or man-made ponds, and not to natural-flowing surface water bodies.

Comment (3109)
State regulations on the discharge of process wastewater differ, and should be evaluated and considered.

Response
DOE will comply with all applicable State standards at sites, once these sites are selected. DOE did not evaluate the impacts of wastewater discharges on surface water resources. Section 5.4.3 in Volume I and Section C.4.3.4.10 in Volume III have been revised to provide more detailed discussions of the potential vulnerability of sites to surface water impacts from waste management actions. DOE believes that because specific locations of waste management facilities on the sites will not be selected based on the WM PEIS, a detailed surface water quality analysis is more appropriate in sitewide or project-level NEPA reviews.

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Comment (3345)
Water contamination constitutes irreparable damage unless DOE can prove that the water can be made pure and clean again.

Response
DOE will comply with all applicable regulations for waste management including DOE Orders that require that releases be maintained as-low-as reasonably achievable (ALARA). This will help to ensure that significant impacts to water quality do not occur.

As described in Chapter 12, if any adverse impacts do occur, mitigation measures can be used to reduce impacts to water quality. The measures could include (1) changing the engineering design to increase recycle and reuse of water within the facility (e.g., zero discharge facility design), (2) limiting the disposal of problem isotopes or storing waste containing problem isotopes until radioactive decay decreases their concentrations, (3) changing the waste form (e.g., vitrification) to reduce leaching, and (4) changing disposal facility design to provide greater isolation.

Also, as described in Appendix H, DOE is involved in the development of advanced technologies that could further reduce emissions to the environment, and facilitate cleanup of accidental releases. DOE expects that future technological breakthroughs will reduce emissions from waste management activities.

Comment (3593)
Nowhere in the WM PEIS are exact calculations on current surface water quality or groundwater quality at the sites stated--a pertinent and vital aspect of evaluating special exposure pathways with respect to subsistence consumption of fish, game, or native plants. We have only found general statements on surface water and groundwater contamination (e.g., Chapter 4) Also, potential impacts on groundwater in the WM PEIS focus more on "availability" not adequately on quality or impacts from regulated and unregulated releases. We feel DOE has avoided fully assessing and documenting such impacts and calculations on both groundwater and surface water because publication of such figures would lead to self-implication of just how out of compliance DOE is under the applicable statutory laws and regulations.

These figures must be fully assessed and documented in order to make informed decisions in regards to any and all aspects of "waste management" of DOE's nuclear and hazardous materials inventory and future inventories. Avoidance of fully assessing the current state of a primary media--water--and potential impacts, would be blatant noncompliance with the purposes and regulations of NEPA. "Assumptions" of current water quality are not acceptable and both surface water and groundwater must be determined before any commitment of resources.

Response
In the WM PEIS, DOE did not specifically address impacts to aquatic life or to subsistence fishermen and hunters at the sites because of the array of assumptions that would have to be made about site-specific variables involved in such an analysis and because the analysis would require identifying specific locations of proposed waste management facilities on sites, which is not part of the programmatic decisionmaking. Sitewide and project-level NEPA reviews would be the appropriate context for this type of analysis. Further, based on the programmatic analysis of land requirements at the sites to implement any of the waste management alternatives, DOE believes it will have sufficient

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flexibility to avoid or minimize any environmental or human health impacts, including any potentially disproportionate high and adverse impacts to Native Americans, minorities, or low-income populations, through selection of different waste management technologies or facility location.

Due to the programmatic nature of this study and in order to facilitate the comparison among potential programmatic sites, the WM PEIS water resources analysis is generic in character. The methodology pertaining to water quality impacts from disposal of low-level mixed waste and low-level waste is provided in Section 5.4.3.2 in Volume I.

Groundwater quality could be affected in the future if there is a loss of institutional control at disposal sites and subsequent deterioration of disposal facility integrity. Contaminants could then leach into groundwater. DOE analyzed this possible effect used the modeling for the human health risk assessment. The transport and fate of disposed radionuclides, and hazardous constituents were estimated using the Disposal Unit Source Term (DUST) and Multimedia Environment Pollutant Assessment System (MEPAS) models that tracked the contaminants as they moved from the disposal location to the point of exposure for a hypothetical farm family drawing water from a well 300 meters (984 feet) downgradient of the center of the disposal facility. DOE will further evaluate the performance of disposal facilities at each site in detail through DOE's performance assessment process. If significant groundwater contamination were predicted by the performance assessment process, changes in the waste acceptance criteria would be made to limit disposal of the waste predicted to cause the significant groundwater contamination. The waste would require further treatment prior to disposal, would be disposed of at another DOE site where the waste meets the waste acceptance criteria, or would be stored until a method was found to treat or dispose of the waste.

While the primary water-related impacts from waste management activities are likely to be through groundwater, nevertheless, there might be sites at which waste management activities could cause surface water impacts. Based on a comparison of selected environmental data at the sites, the vulnerability of the sites to surface-water impacts was estimated. These data include (1) precipitation; (2) the characteristics of major surface-water bodies near the site such as distance to the site and flow rate; (3) the presence of groundwater discharge to surface-water bodies near the site; and (4) the presence of nearby surface-water supply intakes downstream from the site. This vulnerability is found in Section C.4.3.4.10 in Volume III. Impacts on surface-water resources and drinking-water supplies would be examined in more detail after the waste management facility locations on the sites are selected.

Chapter 4 of the WM PEIS provides information to characterize the pertinent environmental conditions (including water resources) at sites potentially affected by implementation of the various waste management alternatives. Additional information is provided in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (4451)
Water quality criteria and air pollution from groundwater are pertinent to groundwater if the groundwater is brought to the surface and used for irrigation. Compliance issues and the environmental impacts of such groundwater usage should be included in the WM PEIS.

Response

Drinking water criteria were used to evaluate the impacts of concentrations of radionuclides and chemicals in groundwater used as a source of drinking water. The hypothetical farm family scenario also considers the use of groundwater contaminated from waste disposal for irrigation. However, the impacts of groundwater used for irrigation or groundwater recharge to surface water on surface water quality were not evaluated. Air quality impacts due to emissions of hazardous air pollutants during groundwater use also were not evaluated. DOE believes that the contributions of irrigation water from a single farm to adverse air quality would be negligible.

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Comment (179)
Because Site 300 is at a higher elevation than the City of Tracy and the area is subject to significant seismic activity, there is a strong concern that storage containers could leak and contaminate the aquifer that supplies the City's drinking water. A water shortage could result if the City of Tracy's aquifer becomes contaminated by wastes stored at Site 300. DOE should be aware that the City of Tracy has three high-capacity water wells that are located approximately 3 miles from Site 300.

Response
As described in Sections 6.3.5 and 7.3.5 in Volume I of the WM PEIS, DOE selected 16 candidate low-level mixed waste and low-level waste disposal sites for evaluation based on a screening it performed to be consistent with the States under the Federal Facility Compliance Act. The screening applied three exclusionary criteria, one of which was that the waste disposal facility could not be within 200 feet of a seismic fault. Section 4.4.6 in Volume I does mention major earthquake faults in the LLNL area. A supporting document, the WM PEIS Affected Environment Technical Report, contains more detailed information on seismic activity near LLNL. This report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Appendix F in Volume IV of the PEIS describes the accident scenarios caused by seismic events (earthquakes) at the sites during which exposure to chemical or radiological constituents of the waste could occur. Facility accident results for low-level mixed waste are presented in Volume I, Sections 6.4.3 (low-level mixed waste), 7.4.3 (low-level waste), and 8.4.3 (transuranic water). Additional information on accident scenarios and health risks from accidents initiated by earthquakes is provided in Appendix F (Volume IV) and Appendix D, (Volume III) respectively. Thus, DOE decisionmakers have information in the PEIS to account for seismic activity in the vicinity of LLNL when deciding on the preferred alternative.

Wastes would be managed in compliance with all regulatory requirements. Any waste storage facility located at LLNL would be built with sufficient containment and would be carefully monitored. In addition, no liquid low-level mixed waste or low-level waste would be disposed of. Under normal operations, wastes would not come in contact with surface water, groundwater, or soils. Spilled wastes would be cleaned up in accordance with all applicable regulations. Furthermore, LLNL would be equipped with sufficient safety and emergency response capabilities to minimize the potential for leaks to contaminate surface water and groundwater.

The potential for a mixed waste facility at Site 300 to cause contamination of the water-supply aquifer tapped by the Tracy municipal water supply wells is extremely remote. The municipal water supply wells in Tracy tap water within the Tulare Formation. This unit is absent from Site 300. Groundwater below Site 300 occurs in the Neroly and Cierbo Formations. These units, where present below Tracy, are significantly deeper than the overlying Tulare Formation. There appears to be no subsurface pathway for pollutants in groundwater at Site 300 to enter the Tulare Formation, and from there the Tracy wells. In addition, the Tracy municipal water supply wells are 3 to 5 miles from Site 300. Pollutants would be appreciably attenuated in transport. Also, all surface water at Site 300 drains to Corral Hollow Creek. This creek ultimately drains to the San Joaquin River in the south Tracy area. The creek flows intermittently and only along certain parts of its length; it has little to no baseflow. Therefore, surface water is unlikely to be a major pathway for contamination to reach the Tracy water supply wells.

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Sections 6.6.2 and 7.6.2 in Volume I of the WM PEIS showed that hypothetical leaks of wastes from disposal units at LLNL would present a low-risk to users of groundwater, even those who use water from a hypothetical well 300 meters (984 feet) immediately downgradient from the center of the disposal facility.

If DOE selected a particular site for a new waste treatment, storage, or disposal facility as a result of the WM PEIS analysis, it would prepare additional sitewide or project-level NEPA reviews. The specific design basis and exact location of the waste management facility would be identified in that document, which would consider potential earthquake impacts. DOE would design, construct, operate, and maintain waste management facilities in accordance with appropriate local seismic standards.

Comment (577)
Nuclear waste storage could contaminate the sole-source aquifer that supplies drinking water to residents around BNL. Contamination of the drinking water would increase the already high incidence of breast cancer on Long Island.

Response
The WM PEIS evaluates impacts to groundwater quality caused by the migration of radionuclides and other hazardous chemicals that could leach from low-level waste and low-level mixed waste disposal facilities over time. The PEIS employed several analytical models to gauge the impacts on groundwater at a hypothetical well 300 meters (984 feet) from the center of the disposal facility. Estimated concentrations of groundwater contamination generated by the models were then compared to standards for drinking water.

As described in Sections 6.6.2 and 7.6.2 in Volume I, the WM PEIS water quality analysis indicated that disposal of low-level mixed waste and low-level waste at BNL would not cause groundwater concentrations to exceed drinking water standards that were used as an indication of acceptable groundwater quality. This was true of all waste management alternatives studied.

Note that the WM PEIS health risk analysis considers site baseline risk only as a component of cumulative impacts. In Chapter 11 (Volume I of the WM PEIS), baseline risk is considered as the potential effect of existing site-related actions on population exposure and risk. The analysis does not include regional epidemiological or health statistics information, such as the rate of cancer incidence on Long Island. The estimated risks of the proposed waste management actions at BNL must be considered as excess latent cancer incidence or fatality risks that would be added to the existing baseline. The estimated incremental risks from the disposal of low-level mixed waste and low-level waste at BNL are presented in Sections 6.4.1.8 and 7.4.1.7 in Volume I, respectively.

The potential relationship between cancer rates on Long Island and BNL site activities is currently under independent investigation by a number of local organizations through funding provided by the National Cancer Institute. In addition, Suffolk County has named an independent group to analyze the influence of BNL actions on public health in communities surrounding the site.

Any new disposal facility at BNL would be designed and located in accordance with all applicable regulations. In addition, best management practices for stormwater management would be implemented to ensure that significant quantities of potentially contaminated runoff would not reach the river. DOE would perform sitewide or project-level NEPA reviews before constructing any disposal

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facility. In addition, a detailed disposal performance assessment would be prepared that would evaluate the performance of the disposal facilities over time, and would assist DOE in complying with all applicable regulations, including those pertaining to waste disposal over a sole-source aquifer.

Comment (1556)
Table II-9.2-10 lists radioactive concentrations in groundwater for disposal at NTS. The table does not list tritium.

Response
Tritium was included as a component of the waste that DOE assumed would be disposed of at NTS. As discussed in Section 5.4.3.2 in Volume I of the WM PEIS, DOE evaluated impacts to groundwater quality caused by the migration of radionuclides that leach from disposal facilities over time. DOE calculated concentrations of radionuclides at a hypothetical groundwater well 300 meters (984 feet) from the center of the disposal facility. The analysis accounted for radioactive decay during the time period between disposing of the wastes and loss of containment. Radionuclides such as tritium with short half-lives would tend to decay to acceptable levels before they reached the hypothetical well. Radionuclide concentrations in the groundwater were then compared to DOE or EPA drinking water standards. Table II-9.2-10 in Volume II does not list tritium because this nuclide would not be present at the hypothetical well. In fact, because of the very low infiltration rates at NTS, no contaminant would be present above acceptable levels.

Comment (1727)
Since groundwater can be a pathway for exposure to contaminants, RFETS, which has a high water table, is a poor site for disposal activities.

Response
As described in Section D.3.2.2 in Volume III of the WM PEIS, for all disposal scenarios, it is assumed that shallow land burial will be used at installations west of the Mississippi River and tumulus (aboveground vault) disposal will be used at eastern installations. The exceptions are RFETS, which disposes in tumulus vaults, and SRS, which disposes in belowground vaults. Aboveground disposal was assumed at RFETS after consideration of the high water table at the site.

As described in Sections 6.6.2 and 7.6.2 in Volume I, the WM PEIS water quality analysis indicated that disposal of low-level mixed waste and low-level waste at RFETS would not cause groundwater concentrations of radionuclides to exceed or even approach drinking water standards that were used as an indication of acceptable groundwater quality. This was true of all waste management alternatives studied. Groundwater concentrations of hazardous constituents could exceed drinking water standards under the Decentralized Alternative and Regionalized Alternative 1 for low-level mixed waste.

DOE, would conduct detailed performance assessments of disposal units before disposing of low-level mixed waste or low-level waste at RFETS. Potential spills or accidental leakages would be minimized by incorporating the following options into the decisionmaking process: modifying the design of generic disposal facilities (used in the PEIS analysis) to fit site-specific conditions; modifying waste form requirements; optimizing the location of a facility on the site; and imposing waste acceptance criteria.

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Comment (1746)
Expand Tables 6.6-3 and 6.6-4 to identify, for each radionuclide in the tables, whether the standard for a particular radionuclide exceeds a DOE Derived Concentration Guideline or exceeds gross alpha or gross beta limits of the Safe Drinking Water Act.

Response
To improve their readability, the tables in Chapters 6 and 7 in Volume I of the WM PEIS do not contain information about specific drinking water standards. However, this information is included in Volume III, Section C.4.3.5, which describes the methods used to assess water quality impacts. Footnotes to the tables in Chapters 6 and 7 in Volume I refer to Appendix C in Volume III for a description of the drinking water standards.

Comment (2064)
The WM PEIS is incomplete in its discussion of water quality issues. Chapter 5 notes that only water quality impacts violating greater than 25% of the applicable standards were analyzed in more detail. The WM PEIS goes on to note that given the 400% uncertainty associated with modeling groundwater impacts, all 25% or greater effects could exceed the standards. This would seem to call for additional discussion of what is a reasonable estimate of the potential for impacts to exceed applicable standards and under what conditions this might occur.

Response
To focus the water quality impacts presentations in Volume I, Chapters 6 and 7, on potentially significant effects, DOE chose a 25%-of-comparison criteria to highlight sites where waste disposal could result in adverse water quality impacts. The 25% threshold reduced the large number of analyses shown in the Site Data Tables (see Volume II) to a manageable number for presentation in Chapters 6 and 7. Levels greater than or equal to 1% of the comparison criteria are listed in the Site Data Tables. The analysis is further focused because the accompanying text discusses primarily the impacts of concentrations that approach or exceed the water quality criteria.

Section D.4.2 in Volume III describes the uncertainties associated with groundwater transport of contaminants from disposal sites to the water well used by the hypothetical farm family. DOE has revised Section D.4.2.1, which now states that the most reasonable estimate of the uncertainty in the risk predictions in the PEIS for the disposal sites was expected to be approximately one to two orders of magnitude. DOE revised Volume III, Section C.4.3.5, and Volume I, Section 5.4, to remove the incorrect reference to the uncertainty of 400%.

Comment (2449)
Potential impacts on the Snake River Plain Aquifer should be considered in discriminating between alternatives. If there are ongoing activities that contribute to groundwater contamination, they should be included in the WM PEIS. If there are no ongoing activities contributing to groundwater contamination, that fact should be stated to alleviate concerns related to groundwater contamination.

Response
Existing environmental conditions at INEL are summarized in Section 4.4.5 in Volume I the WM PEIS. Additional detail about the affected environment at INEL is presented in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in

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Section 1.9 in Volume I of the Final WM PEIS. Also see the SNF/INEL PEIS for detailed information on groundwater contamination at INEL.

Potential impacts of the waste management alternatives on the Snake River Plain Aquifer are evaluated in the water resources impacts sections of the WM PEIS. These include Sections 6.6, 7.6, 8.6, 9.6 and 10.6 in Volume I.

The cumulative impacts of waste management actions when added to past, present, and reasonably foreseeable future actions are presented in Section 11.7 in Volume I. DOE added a description of potential cumulative impacts to groundwater quality to Chapter 11 of the Final WM PEIS.

The DOE Workgroup that is responding to Defense Nuclear Facilities Safety Board Recommendation 94-2 is moving forward with plans to revise DOE performance assessments for radioactive waste disposal sites to include existing contamination and ongoing activities that contribute to groundwater contamination.

Comment (2537)
Referring to Volume I, Section 6.6.2, a commentor asked, "Why are treatment and disposal assumed in the analysis that do not meet EPA standards and so will not be used in practice?"

Response
Any new DOE waste treatment and disposal facilities will meet all regulatory requirements. In fact, the generic waste treatment, storage, and disposal facilities assumed for the WM PEIS were modeled after existing facilities that meet all regulatory requirements. Conservative assumptions about the performance of these facilities and their treatment and disposal processes, along with conservative environmental transport and fate modeling, produced results in the WM PEIS that tend to overestimate impacts.

Volume I, Section 6.6.2.2, explains that the modeled concentrations of hazardous constituents in the groundwater from disposal of low-level mixed waste are largely due to assumptions on the routing of wastes through the treatment system. As shown in the low-level mixed waste flow diagram (Figure 6.2-1), some wastes containing solvents were assumed to bypass the thermal treatment processes. It was also assumed that the solvents in these wastes were not destroyed, but instead, ended up in the disposal facility. Some of these wastes contain solvents in large enough concentrations to cause problems when they are disposed of. In this case, therefore, the routing of waste would cause the problem and not whether the treatment or disposal facilities meet regulatory requirements.

Comment (2562)
One might conclude from the discussion in Volume III, Section C.4.3.2, that it is okay to contaminate groundwater up to the drinking water standards. *Any* contamination of the groundwater is unacceptable, although it may be unavoidable. What the authors may have intended to say is that contaminants *below* the drinking water standards present a low risk to health. Contamination at the drinking water standard is at the threshold where an unacceptable risk to health is present.

Response
DOE changed the referenced sentence in Section C.4.3.2 to say that since the drinking water standards adequately protect human health, concentrations of contaminants in groundwater at or below these levels present a low risk to health.

Comment (2564)
In Volume II, Table II-6.1-13, it is assumed that during normal waste storage operations no water would be allowed to come in contact with the wastes and, that during normal waste treatment operations, no direct releases to groundwater would occur. Then what would be the source for the seepage of contaminated groundwater mentioned in Volume III, Section C.4.3.3, and what would be the source for the contaminants identified at 80 to 100% of drinking water standards in Table II-6.1-13? Groundwaters contaminated to 80 to 100% of the drinking water standard are not acceptable. What are these values based on?

Response
Table II-6.1-13 in Volume II of the WM PEIS is titled "INEL-LLMW - Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)." The contaminants originated from disposal of low-level mixed waste at INEL. Revised analyses performed for the Final WM PEIS show no values greater than 10% of the drinking water standard from low-level mixed waste disposal at INEL.

In addition, Section 6.6.2.2 in Volume I states that the modeled concentrations of hazardous constituents in the groundwater from disposal of low-level mixed waste are largely due to assumptions on the routing of wastes through the treatment system. As shown in the low-level mixed waste flow diagram (Figure 6.2-1), some wastes containing solvents were assumed to bypass the thermal treatment processes. It was further assumed that the solvents in these wastes were not destroyed, but instead, ended up in the disposal facility. Some of these wastes contain solvents in large enough concentrations to cause problems when disposed of. In practice, low-level mixed waste to be disposed of would meet EPA standards for treatment and disposal and, therefore, should not produce major impacts to groundwater quality.

Treatment and storage of wastes would not be expected to affect groundwater quality. Only disposal would be expected to affect groundwater in a localized area beneath the disposal unit. The release of contaminants from the disposal unit could occur in the future as the disposal units degrade.

Comment (2935)
Referring to Volume I, Section 5.4, a commentor stated, "absent a discussion of appropriate technologies, the reasonableness of DOE's analysis of leachate quality and subsequent downgradient water quality is impossible to check."

Response
Section 5.4.3 in Volume I of the WM PEIS presents a summary of information on the groundwater quality methodology. More detailed information is presented in Section C.4.3 in Volume III. The groundwater quality information was obtained as an offshoot of the health risk analysis. Therefore, detailed information on the conduct of the modeling is presented in Appendix D in Volume III and the WM PEIS human health risk technical reports. Supporting technical reports are listed in Section 15.2

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in Volume I and are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2944)
Given the operating record of DOE sites to date, it does not seem necessary to wait for a loss of institutional control for the development of facility deterioration and the onset of impacts to groundwater. Does DOE have specific guarantees that facilities will be operated more responsibly? Will DOE defend the past 10 years of operating history at BNL without reservations, for example? The past 5 years?

Response
DOE waste management facilities will be constructed, operated, maintained, and closed in compliance with all applicable regulatory requirements. This includes requirements of the Atomic Energy Act for radioactive wastes, and the Resource Conservation and Recovery Act and/or Toxic Substances Control Act for hazardous wastes.

As described in Section 6.2.3 in Volume I, two types of disposal were analyzed in the WM PEIS: engineered disposal and shallow land burial. However, when disposing of small quantities of waste (i.e., less than 700 cubic meters per year), aboveground silos were assumed. All of the of low-level mixed waste disposal facilities assumed in the PEIS were designed to meet all applicable RCRA disposal requirements.

The PEIS evaluated above-grade engineered disposal at BNL. These types of facilities utilize concrete to maintain facility integrity. As described in Section 6.4.1.2 in Volume I, DOE assumed that above-grade engineered disposal facility integrity would be maintained for 300 years. Although leakage from the disposal facility could occur prior to closure, as stated in Section C.4.3.5 in Volume III of the PEIS, impacts from leakage during operations and institutional control are unlikely because leachate and groundwater monitoring are likely to detect any leak before significant degradation of groundwater quality could occur.

DOE is committed to remediating environmental impacts from past operations at BNL. Information on environmental restoration activities at BNL can be obtained by contacting BNL's Office of Environmental Restoration.

DOE is also committed to assuring that the operation of BNL is conducted in a manner that is protective of public health and the environment. Providing funding for infrastructure maintenance, requiring that all operations have appropriate environmental permits, and analyzing the potential environmental impacts of proposed actions, such as those covered by this PEIS, are examples of DOE's commitment.

Comment (2981)
In Volume I, Sections 5.4.3, 6.6.2, and 7.6.2, the assumption that no releases will occur pre-closure, and that groundwater flow is insufficient to transport radionuclides 300 meters before large attenuation of radioactive rates occur is not well supported. Releases of radionuclides have been common at BNL prior to closure of facilities, and groundwater has been estimated to transport particles 300 meters in as little as 3 to 4 years on Long Island. This should be acknowledged as another site-specific element tending to make BNL less favorable for disposal activities.

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Response
As stated in Section 6.2.3, two types of disposal were analyzed in the WM PEIS: engineered disposal and shallow land burial. However, when disposing of small quantities of waste (i.e., less than 700 cubic meters per year), aboveground silos were assumed. All of the low-level mixed waste disposal facilities would be designed to meet all applicable RCRA disposal requirements.

The PEIS evaluated aboveground engineered disposal at BNL. These types of facilities utilize concrete to maintain facility integrity. As described in Section 6.4.1.2, the PEIS assumed that aboveground engineered disposal facility integrity would be maintained for 300 years. Although leakage from the disposal facility might occur prior to closure, as stated in Section C.4.3.5 (in Volume III, impacts from leakage during operations and institutional control are unlikely, since leachate and groundwater monitoring are likely to detect the leak before significant degradation of groundwater quality could occur.

In addition, the radioactive decay discussed in the WM PEIS occurs in two places: within the disposal unit, and during transport through the groundwater. The PEIS assumes that the disposal unit would remain intact for 300 years. Therefore, most of the radioactive decay would occur while the wastes are confined to the disposal unit, rather than during transport through the groundwater. As stated in Section 6.6.2 in Volume I, disposal of contact-handled low-level mixed waste at BNL would not result in exceedance of 25% of the drinking water standard for radionuclides or hazardous constituents.

Comment (2983)
A commentor is "uncomfortable" with the apparent degree of certainty expressed concerning the release of organic contaminants to the environment. Not enough information has been provided to independently verify the WM PEIS conclusions and estimates. The necessity for many assumptions in any such analysis renders the analysis "little better than an educated guess gussied up by a great many essentially meaningless equations." The commentor stated that, nonetheless, the results reported here in Table 6.6-5 support the commentor's position that BNL is an inappropriate site for disposal of radioactive and/or hazardous wastes. The WM PEIS guesses that BNL will exceed drinking water standards for several organic compounds in any release scenario. BNL's sensitive location in the Deep Recharge Zone for sole-source aquifers, its sensitive location in a protected ecosystem, and the large population in the BNL region of influence reinforces the necessity for avoiding including BNL in any disposal plan.

Response
Summary information on the groundwater quality methodology is presented in Section 5.4.3.2 in Volume I of the WM PEIS. More detailed information is presented in Section C.4.3.5 in Volume III. The groundwater quality information was obtained as an offshoot of the health risk analysis. Therefore, detailed information on the conduct of the modeling is presented in Appendix D in Volume III and in the WM PEIS human health risk technical reports. The technical reports are listed in Section 15.2 in Volume I and are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

The WM PEIS used generally accepted, verified models for leaching and groundwater transport. The methods used in the PEIS were reviewed before being implemented. Note that most DOE sites had modeled exceedances of drinking water standards for hazardous constituents in the Draft PEIS. As explained in Section 6.6.2.2 in Volume I, the modeled concentrations of hazardous constituents in the

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groundwater from disposal of low-level mixed waste are largely due to assumptions on the routing of wastes through the treatment system. As shown in the low-level mixed waste flow diagram (Figure 6.2-1), some wastes containing solvents were assumed to bypass the thermal treatment processes. It was further assumed that the solvents in these wastes were not destroyed, but instead, ended up in the disposal facility. Some of these wastes contain solvents in large enough concentrations to cause problems when they are disposed of. In practice, low-level mixed waste to be disposed of would meet EPA standards for treatment and disposal and, therefore, should not produce major impacts to groundwater quality. Revised analyses performed for the Final WM PEIS show that no values would exceed the drinking water standards from disposal of low-level mixed waste or low-level waste at BNL.

If BNL were selected to host new waste management facilities, sitewide or project-level NEPA reviews would consider this issue.

Comment (2984)
The basis for determining the leaching of radioactive elements as reported in Tables 6.6-3 and 6.6-4 is not clear. A commentor expressed serious reservations regarding the use of models to determine these estimates and also stated that it is not apparent how else an estimate could be constructed. BNL already experiences contamination problems from strontium and tritium. This should be recognized in the analysis, despite DOE's contention that no leaching will occur pre-closure. In any case, because BNL is not an appropriate site to consider for the disposal of hazardous and/or radioactive wastes, the number of treatment and disposal sites under the Decentralized Alternative should be appropriately decreased in each table to account for BNL's removal from the sites in that option.

Response
The WM PEIS used generally accepted, verified models for leaching and groundwater transport. The methods used in the PEIS were reviewed before being implemented. As described in Section 5.1.2 in Volume I and Appendix D in Volume III, the Disposal Unit Source Term Model (DUST) was used to determine the flux rates out of the disposal facility for each contaminant. A detailed description of how DUST was used is presented in the technical report titled *DOE Public and Onsite Population Health Risk Evaluation Methodology for Assessing Risks Associated with Environmental Restoration and Waste Management.* The technical reports are listed in Section 15.2 in Volume I and can be reviewed at the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Note that most DOE sites had modeled exceedances of drinking water standards for hazardous constituents in the Draft PEIS. As explained in Section 6.6.2.2 in Volume I, the modeled concentrations of hazardous constituents in the groundwater from disposal of low-level mixed waste are largely due to assumptions on the routing of wastes through the treatment system. As shown in the low-level mixed waste flow diagram (Figure 6.2-1), some wastes containing solvents were assumed to bypass the thermal treatment processes. It was further assumed that the solvents in these wastes were not destroyed, but instead, ended up in the disposal facility. Some of these wastes contain solvents in large enough concentrations to cause problems when they are disposed of. In practice, low-level mixed waste to be disposed of would meet EPA standards for treatment and disposal and, therefore, should not produce major impacts to groundwater quality. Revised analyses performed for the Final WM PEIS show that no values would exceed the drinking water standards from disposal of low-level mixed waste or low-level waste at BNL.

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The WM PEIS Affected Environment Technical Report contains more information on current groundwater contamination at BNL. Section 2.15.2.2 of the technical report states that in 1991, groundwater at the site was monitored at 81 wells, including 17 offsite private wells, for radioactive parameters and at 71 wells for nonradioactive parameters. The only average radionuclide concentrations that exceeded concentration limits were gross beta (175% of the standard) and strontium-90 (1,104% of the standard). The high radionuclide concentrations occurred onsite near the landfill areas and the Hazardous Waste Management Facility. For nonradioactive parameters, 1,1,1-trichloroethane, 1,2-dichloroethane, iron, nitrate, pH, tetrachloroethylene, and trichloroethylene were found at concentrations above New York State Drinking Water Standards. The high concentrations occurred onsite near the central portions of the site, the landfill areas, the Hazardous Waste Management Facility, and the Spray Aeration Project areas. All other parameters were within limits. Some groundwater contamination has migrated offsite at concentrations exceeding New York State Drinking Water Standards. The full extent of offsite contamination is currently being evaluated under an Interagency Agreement between the New York State Department of Environmental Conservation, EPA, and DOE.

Comment (3075)
In the water quality impacts sections of Chapters 6, 7, 8, and 9, the WM PEIS uses only DOE or EPA standards. In some cases, Washington State standards are more stringent than EPA standards, and in most cases, are more stringent than DOE standards. The WM PEIS should use State standards for States in which standards are more stringent than DOE or EPA standards.

Response
The WM PEIS used Federal water quality standards that could be applied uniformly across all DOE sites. State standards would be more appropriately considered in sitewide or project-level NEPA reviews.

Comment (3084)
In Volume I, Table 7.16-1, under "Groundwater Impacts from Disposal," the total of entries under the columns "# of sites that meet standards" and "# of sites that require additional constraints to meet standards" should be the number of disposal sites needed for each alternative.

Response
In general, the entries in the two columns should equal the total number of disposal sites associated with the alternative. This is not always true, however, because under some alternatives not all disposal sites actually receive waste. For example, under the Decentralized Alternative for low-level waste, 16 sites could receive wastes for disposal. The Draft WM PEIS showed only 12 sites with low-level waste inventories; therefore, only 12 sites would have disposed of low-level waste under the Decentralized Alternative. Although the Draft PEIS reported no low-level waste volumes at some sites, newer waste-volume data show low-level waste inventories at BNL, NTS, and WVDP. Therefore, 15 sites would dispose of waste management low-level waste. New data from the 1995 Integrated Data Base reported no waste management low-level waste generated or stored at FEMP. Therefore, FEMP would dispose of no waste management low-level waste under the Decentralized Alternative. Appendix I in Volume IV of the WM PEIS provides a comparison of the latest waste volumes reported by DOE to the waste volumes used in the Draft WM PEIS. Note that FEMP is currently included in the DOE Environmental Restoration Program, and that FEMP could dispose of environmental restoration low-level waste.

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Comment (4491)
While information on groundwater pathways and potential exposure from subsequent use was collected to support the human health impacts analysis in the Draft PEIS, it was not used to any significant extent to assess human health impacts from existing sites.

Response
Information on existing groundwater quality at the sites is summarized in Chapter 4 in Volume I of the WM PEIS. More detailed information is presented in the WM PEIS Affected Environment Technical Report. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Chapter 11 in Volume I uses the information on existing groundwater contamination to estimate potential cumulative impacts of the waste management actions when combined with existing activities and reasonably foreseeable future actions. Human health risks associated with groundwater contamination are discussed in terms of water quality exceedances at existing sites. The tables in Chapter 11 indicate the potential for human health risk by providing the contaminants that would exceed drinking waster standards at each site. These drinking water standards are set at levels to protect human health.

Comment (4519)
A considerable amount of information is known about the hydrogeology of the different proposed waste disposal sites. Some sites have prevailing hydrogeology that is much more difficult to monitor, at which groundwater is more difficult to contain, or that allows quicker and more unpredictable transportation of waste from leaking disposal sites through the soil and groundwater to offsite receptors than other sites. These factors are very important when deciding where to locate disposal facilities.

Appropriate modeling and qualitative evaluation of the suitability of sites for minimizing transport of groundwater plumes and for monitoring containment and transport of contaminants in groundwater should be performed before DOE makes decisions on which 'sites to use for landfills and other subsurface disposal facilities.

Response
The hypothetical farm family disposal risk analysis has been supplemented in the Final WM PEIS with an assessment of the potential vulnerability of sites to present risks to offsite populations from disposal of low-level mixed waste and low-level waste.

To supplement the quantitative estimates of individual disposal risks presented in Sections 6.4.1.8 and 7.4.1.7 in Volume I, DOE performed statistical analyses of site environmental characteristics. These analyses produced groupings of sites by relative vulnerability, rather than quantitative estimates of person-rem doses and potential cancer fatalities. Section 5.4.1.2.3 in Volume I and Section C.4.1.2 in Volume III contain additional details about the methods and results of the analyses.

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Comment (474)
The WM PEIS is inaccurate in that it fails to consider the potential effects to the Clinch River of waste activities conducted at Oak Ridge National Laboratory (ORNL). Given that several scenarios suggest the possibility that more than 50,000 curies could be discharged into the river, the effects of such an event should be discussed in this document.

Response
Of the accident scenarios evaluated in the ecological resources impacts sections of the WM PEIS, an accident involving low-level waste resulted in the largest curie release. Section 7.7.5 in Volume I states that an estimated 30,000 curies of radioactivity, including nearly 15,000 curies of cobalt-60, would be released into surface water during a truck transportation accident. Such a release would produce adverse impacts on aquatic populations on 385 meters of a second-order stream and 1 meter of a fourth-order stream; larger streams are expected to be unaffected. Therefore, a body of water the size of the Clinch River should not be significantly affected. Section 7.7.5 further states that DOE also evaluated the potential impacts of the spill under the assumption that all released material partitioned to sediment. Since low-level waste typically includes a large fraction of insoluble material, this scenario probably is a more accurate model of the potential consequences of a low-level waste transportation accident. The results of the sediment deposition scenario analysis suggest that more than 2,000 metric tons of sediment could be contaminated to a level requiring remediation.

The WM PEIS does not evaluate potential health risks resulting from accidental releases to surface waters. To analyze the potential consequences of such releases, large amounts of site-specific data (e.g., location, size and flow of receiving water body; locations and numbers of individuals; and potential exposure pathways) would be required. Such analyses are better addressed in sitewide and project-level NEPA reviews.

The PEIS assumes that the actual risks from a spill or leak of wastes will be reduced or mitigated by (1) dilution in the receiving water body, (2) remedial actions taken to contain or remove the contaminants, and/or (3) the relatively small number of individuals potentially exposed. Finally, the true risk might be limited by the potential frequency of occurrence of the accident or initiating event. That is, an accident could have the potential to adversely impact the health of a relatively large number of individuals if it occurred, but the actual probability of occurrence could be very small.

Comment (1598)
DOE should consider that the Delta Mendota Canal and California aqueduct are within 5 or 6 miles of LLNL Site 300.

Response
Although not specifically analyzed in the WM PEIS, operations at Site 300 would be unlikely to affect any features at a distance of 5 or 6 miles. Because wastewater is not discharged to natural-flowing surface water at Site 300, it is unlikely that surface-water resources would be significantly affected by discharges from the site. Volume III, Section D.2.3.1, provides supporting information that airborne deposition of contamination onto these aqueducts would not result in significant human health risk.

Comment (2085)
Volume I, Section 5.4.3 of the WM PEIS states that, if possible, no new waste management facilities would be located in floodplain areas. We recommend that the Final WM PEIS recognize the

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requirements of 40 CFR 264.18(b), which requires that any RCRA-permitted facility in a 100-year floodplain be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood, unless the owner or operator can demonstrate to EPA's satisfaction that procedures are in effect that will cause the waste to be removed safely, before flood waters can reach the facility, to a location where the wastes will not be vulnerable to flood waters.

If possible, it would be helpful if the Final WM PEIS could identify what facilities could potentially seek a permit to site RCRA-permitted facilities in a 100-year floodplain, as well as the procedures DOE will institute to ensure compliance with 40 CFR 264.18(b), including alternative RCRA facilities (either Federally or privately owned) outside the 100-year floodplain that would accept RCRA wastes in a short time frame.

Response
Sections 5.4.3.3 in Volume I of the WM PEIS states that, if possible, waste management facilities would be located outside a 100-year floodplain. In any case, the waste management facilities would be sited, designed, and constructed in compliance with 40 CFR 264.18(b). Note that the design and siting of the disposal facilities would require sitewide or project-level NEPA reviews that would further assist DOE in complying with floodplain restrictions. Also, any DOE proposed action in a floodplain would be assessed, with public notice and comment, under 10 CFR Part 1022.

Sections 5.4.3.3 in Volume I and Section C.4.3.4 in Volume III of the WM PEIS have been revised to incorporate a reference to the floodplain location standards in 40 CFR 264 that apply to low-level mixed waste, transuranic waste, and hazardous waste management facilities.

Comment (2202)
There are safety concerns relating to waste stored in an earthquake zone in a river bottom. PGDP is located near the Ohio River, from which Cairo, Illinois, draws its drinking water.

Response
Although Cairo, Illinois, does obtain its water from the Ohio River, this city is located approximately 50 kilometers (30 miles) downstream from PGDP.

Accidents initiated by earthquakes at treatment facilities were included in the WM PEIS, assuming generic facility characteristics, and were estimated to produce minimal risks. See Volume I, Sections 6.4.3 and 7.4.3. Storage facility accidents were estimated to result in an estimated radiation-induced incremental cancer fatality risk to the maximally exposed individual of about 5E-06 to 2E-03. The accident frequencies ranged from greater than 1E-02 per year for the low-consequence accidents to less than 1E-06 per year for the high-consequence accidents. Additional information on accident scenarios and health risks from accidents initiated by earthquakes is provided in Appendix F (Volume IV) and Appendix D (Volume III), respectively.

Comment (2526)
Volume I, Section 5.4.3, states, "Most of the potentially contaminated stormwater runoff would be contained within onsite stormwater collection ponds. The stormwater runoff would evaporate and infiltrate into the ground." Holding runoff onsite and allowing it to infiltrate into the ground could aid in the mobilization and movement of contaminates. A better method would be to ensure that runoff is never contaminated in the first place and then channel it away from the disposal facility.

Response
The text in question in the WM PEIS refers to stormwater contamination due to air emissions from waste treatment facilities and not to stormwater runoff at waste disposal facilities. The paragraph (now in Section 5.4.3.3) states, that stormwater runoff would be routinely monitored and any discharges would be in compliance with site-specific permit limits. Controls would be implemented at each site to minimize the potential for contaminated stormwater runoff. Impacts from stormwater runoff are expected to be minor, but are highly site-specific and would depend on the design of the stormwater management system, meteorologic conditions, topography, soil type, and the affected surface water body at the site. These impacts could be evaluated in more detail in sitewide or project-level NEPA documents if necessary. The Final WM PEIS was revised to include a qualitative analysis of the vulnerability of the DOE sites to surface water impacts. This new text is located in Section 5.4.3.3 in Volume I and Section C.4.3.4.10 in Volume III.

Comment (2527)
Volume I, Section 5.4.3, states that waste is discharged to dry steam beds and playas. If the authors are referring to the Big Lost River system, it is not always dry. If they are referring to something else, then this section needs to be clarified.

Response
Section 5.4.3.3 in Volume I and Section C.4.3.3 in Volume II now state that surface water resources would not be affected by effluent discharges at INEL because *generally*, wastewaters are discharged to dry stream beds or man-made ponds.

Section 2.3.2.1 of the WM PEIS Affected Environment Technical Report contains more detailed information on surface water resources at INEL. The technical report states that INEL has only one potential discharge to the Big Lost River and, therefore, has sought one National Pollutant Discharge Elimination System (NPDES) permit. At INEL, sanitary wastewater is piped to treatment facilities before being discharged into drainfields or ponds. Process wastewaters are treated and either conveyed to sanitary waste treatment facilities or discharged into ponds. INEL does have an NPDES permit for stormwater discharges and permits from the State of Idaho for discharges to the sanitary wastewater percolation ponds. The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2802)
BNL contains part of the headwaters of the Peconic River. The Peconic River has been designated as a New York State Wild, Scenic and Recreational River pursuant to ECL 15-2715. Much of its banks have received special zoning considerations due to this designation. The siting of radioactive and/or hazardous waste disposal facilities in such a river's headwater region is inappropriate.

Response
If DOE selects BNL as a disposal site, the facility would be designed, located, and operated in accordance with all applicable regulations. In addition, best management practices for stormwater management would be implemented to ensure that no significant quantities of potentially contaminated runoff would reach the river. Sitewide or project-level NEPA reviews would consider adjacent land use, ecological factors, and pertinent State and local regulations, and land-use plans.

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Comment (2946)
If the BNL wastewater treatment plant is to be used for the treatment of hazardous liquids, there is a known point of discharge to a known body of water. The exceptions to the programmatic assumed state of affairs should be noted in Volume I, Section 5.4.3.

Response
Sanitary wastewater treatment plants will not be used for primary treatment of hazardous wastes. Only non-hazardous wastewaters could be discharged to sanitary plants for treatment. Since the WM PEIS decision process will not select specific locations for waste management facilities on the sites or specific technologies, it is premature to examine impacts at specific locations on the sites. Sitewide or project-level NEPA reviews would consider this and other site-specific issues.

Comment (3364)
Why does the EIS pass over the impacts of emissions on surface water? How are the impacts on surface water any more site-specific dependent than any other impact? Considering that ingestion of radionuclides increases their risk, any internal routes of ingestion need careful analysis. The WM PEIS should consider the impacts of storage and disposal activities on surface water and stormwater runoff.

Response
Section 5.4.1.3 in Volume I states that the potential exists for human exposure to radiological and chemical contaminants in the surface water. Receptors can be exposed through use of contaminated surface water for drinking, bathing, swimming, or irrigation. Ingestion of fish or shellfish taken from contaminated surface waters could be another source of contaminants through bioaccumulation of the contaminants in the tissues of these organisms. Potential pathways for surface water contamination from waste management practices include deposition of contaminants released to the atmosphere on surface water bodies, overland runoff to surface waters, releases of contaminants in aqueous effluents from treatment and storage facilities, and recharge of surface waters by groundwaters potentially contaminated through waste disposal practices.

Of the potential surface water contamination pathways, only deposition of airborne contaminants is amenable to quantitative analysis without information about the exact location or technology employed for waste treatment, storage, or disposal on a given site. Preliminary estimates described in Section D.2.3.1 in Volume III for the Columbia and Clinch Rivers indicated that the potential dose received from ingestion of surface water contaminated by deposition of airborne contaminants were thousand to millions of times lower than that received from inhalation in a gaseous plume of hazardous or radioactive material.

Other potential pathways of surface water contamination can be controlled or are more affected by the technical design and relative location of the waste management facilities with respect to the location of surface water bodies. Releases of contaminants in aqueous effluents from treatment and storage facilities are expected to be small because process wastewaters from these facilities would be discharged to aqueous waste treatment facilities. After treatment, wastewaters would be recycled or discharged from these plants. All wastewaters, including stormwaters, would be discharged in compliance with site-specific DOE, National Pollutant Discharge Elimination System (NPDES), or industrial wastewater discharge limits, which are established based upon consideration of the potential health and environmental effects of contamination of the receiving body.

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Disposal facilities could eventually degrade and release contaminants to the groundwater. Resultant contamination of surface water from the groundwater depends on the specific location of the disposal facility with respect to the surface water; however, dilution of the contaminants in "clean" surface waters is likely to result in surface-water concentrations that are much lower than the concentrations in the groundwater.

Since the WM PEIS does not attempt to select locations for waste management facilities on sites or technologies, there would be a high degree of uncertainty associated with any quantitative surface water pathway exposure estimates. Consequently, the WM PEIS did not conduct a detailed evaluation of this pathway. Surface water pathway analyses would be conducted as part of sitewide or project-level NEPA reviews, as appropriate.

As stated in Section 5.4.3.3 in Volume I, the aqueous wastewaters that are currently being managed at the sites are not part of the WM PEIS. The WM PEIS includes only those aqueous wastes generated by the hypothetical facilities analyzed as part of the WM PEIS alternatives. These waste management facilities were assumed to be very efficient in water use. Process wastewater would be treated according to regulatory and permit requirements and recycled to the extent practicable, with little liquid effluent discharge. Therefore, there is little process wastewater that would be discharged to surface waters after treatment. Since process wastewater treatment would continue at the sites where it presently occurs, and the volumes of process wastewater treated at each site would vary only slightly between alternatives, the effects of process wastewater treatment on surface water and groundwater quality are already accounted for in the affected environment section. Therefore, impacts from these activities are not expected to be major, and would not influence the choice of alternatives. If necessary, these impacts would be evaluated in sitewide or project-level NEPA documents.

Some impacts on water resources were assumed to be minimal at all sites or at particular sites regardless of which waste type and alternative are being considered. To focus the analysis on significant environmental impacts that could influence the choice of alternatives, these potential minimal effects are discussed in Section 5.4.3.3 in Volume I and Section C.4.3.4 in Volume III and are not addressed in the waste-type chapters. This includes impacts to floodplains, impacts from runoff and sedimentation, impacts from wastewater discharges, and impacts from routine transportation and transportation accidents. Further evaluations of these potential effects might be conducted as part of sitewide or project-level NEPA reviews.

Releases of hazardous constituents to surface waters from routine operation of waste management facilities were assumed to be limited because of treatment and recycling of wastewaters. Releases to surface waters could result from accidents at waste management facilities or from transportation accidents. The WM PEIS assumes that the impacts from a spill or leak of wastes will be reduced or mitigated by (1) dilution in the receiving water body, (2) remedial actions taken to contain or remove the contaminants, and/or (3) the relatively small number of individuals potentially exposed. Finally, the impacts could be limited by the potential frequency of occurrence of the accident or initiating event. That is, an accident could have the potential to adversely impact a relatively large area of surface water if it occurred, but the actual probability of occurrence would be very small.

The Final WM PEIS was revised to include a qualitative analysis of the vulnerability of the DOE sites to surface-water impacts. This new text is located in Section 5.4.3.3 in Volume I and Section C.4.3.4.10 in Volume III.

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Comment (4527)
DOE should explain the expectation in the Draft WM PEIS that releases of contaminants in aqueous effluents would be "small" or "insignificant," and define "small" or "insignificant." Wastewater treatment facilities are never 100% effective, and would not be effective for tritium. Either the standards would have to be documented to "a-priori assure" negligible impacts (assuming minimal compliance to all applicable standards simultaneously), or an analysis would be needed of wastewater impacts on a site- and process-specific basis. DOE should consider that aqueous discharges from the WVDP high-level waste treatment facilities are sent to aqueous waste treatment facilities and, nevertheless, the impacts of the water pollution and associated contamination of fish exceed the impacts of airborne radionuclide releases, according to the WVDP site safety report.

Response
Sections 5.4.3.3 in Volume I and C.4.3.4.10 in Volume III have been revised to provide more detailed discussions of the potential vulnerability of sites to surface-water impacts from waste management actions.

Comment (4529)
The WM PEIS is intended to provide input for future configurations of waste management facilities, including DOE installations at which such facilities would be located. However, without also evaluating the likely range of impacts from surface-water pathways, modeling of the impacts of airborne contamination is not a suitable method for making decisions on configurations or installations at which to locate waste treatment facilities. All exposure estimates in the WM PEIS suffer from a high degree of uncertainty. While the WM PEIS analysis would not indicate where on specific installations specific facilities are located, it could be used to indicate at which installations and configurations of installations the facilities would be located. The impacts of such facilities could be highest for surface-water pathways from such facilities.

Response
Section 5.4.3.3 in Volume I and C.4.3.4.10 in Volume III have been revised to provide a more detailed discussion of the potential vulnerability of sites to surface water impacts from waste management actions.

Section 5.4.1.3 in Volume I states that the potential exists for human exposure to radiological and chemical contaminants in the surface water. Receptors can be exposed through use of contaminated surface water for drinking, bathing, swimming, or irrigation. Ingestion of fish or shellfish taken from contaminated surface waters could be another source of contaminants through bioaccumulation of the contaminants in the tissues of these organisms. Potential pathways for surface water contamination from waste management practices include deposition of contaminants released to the atmosphere on surface water bodies, overland runoff to surface waters, releases of contaminants in aqueous effluents from treatment and storage facilities, and recharge of surface waters by groundwaters potentially contaminated through waste disposal practices.

Of the potential surface water contamination pathways, only deposition of airborne contaminants is amenable to quantitative analysis without information about the exact location or technology employed for waste treatment, storage, or disposal on a given site. Preliminary estimates described in Section D.2.3.1 in Volume III for the Columbia and Clinch Rivers indicated that the potential dose received from ingestion of surface water contaminated by deposition of airborne contaminants would be thousands to millions of times lower than that received from inhalation in a gaseous plume of hazardous or radioactive material.

Other potential pathways of surface water contamination can be controlled or are more affected by the technical design and relative location of the waste management facilities with respect to the location of surface water bodies. Releases of contaminants in aqueous effluents from treatment and storage facilities are expected to be small because process wastewaters from these facilities would be discharged to aqueous waste treatment facilities. After treatment, wastewaters would be recycled or discharged from these plants. All wastewaters, including stormwaters, would be discharged in compliance with site-specific DOE, National Pollutant Discharge Elimination System, or industrial wastewater discharge limits, which are established based upon consideration of the potential health and environmental effects of contamination of the receiving body.

Disposal facilities could eventually degrade and release contaminants to the groundwater. Resultant contamination of surface water from the groundwater depends on the specific location of the disposal facility with respect to the surface water; however, dilution of the contaminants in "clean" surface waters is likely to result in surface-water concentrations that are much lower than the concentrations in the groundwater.

Since the WM PEIS does not attempt to select locations for waste management facilities on sites or technologies, there would be a high degree of uncertainty associated with any quantitative surface water pathway exposure estimates. Consequently, the WM PEIS did not conduct a detailed evaluation of this pathway. Surface water pathway analyses would be conducted as part of sitewide or project-level NEPA reviews, as appropriate.

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Comment (19)
Radiation exposure to the environment is a concern.

Response
DOE analyzed the impacts to terrestrial biota from the radioactive and hazardous components of the treated wastes and found that there would be no significant impacts from waste treatment activities at any of the candidate sites during normal operations. DOE also analyzed impacts to aquatic ecosystems from transportation accidents involving releases of radioactive materials and found that, in the unlikely event of such a release, aquatic species could be adversely affected, but the long-term effects should be limited by the emergency response measures taken to mitigate the effects of the accident.

Each DOE site has an emergency spill response system and emergency procedures that depend on the characteristics of the material spilled. For example, there are different emergency procedures for radiological, chemical, and petroleum hazards. In general, a site's fire response unit is responsible for mitigation and the waste management unit is responsible for cleanup. DOE's Radiological Assistance Program provides rapid assistance in the event of a radiological spill anywhere in the United States. The Radiological Assistance Program teams provide assessment and monitoring capabilities.

Comment (100)
Commentors are concerned about the impacts to endangered species and natural resource areas from waste treatment, storage, and disposal activities at LLNL.

Response
Sitewide or project-level NEPA reviews would include a detailed assessment of impacts to endangered species and natural resource areas based on site-specific resources and conditions.

DOE considers sensitive ecosystems and habitats when designing and siting projects and complies with the laws and regulations that protect wildlife resources, including those that protect threatened and endangered species, to ensure the impacts of proposed activities are minimal.

DOE did not conduct a detailed assessment of impacts to endangered species and natural resources in the WM PEIS because it has not proposed specific locations for waste management facilities at the sites. DOE did conduct a screening analysis of the potential for waste management activities to directly affect wildlife through exposure to facility emissions and to affect sensitive habitats and species based on land requirements. The screening analysis indicated that no wildlife effects are expected from facility emissions and that, since the land required for facility construction would be a small fraction of the available nonsensitive lands, DOE would be able to avoid direct impacts. Furthermore, DOE would have sufficient flexibility in locating the waste management facilities to avoid indirect impacts to sensitive habitats, such as might result from construction noise or building access roads.

Comment (1559)
DOE should establish a buffer zone under the land-use analysis to protect sensitive habitats.

Response
The WM PEIS cannot quantify the precise impacts of waste management facilities on ecological resources because DOE has not yet identified the locations of the facilities on the sites. However, based on projected land requirements, DOE analyzed the potential for proposed waste management

activities to affect sensitive habitats and species. The analysis indicated that the land required for the construction of waste management facilities would be a small fraction of available nonsensitive lands, which would enable DOE to avoid direct impacts to sensitive lands. Further, DOE would have enough flexibility in locating facilities to avoid indirect impacts, such as those that could result from building access roads. Sitewide or project-level NEPA analyses will examine potential impacts based on site-specific environmental conditions.

Comment (1796)
A commentor is concerned about the shipment of DOE-managed waste through North Carolina because of the potential for effects on trees from accidental spills and the increased potential for fire in State forests as a result of faulty exhaust systems or accidents.

Response
The WM PEIS does not evaluate potential impacts to trees or other components of terrestrial ecosystems from transportation accidents. The severity of impacts on terrestrial ecosystems would depend largely on the type of waste involved, the amount of waste released, the location of ecological receptors in relation to the location of the accident, and the prevailing meteorological conditions at the time of the accident. Specific ecosystem components affected would vary based on the characteristics of the wastes, but should be localized, with effects limited by emergency response cleanup. Low-level mixed waste, low-level waste, and hazardous waste are more likely to have such localized effects. As described in the WM PEIS transportation impacts assessment for human health risk and for aquatic resources (Sections 5.4.1 and 5.4.4), potential acute toxic effects from short-term releases of radionuclides and hazardous chemicals contained in the waste are likely to be more important than chronic toxic effects, which should be limited by the emergency response measures taken to mitigate the effects of the accident. Due to the strength of the packaging used for the transportation of transuranic and high-level waste, it would be highly unlikely that even a small portion of a shipment inventory would be released after a transportation accident.

In-depth assessment of these types of incidents would require knowledge of the specific characteristics of the wastes being shipped, the specific shipment route being used, and the probability of an accident occurring on the route in question; detailed assumptions about waste release fractions, accident severity, and ecosystem components likely to be affected; and comprehensive data on radionuclide and chemical-specific toxicity levels to those components. This type of detailed risk assessment is not feasible in the context of the programmatic evaluation of alternatives for the WM PEIS. However, DOE recognizes that, in general, the likelihood of accidents that might cause ecological effects would be directly related to the number of shipments and the distances traveled, which is consistent with the findings of the human health risk assessment of waste transportation. Thus, the Centralized Alternatives would have the highest likelihood and the Decentralized Alternatives the lowest likelihood of causing these effects.

DOE did not evaluate the potential for accidents or faulty exhaust systems to cause forest fires. DOE shipments would be a small fraction of total shipments of hazardous materials and an extremely small fraction of commercial transport in the region in general, and the frequency of forest fires should not substantially increase.

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Comment (1797)
There is concern about potential effects of releases of radioactive materials on vegetation and about the potential for bioaccumulation of radioactive materials in the food chain.

Response
The WM PEIS does include an evaluation of the potential toxic effects of radioactive and hazardous chemical contaminants released from waste treatment facilities to a representative terrestrial receptor. As described in Section 5.4.4 in Volume I, DOE conducted a screening analysis of the impacts of airborne releases of contaminants to terrestrial animals living in the vicinity of such facilities. The analysis estimated doses of contaminants deposited downwind on soils over the assumed 10-year operational period of the facility. The model estimated uptake from the soils to vegetation and subsequent transfer in a terrestrial food chain leading to the exposure of a small mammal (a representative terrestrial receptor). The analysis then compared internal and external doses to available toxicity benchmarks. The results indicated that emissions from low-level mixed, low-level, transuranic, and hazardous waste treatment facilities would be expected to produce minimal impacts to terrestrial receptor populations. The effects of contaminant releases on plant species were not evaluated, as these effects were also considered to be minimal. High-level waste was not evaluated in the same way because the treatment of high-level waste is outside the scope of the WM PEIS, and no releases are expected from stored canisters of vitrified high-level waste.

Comment (2077)
The document concentrates on human risk due to exposure to radionuclides and hazardous wastes. It should identify and discuss the potential ecological impacts to sensitive species or habitats. The PEIS does not discuss impacts to the ecology very well.

Response
WM PEIS Sections 5.4.4 (Volume I) and C.4.4 (Volume III) describe the methods DOE used to analyze impacts to ecological resources. The analysis consisted of evaluating the impacts of the construction of new treatment, storage, and disposal facilities on the existing nonsensitive terrestrial habitats, the toxicity of contaminants released from waste treatment facilities to a model terrestrial receptor, and the toxicity to aquatic organisms of spills of waste shipments during transportation. Sections 6.7, 7.7, 8.7, 9.7, and 10.7 describe these impacts for low-level mixed, low-level, transuranic, high-level, and hazardous wastes, respectively.

Because of the programmatic nature of the WM PEIS, DOE could not conduct a detailed assessment of the impacts of waste management facilities on ecological resources. This would require identification of the proposed locations of the facilities on the sites and a more detailed description of facility design, which DOE has not yet done.

DOE did conduct a screening-level evaluation of the potential for site clearing and excavation to affect nearby sensitive habitats, including wetlands and designated critical habitats of Federally and State-listed endangered and threatened species, based on the assumption that the likelihood of such effects occurring would be roughly proportional to the ratio of the waste management acreage required compared to the acreage of nonsensitive land onsite. The premise was that the smaller the fraction of available nonsensitive lands required for construction of waste management facilities, the greater DOE's flexibility in locating the facility to avoid affecting nearby sensitive habitats. The analysis, therefore, compared total waste management facility acreage requirements for each waste type under each alternative at each site having sensitive habitats with the amount of available, nonsensitive land area at each site. The available land area was determined from site development plans and Site Environmental Reports as either the amount of land specifically designated for waste management facility development or the amount of land remaining after subtracting from the site's total acreage the acreages of wetlands, wildlife management areas, topographic features, existing roads and structures, cultural properties, and other areas and features that would make development unfeasible.

The analysis in each waste-type chapter (6 through 10) presents percentage figures for sites and alternatives under which waste management land requirements equal or exceed 1% of the available land. These are noted as situations that pose a greater likelihood of affecting nearby sensitive habitats. Sitewide or project-level analyses would evaluate whether these impacts would occur, and their extent and severity. Generally, the PEIS analysis showed that, at all of the sites, the land required for construction of waste management facilities would be a small fraction of available nonsensitive lands, which would enable DOE to avoid direct impacts to sensitive habitats. Furthermore, DOE would have enough flexibility in selecting specific locations for waste management facilities on sites to avoid indirect impacts, such as those that could result from construction noise or building access roads.

The ecological impacts analysis in the WM PEIS does not determine the likelihood and severity of effects on sensitive species, including Federally and State-listed endangered and threatened species, because DOE has not proposed specific waste management facility locations at the various sites. As stated in Section 5.4.4 in Volume I, these species-specific evaluations and assessments of impacts to natural resources would be conducted as part of sitewide or project-level NEPA reviews. However, the WM PEIS does identify sensitive species that might be affected by the proposed waste management facilities at each site. Chapter 4 identifies the sensitive species known to occur, or with the potential to occur, at or in the vicinity of each of the 17 major DOE sites, and provides a summary table of the Federally and State-listed endangered or threatened species at the 17 major sites. The waste type chapters (6 through 10) list in tabular form the numbers of Federally and State-listed endangered and threatened species that could be affected at each site under each alternative.

Comment (2199)
DOE should consult with the Fish and Wildlife Service regarding Section 7 of the Endangered Species Act. There are endangered species being affected by the activities at PGDP.

Response
DOE is committed to full compliance with all environmental laws and regulations, including the Endangered Species Act. In accordance with those laws, DOE establishes comprehensive consultation agreements with responsible agencies such as the Fish and Wildlife Service to ensure compliance. Currently, PGDP's waste management activities are not affecting endangered species and sensitive habitats.

The WM PEIS does not quantify impacts to threatened or endangered species and other natural resources because DOE has not yet proposed the locations of sites for waste management facilities, on which it would base its evaluations.

Sitewide and project-level NEPA reviews would evaluate specific impacts to endangered species and sensitive habitats. DOE did qualitatively analyze potential impacts to sensitive species and habitats based on land requirements. That analysis indicated that the land required for facility construction

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would be a small fraction of available nonsensitive lands, which would enable DOE to avoid direct impacts. Further, DOE would have enough flexibility in siting waste management facilities that it would also avoid indirect impacts to sensitive habitats, such as those that could result from road-building activities.

Comment (2851)
According to Volume I, Section 6.7.3, DOE examined sites with "the highest projected emissions." Toxicity to terrestrial wildlife was based on radionuclides that comprise "80% of the total volume of all radionuclides." Radionuclide emissions need to be evaluated in terms of dose and risk, not in terms of volumes or quantities. Volume (cubic meters) and quantity (curies) are not meaningful screening or evaluation criteria. The dose delivered by a quantity or volume of emissions is determined by the specific nature of the radionuclides involved. Were wildlife other than terrestrial organisms evaluated?

Response
DOE revised Section 6.7.3 of the WM PEIS to clarify the discussion of the 80% limit. The ecological resources impacts assessment included analysis of the potential toxic effects of airborne contaminants released from waste treatment and storage facilities on terrestrial organisms. Non-terrestrial wildlife were not included among the receptors that were modeled for routine facility operations. However, aquatic receptor impacts were evaluated for a transportation accident scenario, as described in Section 5.4.4 in Volume I.

The ecotoxicity risk assessment for routine operation of waste treatment facilities examined potential toxicity to terrestrial receptors following deposition of airborne contaminants to soils and contaminant uptake in terrestrial food chains. All nonvolatile hazardous chemicals expected to be released from the facilities were included in the analysis; volatile hazardous chemicals are not expected to be significantly redeposited to surface soils. The radionuclide contaminants expected to be contained in the facility airborne emissions were also evaluated. However, only the radionuclides that would contribute up to 80% of the total released activity were included in the analysis. The remaining activity would be contributed by trace emissions of a large number of radionuclides. Not including each of these minor radionuclides should not compromise the validity of the analysis, given the conservative assumptions used to characterize the scenario. For example, airborne contaminants deposited to surface soils were assumed to accumulate over the 10- to 20-year period of facility operation, with no loss due to leaching, runoff, or decay. This assumption should account for most or all of the uncertainty associated with limiting the analysis to 80% of the activity. An exception might be radionuclides that contribute trace amounts of released activity, but are taken up in terrestrial foodchains on a highly selective basis. A detailed analysis of the potential for these types of effects is not feasible within the scope of the general screening methodology of the WM PEIS programmatic impacts assessment, but would be done, if considered warranted, in sitewide or project-level NEPA reviews.

The results of the ecotoxicity risk analysis presented in Section 6.7.3, 7.7.3, and 8.7.3, indicate that body burden exposures of the model terrestrial receptor were all approximately a factor of 10 lower than concentrations expected to produce toxic effects. Given these results, DOE does not believe that the use of a limit on the radionuclide contaminants included in the analysis is problematic.

Comment (2853)
Section 7.7.5 in Volume I should define "significant impacts" to surface waters.

Response
The ecological resources impacts analysis conducted for the WM PEIS included evaluation of the potential impacts of a waste shipment transportation accident on aquatic ecosystems. As described in Section C.4.4.2.2 in Volume III, acute toxicity to aquatic biota is assumed to occur when combined internal and external doses are estimated to exceed 1 rad per day, an exposure level thought by the National Council on Radiation Protection and Measurements to be protective of aquatic populations. Because doses could exceed 1 rad per day, DOE revised Volume I, Section 7.7.5, of the PEIS to clarify that the release of the shipment of low-level waste to surface waters could adversely affect aquatic populations living in a second-order stream for 385 meters downstream of the release and for 1 meter downstream in a fourth-order stream. The term "significant impacts" was revised in the Final WM PEIS to "adverse impact."

Comment (2954)
The assumptions used in Section 5.4.4 are much too simplistic. Much has been written about the effects of habitat fragmentation and the needs of many species (including sensitive flora and fauna) for large segments of undisturbed habitat. (For example, in arid climate areas such as the Hanford Site, site clearing allows the invasion of exotic plant species, further degrading additional habitat surrounding a site.) The facile comparison here of "acres required for a facility to available acres" does not account for this large body of knowledge. This section should be revised to account for such research results. The Section 4.4.4 description of the Hanford land-use is incorrect. Only 77,000 acres was set aside as an arid land ecology reserve. Another 89,000 acres (Wahluke Slope) is managed by the U.S. Fish and Wildlife Service and Washington Department of Fish and Wildlife as a National Wildlife Refuge and Wildlife Area, respectively.

Response
Volume I, Section 5.4.4, of the WM PEIS describes the methodology used to assess the potential impacts on ecological resources from site clearing for the construction of new waste management facilities. Since DOE has not yet proposed locations on the sites for new facilities, a screening-level analysis was conducted to evaluate the potential for waste management actions to cause habitat loss and indirect effects on sensitive habitats. The potential was based on the percentage of available land area required for the facilities--with available land area consisting of only nonsensitive habitat. Because in all cases DOE determined that sufficient nonsensitive land was available, this screening-level analysis was considered sufficient for the programmatic review.

More detailed assessments of habitat impacts would require additional site-specific information, particularly the proposed location of the new facilities on the site in relation to existing available land and sensitive habitats. Sitewide or project-level NEPA reviews would include these types of analyses. However, the WM PEIS estimates of the land area required for construction of new facilities are generally small in comparison to estimates of total available land area. In addition, the sites already contain developed areas; not all habitat is pristine. The land required for construction of new waste management facilities could well be located in areas that are already disturbed or developed and that are only marginally useful as habitat for indigenous species.

DOE revised the text in Section 4.4.4 in Volume I of the WM PEIS to include the correct acreage for the arid land ecology reserve and the wildlife refuge identified in the comment.

5.5 Ecological Resources

Comment (2956)
The "Toxicity From Exposure to Contaminants" portion in Volume I, Section 5.4.4, recent research documenting genetic changes in the regions contaminated by the Chernobyl accident should be incorporated to more fully discuss this issue.

Response
As described in Section 5.4.4 in Volume I, the ecological resources impacts analysis considered the potential effects of exposure to radionuclides and hazardous chemicals released from waste treatment facilities on terrestrial receptors. This analysis evaluated the toxicity of radiological contaminants by comparing estimated total internal and external doses to a benchmark value of 100 mrad per day established by the International Atomic Energy Agency and listed in DOE Order 5400.5. No-observable-adverse-effect levels were used as benchmarks for chemical contaminants.

In addition, the Chernobyl accident resulted in different types of radiation exposures (acute gamma radiation) as well as radiation exposure levels far in excess of any exposures anticipated by operation of waste management facilities at DOE sites. Therefore, the effects produced by this accident are not comparable to the potential effects resulting from waste management activities.

Comment (2987)
The generic analysis of ecological resources impacts for low-level mixed waste and low-level waste provided in Sections 6.7 and 7.7, respectively, may be true for sites nationwide in general; however, it is not applicable to BNL, in particular.

Response
As presented in the Volume II Site Data Tables, at BNL, a maximum of 1.6 acres would be required for low-level mixed waste facilities and 2.8 acres for low-level waste facilities. At BNL, even given the commentor's suggested revisions to the BNL available land estimates, sufficient land is available at BNL to implement the proposed waste management actions. The small amount of land required for the low-level mixed waste and low-level waste facilities at BNL should give DOE a great degree of flexibility in making facility location decisions. Mitigation measures would also be used to ensure that site clearing and facility operation would not affect nearby sensitive habitats. As stated in Sections 6.7.1 and 7.7.1 in Volume I, site clearing for the construction of low-level mixed waste and low-level waste facilities would require no more than 55 and 86 acres at any site, respectively.

As stated in Sections 6.7.3 and 7.7.3, the maximum estimated total doses of radionuclides released from the operation of low-level mixed waste and low-level waste treatment sites are about one-tenth those of potential concern for ecotoxicity. Therefore, impacts to terrestrial receptor populations are expected to be minimal.

Comment (3069)
Section 5.4.4 ties the impacts to ecological resources to an inadequate concept for land-use impact thresholds. In the subsequent analysis, this concept does not allow for discrimination between alternatives.

Response
Volume I, Section 5.4.4.1, of the WM PEIS describes the evaluation of habitat effects in the ecological resources impacts analysis. At this level of analysis, the potential for direct effects on habitats can be

compared among alternatives because habitat loss would be a direct consequence of land clearing to build waste management facilities. The amount of land required for the waste management facilities is determined by the amount of waste to be processed under each alternative. In general, land requirements, and any resulting land-use or ecological resources impacts, are estimated to be small as compared to the amount of land available to build facilities across all alternatives. Available land is land designated for waste management activities not supporting sensitive habitats or sensitive species including endangered and threatened species. Furthermore, these relatively limited requirements would give DOE the flexibility to avoid indirect impacts to nearby sensitive habitats or species by selecting the specific location of the facilities. Nevertheless, the WM PEIS analysis is a screening-level assessment conducted to identify the potential for impacts. Site-specific analyses would evaluate the extent and severity of any potential land-use and ecological resources impacts once specific facility locations are proposed.

Comment (3095)
Volume I, Section 12.2, does not mention the impacts of site clearing on habitat. Site clearing causes fragmentation of wildlife corridors and blocks of habitat, thus diminishing habitat value for sensitive flora and fauna. For example, in arid-climate areas such as the Hanford Site, site clearing allows the invasion of exotic plant species, further degrading additional habitat surrounding the site.

Response
Since the WM PEIS does not specify the locations of waste management facilities on the sites, impacts such as habitat fragmentation could not be evaluated at this time. Sitewide and project-level NEPA reviews would more appropriately evaluate these impacts.

Comment (3112)
Section C.4.4.1.2, states that the total disturbed area includes 10-foot buffer zones around the facilities. However, the WM PEIS assumes a 25-foot lay-down area for facilities construction. This area will not be usable habitat.

Response
The habitat impacts assessment was based on the land area that would be disturbed during facility construction. This area was estimated to be the plant area plus a 25-foot buffer zone plus a parking area. The WM PEIS analysis used the area disturbed for construction, assuming that once the area was disturbed it would not be reclaimed as suitable habitat, given its close proximity to the waste management facilities. DOE revised the discussion of habitat impacts included in Volume III, Section C.4.4.1.2, to indicate that 25-foot buffer zones were considered in the analysis.

Comment (3177)
The EIS dismisses the need to analyze specific sites in detail based on the planned small size of the proposed facilities as compared to the total size of the various sites. At Hanford, the potential facility locations are all in areas of priority habitat, as identified by the State of Washington and the National Biological Survey.

Response
About 6 percent of the Hanford Site has been used for defense production and waste management purposes. Because much of the Hanford Site has been undisturbed for nearly 50 years, the Site contains one of the largest remaining relatively undisturbed shrub-steppe habitat areas in Washington

5.5 Ecological Resources

State. Shrub-steppe habitat is vegetation that flourishes on arid lands in areas with extreme temperature ranges. Shrub-steppe is considered a priority habitat by Washington State because of its importance to sensitive wildlife. About one-half of the land located on the Hanford Site has been designated as an ecological study area or wildlife refuge. These areas include the Fitzner Eberhardt Arid Lands Ecology Reserve located south and west of the 200 Areas and areas north of the Columbia River.

Much of the defense production activity occurred in the 200 Areas and, therefore, much of the land in the 200 Areas is disturbed. The 200 Areas also are the location of large low-level waste burial grounds. The 200 Areas and the surrounding Central Plateau have been identified as potential exclusive-use waste management areas to support the Hanford Site's waste management and environmental restoration programs. Because of past disturbances in the 200 Areas, the shrub-steppe habitat, wildlife typically found in the shrub-steppe habitat, and archaeological sites are limited.

Based on projected land requirements, DOE analyzed the potential for proposed waste management activities to affect sensitive habitats and species. The analysis indicated that the land required for the construction of waste management facilities would be a small fraction of available nonsensitive lands, which would enable DOE to avoid direct impacts to sensitive lands. Further, DOE would have enough flexibility in locating facilities on sites to avoid indirect impacts, such as those that could result from building access roads.

DOE revised Section 4.4.4 in Volume I to identify the presence of priority habitats at Hanford as referred to in the comment. Section 5.4.4.1 of the WM PEIS describes the methodology used to evaluate habitat impacts. The habitat impact analysis is a screening-level assessment conducted to identify potential impacts. The methodology does not dismiss the need to analyze sites in detail. Rather, it indicates that, because the specific locations of the proposed waste management facilities at the various sites have not been identified, sitewide and project-level reviews could be required to evaluate the extent and severity of any potential impacts. State and Federal habitat designations would be taken into account at that time. Also, the siting of any future facility at Hanford would take into account the findings of the Hanford Future Site Uses Working Group, which is composed of local stakeholders, as well as Federal, State, and local government agencies, and the Hanford Remedial Action EIS and Comprehensive Land Use Plan.

Comment (3366)
The analysis of the effects on threatened and endangered species is totally inadequate. This major action requires formal consultation under Section 7 of the Endangered Species Act. What is the cumulative impact on threatened and endangered species' reproductive systems from continued exposure and probable increases in such exposures? Simply listing the threatened and endangered species while stating that potential impacts to them cannot be predicted is not an adequate method for comparing alternatives.

Response
Volume I, Section 5.4.4, states that the ecological impacts analysis in the WM PEIS does not determine the likelihood and severity of effects on sensitive species, including Federally and State-listed endangered and threatened species, because DOE has not proposed specific locations for waste management facilities at the sites. Detailed ecological impacts evaluations would be conducted as part of any necessary sitewide or project-level NEPA reviews, including any consultations required under the Endangered Species Act. However, the WM PEIS analysis does provide information to

decisionmakers concerning the sensitive species that could be affected by the proposed waste management facilities at each site.

Volume I, Section 5.4.4, of the WM PEIS now states, "In addition to impacts through disturbance of habitat, sensitive species could be affected by exposure to contaminants released from waste treatment and storage facilities." These impacts are expected to be similar to those estimated for nonsensitive species, as described previously in this section (see discussion under the heading "Toxicity from Exposure to Contaminants"). However, unlike for nonsensitive species, estimated adverse impacts to a single organism could have a significance for the entire population. Therefore, careful consideration of potential actions to mitigate toxic effects to sensitive species is required. Potential toxicity effects on sensitive species can be fully addressed only in sitewide or project-level NEPA analyses.

Comment (3564)
Site data tables should address ecological impacts (e.g., habitat destruction, degradation). The arid-climate sites will be affected much more than sites that receive adequate precipitation. (Table II.1-3).

Response
Arid-climate sites could be more sensitive in terms of waste management construction activities. However, DOE did not perform an analysis of the impact on arid-climate sites versus wet-climate sites for the WM PEIS. Impacts to ecological resources are qualitatively addressed in terms of land-use requirements, the overall acreage of land available at each site, and the degree of flexibility DOE would have in selecting waste management facility locations to avoid indirect impacts to sensitive habitats. The Site Data Tables in Volume II do contain information regarding the number of acres required for waste management facility construction under each alternative and the percentage of available land this would constitute. DOE concluded from this analysis that the limited land requirements for waste management facilities should enable DOE to minimize any impacts to sensitive habitats at all sites, although some non-sensitive habitats may be affected. Furthermore, potential effects to ecological resources at arid-climate or wet-climate sites would be assessed in sitewide or project-level NEPA reviews.

Comment (4574)
A commentor is concerned about the spread of waste materials via wildlife at ANL-E.

Response
DOE did not evaluate the potential for spread of radionuclides or chemicals in wildlife, but did evaluate multiple pathways of human exposure for airborne contaminants using an agricultural food chain (including livestock). This analysis showed the relative risks of the alternatives for the waste types. Sitewide or project-level analyses would address wildlife dispersal of contaminants if that pathway was considered important for ecological or human health effects analysis.

5.6 Socioeconomics

Comment (1510)
Los Alamos benefits economically from the presence of LANL. Other communities around LANL suffer or see no benefit.

Response
Total LANL site employment in 1994 was 6,199. Table 2.5-16 of the WM PEIS Affected Environment Technical Report lists LANL employee data for 1994 for Los Alamos, Rio Arriba, and Santa Fe Counties. Together, Rio Arriba and Santa Fe Counties housed 2,389 LANL site employees, or 36.5% of the site workforce; so there are benefits to these communities in terms of the earnings of these workers and the value of their spending in their local economies. Additional benefits could accrue from future waste management actions at LANL because additional labor (254 to 1,741 employees for all waste types managed at LANL; see Table 11.9-2) would be required for facility construction and operation and many of those workers would likely spend a portion of their incomes in Rio Arriba and Santa Fe Counties.

DOE is addressing specific socioeconomic issues, including employment benefits, as well as concomitant adverse environmental and socioeconomic impacts in the LANL Site Wide EIS.

Comment (1722)
Socioeconomic conditions discussed in Volume I, Chapter 4 and Section 5.4.6, are based on 1990 and 1991 information. There have been many changes in levels of general employment, site employment, and per capita income since then. Information should be more current.

Response
The WM PEIS is a broad programmatic analysis. DOE believes that the data from the 1990 U.S. Census and the other documents from which it built its socioeconomic analysis provide the most consistent database for the broad, programmatic nature of the study. DOE would provide more detailed socioeconomic information and impacts analysis where appropriate in sitewide and project-level NEPA reviews.

Comment (2086)
A commentor is concerned that people will lose their jobs at the Portsmouth Plant when treatment operations begin.

Response
As shown in Tables II-13.1-13 and II-13.2-11 in Volume II of the WM PEIS, jobs are projected to increase at the Portsmouth Plant to support waste management facility construction and operation under all low-level mixed waste and low-level waste alternatives. Jobs in the Portsmouth region are also expected to increase. Changes in waste management activities are not expected to appreciably change employment related to other activities at the Portsmouth Plant.

Comment (2346)
Volume I, Chapter 10, appears to contain conflicting statements. In one place it reads "HW alternatives would only minimally benefit regional and national economies." In another it reads "None of the HW Alternatives substantially affect the national economy."

Response
DOE draws a distinction between minimal and substantial benefits. However, DOE revised statements in the WM PEIS about the economic benefits of alternatives to make it clear that the alternatives would only minimally benefit the national economy.

Comment (2351)
The WM PEIS states that none of the alternatives would affect the national economy. (This is found in the comparison of alternatives.) I believe taxes would be affected at the national level.

Response
The WM PEIS economic analysis determined that the proposed waste management actions would cause no effects on jobs or personal income on a national basis. The impact of required expenditures on taxes as a function of DOE's portion of the Federal budget were not evaluated because they are determined by the U.S. Congress and are, therefore, outside the scope of the PEIS.

Comment (2473)
The PEIS compares the effect of implementing the waste management alternatives to the employment at INEL and in the region of influence (ROI) for the baseline year of 1990. Site employment in 1990 is set at 11,813 and total ROI employment at 99,692. In evaluating the socioeconomic impact of the waste management alternatives, DOE's choice of the baseline year is crucial because of the job reductions that have occurred at INEL since 1990 (down to approximately 8,620 in 1995). Use of 1990 as the baseline year in the Draft WM PEIS has three problems.

First, different baseline years are cited in different parts of the Draft WM PEIS. In the Draft WM PEIS Summary document, the baseline year is set in 1990. In contrast, in Volume I of the WM PEIS, the baseline year is set in 1992. Finally, in Volume II of the WM PEIS, the employment and personal income changes in the ROI due to the implementation of the various alternatives are compared to the 1990 baseline year. However, in the same section, changes in site employment at INEL are compared to the 1991 site employment. Workforce reductions at INEL since 1992 were not incorporated.

Second, the choice of either 1990 or 1992 as the baseline year does not mesh with the 1995 baseline year used in the Final INEL Site Wide EIS for Environmental Restoration and Waste Management. There is no justification for using a 1990-1992 baseline employment of 11,813 that no longer exists; especially when the base period for the WM PEIS is 1996 to 2015.

Third, the use of 1990 or 1992 as the baseline year underestimates the effects of the management alternatives on employment at INEL. Because the projected 1995 employment is smaller than the 1991 employment, the percent changes increase. Simply adopting a realistic baseline year shows that Regionalized Alternative 3 *alone* could have a major impact on INEL employment levels.

Response
The WM PEIS did not evaluate changes in site employment *per se* or workforce reduction effects under different waste management alternatives, but rather, evaluated changes in regional employment caused by expenditures for waste management facility construction and operation. This part of the economic analysis used county-level employment and income data from the 1990 Census.

5.6 Socioeconomics

No separate trend analysis was done for site employment alone. However, site employment changes were used as an index for evaluating the potential for impacts to site transportation infrastructure. The baseline for this infrastructure analysis was the employment level from the Site Environmental Reports of 1992. DOE did not change the site employment figure to the lower 1995 level because the INEL transportation infrastructure, including roads, signs, and traffic signals, assumed to have the capacity to accommodate the higher 1992 site employment level is still in place. Therefore, using the lower 1995 employment level to calculate the percent increase in employment as an index of increased transportation infrastructure load would overestimate the potential for transportation infrastructure impacts.

Different baseline years were used in the WM PEIS because different elements of the analysis used data from different sources. The economic and population impacts analyses were based on data from the most recent census year, which was 1990. The analyses of other environmental resources at the sites was based on the most recent Site Environmental Reports from 1992.

Comment (2474)
The socioeconomic consequences for INEL and its ROI depend on which combination of alternatives is chosen for the various waste types. For INEL, there are hundreds of possible combinations of alternatives across all the waste types. It is difficult, if not impossible, to make a realistic forecast of the impact on INEL or its ROI until DOE expresses a specific preference for all five waste types.

Response
There are many possible combinations of alternatives across all the waste types for INEL, as well as for other sites. For this reason, the minimum and maximum values for each impact parameter, including socioeconomic effects, were identified for each site for each waste type. These values were summed to determine the combined minimum and maximum impacts. This information is provided by site in Volume I, Chapter 11, under combined waste management impacts.

Because the factors that influence the socioeconomic consequences of the proposed alternatives are multiple and complex, it is not possible to predict precise outcomes at each site for the proposed waste management alternatives. These are subject to multiple internal and external influences such as site priorities, local social conditions, Records of Decision, etc. However, estimates can be made by comparing certain characteristics of the alternatives with existing conditions of the local affected communities. The result is not intended as an absolute statement of definitive outcomes, but serves as a basis for comparing the potential effects of one alternative with another.

At INEL, the socioeconomic impacts of the combined waste-type alternatives (Table 11.7-1) include a 1.44% to a 7.35% increase in jobs in the region and a population increase ranging from 0.59% to 4.92%. DOE expects the effects of the combined preferred alternatives to fall within these ranges.

Comment (2475)
Given the possibility of employment increases at the levels projected in the WM PEIS for pending DOE actions and the possibility of construction overlap, it is vital that the State of Idaho obtain a time line for all pending DOE actions at INEL. Although only a projected time line, it would give the State and the region of influence the information necessary to prepare for periods of inflated or deflated employment at INEL.

Response
DOE revised the WM PEIS to include a more comprehensive analysis of cumulative impacts. Section 11.2 in Volume I notes that site employment levels are considered in the cumulative impacts analysis. The cumulative impacts analysis considers impacts from all reasonably foreseeable past, present, and future DOE actions at DOE sites.

The economic impacts subsections in each waste-type chapter discuss the potential employment impacts. Included are the assumptions regarding the number of years for which there would be construction and operations jobs for waste management activities. The WM PEIS analysis does not include specific assumptions about the time at which actual construction or operations activities begin or end at individual sites. Except for the use of general time frames for activity, no assumptions are made with respect to peak or off-years for employment. These are presented without reference to the year in which they occur, since the specific years are not known.

Although DOE recognizes that the potential cumulative socioeconomic effect of rapid or cyclical changes in employment are important, it was not feasible to characterize each of the sites affected in the detail necessary to create a year-by-year projection of employment. These scheduling decisions would be made at the site-level when analyzing specific waste management projects. Projected decline or expansion of individual site activity is not a component part of any of the alternatives considered; therefore, delineated project schedules for other projects were not included as a part of this evaluation. However, overall effects are considered as aggregate effects in the cumulative impacts analysis.

Comment (2479)
No rationale is given for selection of the 15% criterion for a major impact on site employment or for the 1% criterion for indicating a "significant potential for creating change to the social environment." If, in fact, pending DOE actions would subject employment at INEL and its region of influence to a yo-yo effect, the adverse effects on the infrastructure could be much worse than a simple 15% increase in employment at INEL over a number of years. It is one thing to provide for moderate increases in elementary school age children over a number of years; it is another to accommodate extended periods of temporary but unexpected sharp increases and decreases. The latter is far more disruptive than the former. The DOE criteria for significant impacts fails to address this problem.

Response
The WM PEIS does not directly analyze potential increases in site employment, but does use site employment as the basis for analyzing of other effects. The 15% criteria was used as an index to represent the level of increased site employment at which impacts to onsite transportation infrastructure would potentially increase. It was not intended to be a projection of increased employment under the waste management alternatives. Detailed methodologies for transportation infrastructure impacts are presented in Section C.4.9 in Volume III.

The potential for cyclical (yo-yo) effects related to changing employment requirements during the life of a project was recognized by DOE in the analysis for its potential to result in sharp and sudden population increases in the regions of influence. In addition to average annual employment figures, the potential highest peak employment was calculated for each site under each alternative to determine any potential effect on regional population due to site activity. These figures are presented and discussed in Sections 6.8, 7.8, 8.8, 9.8, and 10.8 in Volume I. Further details can be found in the WM PEIS

5.6 Socioeconomics

Environmental and Socioeconomic Impacts Methods and Results Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Detailed methodologies for socioeconomic and population effects are presented in Sections C.4.5 and C.4.6 in Volume III of the WM PEIS. Additional supporting material is presented in Sections 6.5 and 6.6 of the WM PEIS Environmental and Socioeconomic Impacts Methods and Results Technical Report. DOE revised the discussion in Section 5.4.6.1 in Volume I of the WM PEIS to clarify the use of the 1% criterion for creating change in the social environment. The 1% criterion was based on the assumption of a minimum 1% surplus capacity in public service delivery systems, infrastructure, and other health and welfare services.

Comment (2488)
Volume I, Section 4.3.6 states, "When examined on an individual county basis, with the ROIs, DOE and contractor employment was in all cases less than 9.5% of the total county employment." Is this true for Bonneville County, Idaho? Seventy-seven percent of the INEL workforce resides in that county. Also see Section 4.4.5.

Response
DOE deleted the reference to the relationship of DOE and contractor employment to individual county employment across all regions of influence. This information was not required as a baseline for the analysis, and was not utilized. Regions of influence were defined according to the criteria presented in Section 5.4.5 in Volume I and Section C.4.6.1 in Volume III. The counties that together account for at least 90% of a sites' workforce are those considered to comprise the sites' socioeconomic region of influence. Bannock, Bingham, Bonneville, Butte, Clark, and Jefferson counties together comprise INEL's region of influence.

Comment (2498)
Madison County, Idaho, is not included in the INEL socioeconomic region of influence.

Response
Although a potential for impact to Madison County is considered in the analysis, Madison did not meet the criteria for inclusion in the INEL socioeconomic region of influence. Regions of influence were defined according to the criteria presented in Section 5.4.5 in Volume I and Section C.4.6.1 in Volume III. The site-level region of influence was defined to include host and/or contiguous counties and any counties within the region containing at least 90% of the work force. The WM PEIS Affected Environment Technical Report, Sections 2.3.5 and 4.4.5, contain additional detail.

Comment (3113)
The WM PEIS economic analysis only considers increases in spending. It does not consider decreases in spending as activities are shifted from the individual sites to a regional or central site.

Response
In general, the No Action Alternative for each waste type represents the baseline for comparison of alternatives. Employment, income, and industry output under No Action can be assumed to be part of the 1990 regional economies of the 17 major sites. Any alternatives under which expenditures induce employment, income, and industry output greater than the No Action figures at a site would cause

growth in that sites' economy. Any alternatives under which expenditures induce changes lower than those of the No Action expenditures would diminish the sites' regional economy. In general, because expenditures under No Action are minimal (some waste management activity is required under all alternatives), alternatives that would diminish any regional economy are the exception.

5.7 Land Use

Comment (177)
A decision to store nuclear and hazardous waste at LLNL Site 300 would greatly interfere with the long-term land management decisions planned for the City of Tracy, California.

Response
As described in DOE's *Charting the Course - the Future Uses Report*, current uses at LLNL Site 300, including research and development, industrial, institutional, and administrative/technical uses, will be continued. Most of Site 300 is undeveloped and is available for compatible experimentation and testing. Additional areas for possible development to support site missions have been delineated. Therefore, alternatives evaluated in the WM PEIS are generally consistent with future land-use at LLNL Site 300.

Subsequent to a programmatic decision to manage waste at LLNL, DOE would perform a sitewide or project-level NEPA analysis that would consider local and regional planning issues. The development of Site 300-specific NEPA documentation will include consultation with local community and regional planning entities, including the City of Tracy.

Comment (523)
DOE needs to clarify how current and future land-use scenarios at INEL will be affected by WM PEIS decisions.

Response
The WM PEIS land-use analysis evaluates the potential land area requirements for the proposed treatment, storage, and disposal facilities against the potentially available land at each candidate site. As described in DOE's *Charting the Course - The Future Use Report*, INEL's future use recommendations, generated by an internal site team with local, regional, State, Tribal, and public input, generally support continuing current site land use with the central developed area being used as an industrial/commercial area and the surrounding area serving as a buffer and for grazing. The industrial/commercial use category consists of worker-based facilities such as research and development facilities, support uses, and storage and disposal facilities. Therefore, alternatives evaluated in the WM PEIS are consistent with future land-use at INEL.

Potential land-use conflicts or restrictions at specific INEL locations would be addressed in sitewide or project-level analyses. Volume I, Section 1.8.1, of the WM PEIS discusses the relationship between the WM PEIS and current project-level documents that address specific land-use decisions.

Comment (2188)
DOE failed to factor in any value for using land and resources in the Northwest for disposal. The WM PEIS says the cost of volume reduction is not worthwhile, in comparison to the cost savings from disposal. In other words, it is cheaper not to reduce the volume. The law requires DOE to consider the irreversibility of the commitment of resources, and the use of land is one of them.

Response
When land is used for treatment, storage, or disposal facilities its value for other purposes may be lost or diminished. NEPA mandates that an EIS address any adverse environmental effects that cannot be avoided if the proposal is implemented. Volume I, Sections 12.3 through 12.5, of the WM PEIS addresses unavoidable adverse impacts, the relationship between short-term uses of the environment

and maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitments of resources, including land, that could result when DOE implements its waste management strategy.

DOE revised Volume I, Sections 6.14, 7.14, 8.14, 9.14, and 10.14, and Volume III, Section C.3.2.1.4, to indicate that it would be too speculative to attempt to factor in the long-term value of land.

Comment (2319)
The PEIS should address the land area for disposal at Hanford.

Response
Although DOE will select sites for waste management activities based on the WM PEIS, it will not select specific locations for waste management facilities at any site. The area considered for construction of waste management facilities, including disposal facilities, at Hanford is the 6,000-acre Central Plateau, designated in Hanford's site development plan for waste management use. The acreage requirements estimated in the PEIS for waste management facilities at Hanford for all waste types combined in Volume I, Section 11.6.2, including any low-level waste or low-level mixed waste disposal facilities, constitute only a small portion (from 6.5 to 178 acres) of this 6,000-acre area (see Table 11.6-1). Again, the specific locations of the disposal units on the Hanford Central Plateau have not been chosen. However, DOE believes, based on these estimates, that sufficient land is available to support construction of any necessary waste management facilities on the Central Plateau.

Comment (2489)
Volume I, Section 4.3.8, describes how land availability was determined for 54 DOE sites nationwide and provides a table that presents total acreage and estimated available acreage at the 17 major DOE sites (Table 4-8). DOE determined available acreage by subtracting land currently used and unavailable land from the total acreage.

The Draft PEIS does not document what conclusions were reached from each of the steps in the assessment of available land, nor which references were utilized to reach those conclusions. The PEIS should include sections in the land-use assessment portion of the document discussing the following items, in detail, for each facility:

- Total site acreage and current land use at the facility;
- Land set aside for cultural resources, sensitive species, wetlands, floodplains, buffer zones, etc.;
- Land determined to be unsuitable for future development due to seismic, volcanic, or other geological constraints (such as superficial materials and availability of water);
- Anticipated future land uses and zoning;
- Projected decontamination and decommissioning activities;
- Population densities;
- Public Land Orders, Memoranda of Understanding, and other agreements affecting land use at the site;
- Recreational uses;
- Contaminated areas and areas expected to be restored to conditions suitable for new development.

5.7 Land Use

Response
The WM PEIS is a programmatic document that will lead to nationwide decisions on where to treat, store, and dispose of wastes. DOE used the land-use information in the WM PEIS solely to determine if sufficient land would be available for waste management facility construction at the sites and to determine if facility construction would be compatible with DOE's site planning. The WM PEIS was revised to include new waste management-designated acreage numbers for several sites, as well as more detailed information on site activity and proposed land uses.

DOE sitewide or project-level NEPA analyses would also consider local and regional planning issues, in addition to any incompatible land-uses either on or adjacent to the sites. Consideration of Site-Specific Advisory Board land-use plans would be an integral part of those analyses. However, because the WM PEIS does not address site or regional land-use decisionmaking, DOE did not evaluate Site-Specific Advisory Board plans in the PEIS land-use impacts analysis.

Information used in the land-use assessment portion of the PEIS was summarized from the WM PEIS Affected Environment Technical Report, which contains the details of the land-use information and sources. The report is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the WM PEIS.

Comment (2529)
DOE did not perform a detailed land-use analysis because at all sites considered in the WM PEIS land-use requirements would be below 1% of the estimated land available. This approach provides a very narrow assessment of impacts from future DOE actions. A programmatic analysis of impacts should also consider the cumulative impacts of that program on actions taken by other programs within the Department. As an example, the maximum estimated land needs at INEL, under all alternatives, are 121 acres (Section 11.5), far below the 1% threshold. However, "other," generally unspecified, actions at INEL are expected to affect a maximum of 1,096 additional acres. This would easily exceed the Draft WM PEIS 1% screening threshold and require a detailed land-use impact analysis for the site.

Response
Chapter 11 in Volume I of the WM PEIS describes the cumulative impacts analysis for all sites analyzed in the WM PEIS. The analysis also includes the results of combined impacts, which would result from locating more than one waste facility at a site. The 1% threshold for land use is a screening level used for programmatic analysis of the waste management requirements only. The combined alternatives would affect between 28 and 121 acres of land at INEL, while other actions could affect another 1,059 acres. Although existing operations, the combined alternatives, and other actions would only cumulatively affect a maximum of about 2% of the suitable acreage at INEL, any land to be disturbed might require detailed characterization studies and evaluations to ensure protection of wildlife habitats and cultural artifacts. Sitewide or project-level NEPA reviews would consider land-use impacts, including cumulative impacts, in more detail.

Comment (2812)
It is sometimes difficult to assess potential future use of DOE facilities (some of which span multiple counties) using local development plans. These facilities are often the primary livelihood of the community. If available, the site-specific land-use plans approved by the citizens groups chartered by the Federal Advisory Committee Act (e.g., the Site-Specific Advisory Boards) would be preferable.

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Response

Local and regional development plans are one factor in assessing the future use of DOE facilities. Sitewide or project-level NEPA reviews would address local and regional planning issues in addition to any incompatible land uses either on or adjacent to the sites. Consideration of Site-Specific Advisory Board land use studies and advice would be an integral part of those analyses. Until final selection of alternatives and the subsequent identification of proposed specific locations on sites, consideration of adjacent land use is not possible. DOE is committed to working with local governments to clarify planning expectations and evaluate future uses of sites and contiguous areas.

Comment (2819)

Volume I, Table 7.13-2, Acres Disturbed During Construction, [in the cultural resources section of the Draft WM PEIS] does not include BNL, even though earlier tables and figures (Tables 3.4-2, 3.6-2, 7.3-2, 7.4-7, and 7.4-10, and Figure 7.3-2) indicate that disposal and/or treatment facilities would be required at BNL.

Response

Table 7.13-2 has been removed since, as explained in Volume I, Section 5.4.10, the number of acres disturbed is less important than the exact location of a facility in determining impacts to cultural resources. These impacts will be considered in sitewide or project-level NEPA reviews.

Comment (2888)

DOE did not perform a detailed analysis of land use impacts at INEL. The WM PEIS "screens" INEL from a detailed analysis based on assumptions regarding land availability for future development. However, the basis for those assumptions is not adequately documented. In addition, the PEIS does not assess cumulative land-use impacts arising from current uses, future spent nuclear fuel management uses, and future waste management activities. Further, it does not indicate if land-use impacts would be temporary or permanent. To conduct a meaningful evaluation of land use impacts, the Final WM PEIS should present site-specific information for the various sites. Waste disposal at INEL will have to be in accordance with the INEL Land Use Plan.

Response

The WM PEIS is a programmatic document that provides information for policy-related decisions. The SNF/INEL PEIS discusses INEL site-specific information in detail, including land use, in Volume II, Part A.

No attempt was made in the WM PEIS to identify or select the actual locations of proposed waste management facilities on sites. The land-use analysis available at the programmatic level is a comparison of land available to land required. DOE did not attempt to determine the acceptability or suitability of available land beyond certain minimal requirements. DOE will choose locations for new facilities on sites after it issues WM PEIS Records of Decision and completes any additional sitewide or project-level NEPA reviews that could be required. The INEL Land Use Plan will be considered in any project-level reviews. Until final selection of alternatives and the subsequent identification of proposed specific locations on sites, consideration of adjacent land use is not possible. DOE is committed to working with local governments to clarify planning expectations and evaluate future uses of sites and contiguous areas.

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The waste management land-use requirements would be generally small in relation to total available land. As a result, the final analysis does not necessarily discriminate between alternatives, since sufficient land area would exist under any of the alternatives. However, the analysis does conclude that sufficient land exists at most sites to allow DOE to avoid environmentally or culturally sensitive areas.

Cumulative impacts of land-use requirements at the sites are presented in Chapter 11 in Volume I. This includes cumulative impacts of current activities and reasonably foreseeable future activities.

Section 12.5 describes the potential irreversible and irretrievable commitment of land at DOE sites. Only land used for disposal would be irretrievably committed.

Comment (2895)

Volume I, Section 4.3.8 states that "pertinent" State and local land-use plans are acknowledged as an important factor in determining the impact of siting the disposal facilities. However, site-specific evaluations are identified as the appropriate vehicle for determining siting constraints. This is contradictory to the purpose of the WM PEIS. In the case of BNL, special surrounding land-use decisions have already been made that are inconsistent with the disposal of hazardous and/or radioactive wastes, and BNL officials have suggested that BNL's mission is not incompatible with such planning decisions. Therefore, it seems that at least one site, BNL, has made it easier for DOE to address land-use issues prior to a site-specific study. Accordingly, Section 4.3.8 should be modified to address the particular case of BNL, and use this issue as an obvious reason for dismissing BNL as a candidate for the disposal of wastes, even under the Decentralized Alternatives. In addition, Section 5.4.8, contains a generic discussion of the land-use analysis that is too simplistic, especially when considering site-specific issues relating to BNL. There are many land-use issues concerning BNL that must be addressed.

Response

The WM PEIS does not attempt to identify or select the actual locations of the proposed waste management facilities on sites. The land-use analysis evaluates the potential land-area requirements for the proposed treatment, storage, and disposal facilities against the potentially available land at each site. For purposes of analysis, newly constructed facilities were assumed to be located near existing facilities or at the center of the site. Therefore the WM PEIS land-use analysis does not attempt to determine the acceptability of the available land for use by waste management facilities. Rather, the PEIS assumes that sufficient land will be available in comparison to waste management requirements to allow DOE to avoid environmentally or culturally sensitive areas. Waste management land-use requirements would be generally very small in relation to total available land area.

While useful at a programmatic level, the WM PEIS land-use analysis will be supplemented by detailed analyses in sitewide or project-level NEPA reviews if waste management facilities are actually to be located at BNL. These analyses would consider local and regional land-use plans in more detail. Until final selection of alternatives and the subsequent identification of proposed specific locations on sites, consideration of adjacent land use is not possible. DOE is committed to working with local governments to clarify planning expectations and evaluate future uses of sites and contiguous areas.

Comment (3067)

It appears that land requirements below 5.4 square miles at Hanford are not "displayed in the waste-type chapters" (as suggested in Section 5.4). This disregards a substantial portion of land.

Response

The 1% criterion for land use applies to 1% of either the land area available for development at the site, or of land specifically designated for waste management activities at the site, not to the total site acreage. The designated waste management land area used in the Final WM PEIS for Hanford is 6,000 acres (approximately 9.4 square miles), substantially less than the approximately 540-square-mile total size of the site. The 1% criterion for Hanford, then, applies to all waste management activities requiring 60 or more acres (less than 0.1 square mile).

Considering the size of the site and the extensive area designated for waste management activities, this is not a substantial portion of land. As noted in Chapter 5, the 1% screening criterion for land-use impact is established to increase the clarity of the document and focus attention on the sites and alternatives where the land requirement is more likely to result in significant land-use impacts. Requirements below the 1% criterion, although not expected to result in significant impacts, are not disregarded, but are presented in the Site Data Tables contained in Volume II of the WM PEIS. These tables present detailed acreage requirements for each site under each waste management alternative.

Comment (3071)

Section 5.4.8 establishes a concept for land-use impact evaluation and a threshold screening criterion that, when applied in the analysis, does not discriminate between alternatives.

Response

The PEIS does not identify or select the actual locations of the proposed waste management facilities on sites. Neither does it determine the acceptability or suitability of available land beyond certain minimal requirements. The PEIS land-use analysis simply compares the potential land-area requirements for the proposed treatment, storage, and disposal facilities to the land potentially available at each site. The actual siting of new facilities would be done after completion of the sitewide of project-level NEPA analyses.

The waste management land-use requirements would be generally small in relation to total available land at each site. As a result, the final analysis does not necessarily discriminate between alternatives, since sufficient land area would exist under any of the alternatives. However, the analysis does conclude that sufficient land exists at most sites to allow DOE to avoid environmentally or culturally sensitive areas.

Comment (3085)

Volume I, Section 8.7.2, of the Draft WM PEIS stated that the Centralized Alternative for transuranic waste would require 0.17% of Hanford's available land for a treatment facility. It is unclear whether the 0.17% acreage required for transuranic waste facilities at Hanford under the Centralized Alternative is based on the 14,496 available acres referenced elsewhere in the Draft WM PEIS (Table 4-8). The available acreage should be based on the 6,000 acres recommended by the Hanford Future Site Uses Working Group.

Response

DOE revised the WM PEIS to use the 6,000 acres of the Central Plateau that was set aside in Hanford's site development plan for waste management. This is the same area recommended for use by the Hanford Future Site Uses Working Group. In the transuranic waste land-use analysis, 24.7 acres was estimated to be required to construct new facilities at Hanford under Regionalized

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Alternatives 2 and 3. In Volume II, Table II-5.3-11, that acreage translates to 0.41% of the 6,000 available acres. DOE revised Volume I, Section 8.7.2, to indicate that the acreage required for transuranic waste facilities under Regionalized Alternatives 2 and 3 would be 0.41% of the available acres.

Comment (3242)
Economic impacts and land-use impacts should include the lost value of the land set aside for use by DOE for waste disposal operations. The value of land should be based on contingent valuation based on the greater of Tribal or agricultural value amortized forever.

Response
Section 12.4 in Volume I of the WM PEIS does consider the potential impacts of land set aside for waste disposal operations. However, land valuation is a strongly site-specific consideration. Because the precise location of future waste management facilities at individual sites is not yet known, a more detailed assessment of the value of any land commitments, either in market terms or as the value of any other social or economic use that might be forgone, is not considered useful to this programmatic analysis. Moreover, because of the potential for variation from site to site and over time, it would be difficult to develop, at the programmatic level, a consistent and uniform methodology that could be applied to all sites. Therefore, the WM PEIS land-use analysis is limited to a comparison of the land available to land required. No attempt was made to determine the acceptability or suitability of land or the potential value of other uses of the land beyond certain minimal requirements.

DOE is committed to the process of developing Site-Specific Advisory Board sponsored plans for future land use as another approach to incorporating community values and encouraging local community input into the land-use evaluation process. This is especially useful in determining the importance of particular land areas or uses to stakeholder groups and incorporating a concern for future generations into current land-use studies. This information would be used during sitewide or project-level NEPA reviews.

Comment (3299)
Given the potential for irreversible and irretrievable land use, DOE site managers should work closely with local government officials to clarify planning expectations and avoid conflicts with anticipated future uses of the site or contiguous areas. In general, every effort should be made to use already contaminated sites for waste management operations.

Response
No attempt was made in the WM PEIS to identify or select the actual locations of the proposed waste management facilities on sites. The implementation of waste management alternatives will require additional studies. DOE is committed to working with stakeholders to clarify planning expectations and evaluate future uses of sites and contiguous areas.

Although there are some advantages to using contaminated sites that are already for waste management activities, there are some disadvantages. These include interference with remediation activities, exposure of waste management workers to existing contamination, and interference of existing contamination with future monitoring.

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Comment (3554)
The comparison of alternatives summaries in the waste-type chapters should consider land use a factor, because waste management actions will destroy important habitat at some of the sites (e.g., at Hanford, mature shrub steppe ecosystems), especially in arid climates where restoration/mitigation is difficult due to low amounts of precipitation.

Response
The PEIS does not identify or select the actual locations of the proposed waste management facilities on sites, and no attempt was made to determine the acceptability or suitability of available land beyond certain minimal requirements. If site development plans identified areas set aside for waste management, then these areas were used.

The waste management land-use requirements would be generally small in relation to total available land. As a result, the final analysis does not necessarily discriminate between alternatives, since sufficient land area would exist under any of the alternatives. However, the analysis does conclude that sufficient land exists at most sites to allow DOE to avoid environmentally sensitive areas.

Comment (3724)
The WM PEIS fails to place any value on land and other resources at the Hanford Site. It ignores the Hanford Future Site Uses Working Group Report and Native American Treaty Rights to use Hanford lands after they are cleaned up.

Response
DOE is concerned about the future use of land at and surrounding DOE sites and facilities. Recommendations for future use of the Hanford Site are being developed by the Hanford Future Site Uses Working Group, which includes representatives of Federal, Tribal, State, and local entities. These recommendations will be considered during the sitewide and project-level NEPA reviews that may follow the WM PEIS programmatic decisions.

The WM PEIS land-use analysis evaluates the potential land area requirements for the proposed treatment, storage, and disposal facilities against the land potentially available at each site. If site development plans identified areas set aside for waste management, then these areas were used. The PEIS does not identify or select the actual locations of the proposed waste management facilities on sites, and no attempt was made to determine the acceptability or suitability of available land beyond certain minimal requirements.

The waste management land-use requirements would be generally small in relation to total available land. The analysis indicates that sufficient land exists at most sites to allow DOE to avoid environmentally or culturally sensitive areas.

Comment (4061)
The PEIS does not adequately address land-use planning in the selection of nuclear waste or treatment sites (e.g., although Site 300 is proposed as a low-level waste site, it is not permitted as such).

Response
At the programmatic level of analysis, consideration of land-use issues is, by definition, very general in scope. No attempt was made in the WM PEIS to identify or select the actual locations of the proposed

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waste management facilities on sites. DOE will select actual locations on sites for new facilities after completion of any necessary sitewide or project-level NEPA analyses. Therefore, the PEIS land-use analysis does not attempt to determine the acceptability of the land available for waste management facilities. However, the PEIS analysis indicates that sufficient land will be available for waste management facilities to allow DOE to avoid environmentally or culturally sensitive areas. DOE is committed to working with local governments to clarify planning expectations and evaluate future uses of sites and contiguous areas. Sitewide or project-level NEPA analyses will also address local and regional planning issues.

5.8 Infrastructure

Comment (219)
In the Site Data Tables for BNL low-level mixed waste, the predicted power requirement for the Decentralized Alternative is 0.2 megawatts at 24% of existing capacity, while for the No Action Alternative the requirement is 0.23 megawatts at 49% of existing capacity. It seems illogical that a treatment/removal process could use less power than a storage/removal process. DOE's answer was that storage uses more power. One possibility is that combustible waste products would be used to lower energy costs at the site. If this were the case, then airborne waste might stay airborne beyond the boundaries of the site, and that would help explain the projected health effects listed in Volume II, Table II-3.1-2. These figures show a greater health risk for offsite individuals than for BNL lab workers. Is this true?

Response
Table II-3.1-14 in Volume II of the WM PEIS shows infrastructure impacts for low-level mixed waste treatment and disposal at BNL, including requirements for electrical power.

Electrical power requirements for the Decentralized and No Action Alternatives are similar. However, this similarity is coincidental. The Decentralized and No Action Alternatives are different management alternatives with an emphasis on different activities. For the low-level mixed waste No Action Alternative, the emphasis is on storage of BNL waste onsite, while for the low-level mixed waste Decentralized Alternative, the emphasis is on treatment and disposal of BNL waste onsite.

Waste at BNL is mainly combustible and requires primarily incineration and grouting. For BNL's waste, both of these treatment activities would have relatively small power requirements. Because this treatment would result in a large reduction in the volume of waste to be disposed of, the power required for disposal would be much lower than for indefinite storage. Another site with a different waste profile could have very different power requirements. DOE added a footnote to Table II-3.1-14 to explain the varying power requirements for BNL under the two alternatives.

Estimated health risks can be greater for offsite residents than for onsite workers. Onsite workers are assumed to be exposed to contaminants for 8 hours per day, 5 days per week, over the 10-year operational period of the waste management facility. Offsite residents are assumed to be exposed for 24 hours per day, every day for the 10-year operational period of the facility. Another reason is that the BNL waste profile contains a high proportion of organic liquids and sludges.

Comment (2877)
Under some alternatives, power consumption at INEL would increase to a level that would require new generating plants. The impacts and costs of these new facilities should have been estimated and included in the appropriate sections and with the cumulative impacts in the WM PEIS.

Response
The WM PEIS analyzed the combined impacts for each waste type of placing multiple facilities at each site. The minimum and maximum impacts for individual sites were then considered together with the impacts of other past, present, and reasonably foreseeable actions at and in the region of each of the 17 major sites. Volume I, Table 11.7-2, shows the cumulative impacts for INEL. DOE revised Section 11.7 to reflect that the maximum cumulative power consumption rate would be approximately 100% of current use. More detailed site-specific information is contained in the SNF/INEL PEIS, specifically in Sections 4.13 and 5.13.

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Comment (3044)
DOE should consider infrastructure age as well as capacity in Section 4.3.9 when calculating impacts of proposed additional loads.

Response
DOE assumed that any excess infrastructure capacity would be available for use by waste management activities. The infrastructure analysis does not account for, nor should it account for, replacement costs for systems nearing the end of their useful lifetimes. Although waste management activities could overload an already stressed site infrastructure, the waste management activities by themselves would not be the reason for replacing an aging infrastructure.

Comment (3238)
Volume I, Section 6.12, does not include infrastructure impacts for associated basalt, rock, or other materials needed for capping any disposal cells. The Environmental Restoration Program is already having difficulties in this area, as all of the basalt outcroppings on or near the Hanford Site are religious sites for the Tribes. As such, they may not be considered for use. Also, use of gravel and other materials could result in additional damage to the environment. This needs to be accounted for and mitigated.

Response
The WM PEIS site infrastructure impacts analysis focused on the effects of the waste management alternatives on water supplies, wastewater treatment, and electrical power systems. The consumption of resource materials such as basalt, rock, or other required materials (e.g. wood, concrete, sand, gravel, plastics, metals, and other materials used in construction) is addressed in Volume I, Section 12.5.

Since the WM PEIS is a national-level analysis, individual or spot shortages at specific sites are not considered. Sitewide or project-level NEPA analyses will consider any significant effects on consumption or potential shortages of construction materials, as well as potential mitigation measures.

With the exception of materials that can be recovered or recycled with present technology, the WM PEIS analysis assumes that these construction resources would be irretrievably lost. However, none of the identified construction materials is in critically short supply nationally, and most are generally available in the regions of sites that are being considered.

Comment (3301)
Although the WM PEIS addresses potential transportation infrastructure improvements associated with an increase in the number of commuters, it does not address potential impacts associated with up to 257,000 shipments of low-level waste over 20 years.

Response
Although 257,000 low-level waste shipments over 20 years is a large number of shipments, this works out to approximately 50 shipments per day, or 6 shipments per hour. Six trips per hour should not significantly impact traffic in the site regions of influence. In addition, waste shipments would tend to be spread across the workday, while worker trips tend to occur during the morning and evening rush hours. Therefore, the impacts to traffic would tend to be less for waste shipments, even when there are more waste shipments per day than worker trips.

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Sections 12.1 and 12.2 in Volume I describe measures that could be used to mitigate impacts from transportation. These include using a mix of truck and rail transport to minimize potential impacts from truck transport alone, and working with local and regional planners to prepare for additional road traffic.

Comment (3302)
Commuter numbers for NTS are based on the assumption that the relative distribution of NTS workers will be the same as the current distribution. However, the town of Pahrump, Nevada, has doubled in size since the 1990 Census, and is one of the fastest growing communities in the Nation. Travel on Highway 160, a two-lane route to NTS, should be analyzed based on higher commuter projections.

Response
DOE recognizes the potential for sudden and rapid changes in the socioeconomic conditions of local communities. However, because the WM PEIS is a broad, programmatic document intended to support a relative comparison of the alternatives, DOE did not attempt to analyze the potential effects of population growth on individual elements of offsite transportation infrastructure. That type of detailed analysis would be conducted, where warranted, in sitewide or project-level NEPA reviews. In the PEIS, DOE used an estimate of percentage increase in population as an index of the potential for effects on regional infrastructure.

Comment (3947)
DOE's assumption that there will be little impact to infrastructure elements such as drinking water supplies, sewage treatment, and roads is erroneous. DOE is only considering the immediate consequences, not the direct and indirect impacts of the proposed action for the next 20 years, as mandated by NEPA.

Response
DOE did not assume that there would be little impact to infrastructure elements. DOE understands the potential for impacts that its proposed actions could have on the infrastructure resources of the surrounding communities and regions as a whole. Section 5.4.9.2 in Volume I states that new resource requirement demands on offsite infrastructure for each alternative were based on population increases from 1990 regional population data. Evaluation of the transportation effects on infrastructure resources was based on forecasted increased traffic from employees directly or indirectly associated with the alternatives, based on estimated population changes. New offsite demands of less than 5% of current demand were assumed to be negligible or to result in minor impacts. Increases in demand of 5% or more were assumed to have the potential to cause moderate impacts, and increases of 15% or more were assumed to have potentially major impacts. The results are discussed in each waste-type chapter.

It is possible that the proposed action could attract other commercial development projects compatible with radioactive waste treatment and disposal. However, the introduction of these new projects in regions is a function of other factors (such as local taxes, facilities, regional preferences, etc.), as well as the proposed DOE action. As such, the proposed number, size, and location of these projects cannot be reasonably foreseen and their potential cumulative impacts when combined with the WM PEIS actions cannot be estimated.

5.9 Cultural Resources

Comment (96)
Commentors are concerned about impacts to Native American cultural resources from waste treatment, storage, and disposal activities at the LLNL.

Response
Volume I, Section 4.4.6, summarizes known cultural resources at LLNL. DOE could not evaluate site-specific cultural resources impacts in the WM PEIS because it has not proposed specific locations for waste management facilities on the sites. However, DOE did determine in the PEIS that the land required for such facilities would be a small fraction of the land available or designated for waste management. Therefore, DOE believes it probably will have sufficient flexibility to avoid or mitigate potential impacts to cultural resources. Sitewide or project-level NEPA reviews would consider cultural resources in detail. (See Volume I, Section 5.4.10.)

Volume I, Section 5.4.10, of the Final WM PEIS discusses the unique nature of Native American Cultural and religious resources. Five Federal laws prompt consultation between Federal agencies and Native American tribes: the National Environmental Policy Act, the National Historic Preservation Act, as amended, the American Indian Religious Freedom Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act. In accordance with these Acts, and in consideration of DOE's American Indian Policy, DOE would consult with Native American stakeholders before implementing waste management alternatives.

Comment (511)
The PEIS identifies Tribal members as minorities for the analysis. Although clearly mandated by Presidential Memoranda, Executive Orders, and DOE policy, the WM PEIS fails to recognize the sovereignty of the Native American Tribes and their unique government-to-government relationship with the United States government. The Tribes were not consulted early in the WM PEIS development process to identify issues critical to the survival of the Tribes and their cultures. The Federal Government must take affirmative steps to protect Tribal lands, resources, treaty rights, and ways of life. This includes the gathering of wild foods, fishing, and the use of several sites for religious activities. Without such steps, the treaty rights and obligations and Federal Trust responsibilities that have already been negatively impacted by DOE actions will be further adversely impacted. To ensure consideration of these issues, DOE should keep the Tribes informed on a timely and direct basis, and should clearly identify the plans for and timing of future Tribal consultations prior to making waste management decisions.

Response
The WM PEIS classifies Native Americans as minority populations in a numerical context only to describe the demographic characteristics of the regions surrounding the DOE sites. This information is used in the environmental justice analysis. This designation is not intended to contradict the discussion of the unique government-to-government relationships between the United States Government and Tribes, nor the Federal Trust responsibility. DOE policy recognizes the sovereignty of Native American Tribal Governments and their unique government-to-government relationship with the Federal Government as defined by history, treaties, statutes, court decisions, and the U.S. Constitution. DOE recognizes that it must consider the treaty rights of Native American Tribal Governments and the Federal Government's trust responsibility toward them when making decisions.

5.9 Cultural Resources

DOE policy requires the agency to consult with Tribal Governments to ensure that Tribal rights and interests are considered; that the potential impacts of proposed DOE actions on cultural or religious resources are disclosed; and that any unnecessary interference with traditional religious practices is avoided. DOE is committed to incorporating this policy into its ongoing and long-term planning and management processes, including the NEPA process, and has worked through its site representatives to notify the Tribes of the WM PEIS scope and the availability of the document for comment. The Final WM PEIS was revised to include a general discussion of the consultation obligations and activities, as well as DOE's treaty obligations in Section 1.4.5. Section 5.4.10 in Volume I was revised to discuss the unique nature of Native American cultural and religious resources.

The WM PEIS analysis focuses on alternatives to support a national waste management strategy. The programmatic nature of the WM PEIS analyses is not conducive to considering the individual character of Native American cultures near DOE sites, and the specialized nature of each Tribe's concerns related to site activities. Sitewide and project-level NEPA reviews will more fully explore specific concerns related to Native American issues, such as the protection of sacred lands, cultural properties, and religious practices. During these reviews, local DOE officials will continue to work with Tribal representatives to exchange information about the need for and location of any necessary facilities and related activities, such as transportation requirements, and to consider specific Tribal values, potential environmental impacts, and appropriate mitigative measures. Several DOE Operations Offices have cooperative agreements with Tribal Governments about a range of environmental issues, and the sites' Tribal contacts will assist in the consultation process for site-specific and transportation issues related to the WM PEIS.

Comment (532)
DOE needs to understand the values of the Tribes in the State of Idaho and how their view of cultural resources diverges from the scientific community's. The Tribes believe air, land, and water are cultural resources and that an intrusion into "mother earth" is an effect on cultural resources.

Response
DOE recognizes that, for many Tribes, cultural resources include the natural environment and the natural landscape, and air, plant, water or animal resources that might have special significance. To facilitate communication between DOE and the Tribes, each local DOE office has a point of contact for Tribal issues and an ongoing cultural resource program to discuss such issues.

Section 1.4.5 was added to the Final WM PEIS to recognize DOE's obligation to consult with Tribal Governments about actions that could affect Tribal cultural resources. Section 5.4.10 discusses the unique nature of Native American cultural and religious resources, including regional locations, natural features, and biological and geological resources.

Comment (1561)
A Pueblo Native American site at LANL is being threatened by the Dual-Axis Radiographic Hydrodynamic Test (DARHT) facility. DOE needs to ensure traditional and cultural resources will be protected and their integrity maintained.

Response
DOE is committed to consultation. As described in Volume I, Section 1.4.5, of the Final WM PEIS, DOE's American Indian Policy, as implemented by DOE Order 1230.2, emphasizes the importance of

5.9 Cultural Resources

establishing a proactive approach to solicit input from Tribal governments on Departmental policies and issues. It also encourages Tribal governments and their members to participate fully in national and regional dialogues concerning Departmental programs. Consultation with Federally recognized Tribes is also an integral part of compliance with a number of cultural resource statutes and their implementing regulations discussed in Volume I, Section 1.4.1, of the WM PEIS

DOE complies with all laws protecting cultural resources, including the National Historic Preservation Act, the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act, and Executive Order 13007 regarding sacred sites.

Potential impacts associated with DARHT are presented in the DARHT Final EIS.

Comment (3083)
The WM PEIS states that impacts to cultural resources from construction of facilities cannot be effectively analyzed at the programmatic level because there have been no decisions about where to locate facilities on sites. This is an admission of insufficient basis for effective analysis.

Response
DOE prepared the WM PEIS to support its strategy for broad, programmatic decisions about Department-wide waste management. NEPA permits the "tiering" of environmental analyses; that is, the agency may prepare levels of NEPA documentation beginning with an upper tier, broad analysis, and proceeding to lower tier, more detailed analyses as specific project and location decisions are developed. The detailed analysis of potential cultural resources impacts depends very much on the location of facilities on sites. In addition, at this time DOE cannot presume to know the results of cultural resources surveys until those surveys are conducted. DOE believes that the WM PEIS provides a sufficient basis for making programmatic decisions about its Waste Management Program.

Comment (3087)
Volume I, Section 8.10, states that "none of the alternatives appear to be superior in terms of limiting potential effects on cultural resources because the acreage requirements at the TRUW sites do not vary markedly across alternatives." This assumes that cultural resources are equally distributed throughout all DOE sites being considered, which is not true.

Response
DOE recognizes that the distribution of cultural resources is not uniform across the sites. Construction and operation of transuranic waste facilities could adversely affect cultural resources depending on final siting decisions. The WM PEIS analysis determined that land requirements for transuranic waste facilities, when measured against the total available land at potential sites, were sufficiently small that DOE would have sufficient flexibility in siting facilities so that, under all alternatives, DOE probably could avoid or mitigate potential impacts to cultural resources.

The No Action Alternative would result in no effects on cultural resources. Acreage requirements at each site under the other alternatives do not vary significantly, with the single exception of WIPP under the Centralized Alternative. Because these acreages are small relative to the site sizes in all cases, there is no basis for discrimination among alternatives in terms of the potential for cultural resources impacts. DOE revised Section 8.13 in Volume I to clarify these points.

5.9 Cultural Resources

Comment (3089)
Table 9.13-2 on acreage disturbance by site for construction of high-level waste facilities is based on the simplistic assumption of uniform distribution, and is followed by a footnote worth noting: Hanford's land requirements for high-level waste will increase by 8 acres if the high-level waste repository isn't taking wastes by 2015.

Response
Table 9.13-2 has been removed because DOE was concerned that this table could be misinterpreted as estimates of impacts, which they were not. Note that the acreage requirements at all sites under all alternatives are only a small fraction of the areas available for waste operations so DOE should be able to avoid impacts to any known cultural resources and any identified during pre-construction site surveys. If not, measures would be taken to mitigate negative effects on these resources.

The acreage for construction of the high-level waste interim storage facilities was determined by correlation of the available literature for similar facilities. Further information on the methodology for estimation of the land area required is given in Appendix A of the High-Level Waste Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

The footnote referred to in the comment addresses the second Centralized Alternative, which considers the delay of the opening of the national geologic repository for high-level waste disposal beyond the year 2015. In this case, an interim high-level waste storage facility would be required for the Hanford glass canisters produced after 2015, which would occupy a land area of 8 acres. For the other high-level waste alternatives in the PEIS, DOE assumed that the national geologic repository would be available for receipt of high-level waste in 2015, and that any canisters produced after 2015 could be shipped directly to the repository without construction of an interim storage facility.

The WM PEIS does not provide a detailed analysis of the potential for cultural resources impacts because the specific locations of facilities on sites are not yet known. After DOE announces its programmatic decisions, it will conduct detailed cultural resources studies as part of sitewide or project-level NEPA analyses before implementing any waste management alternative.

Comment (3114)
If cultural resources impacts are not evaluated in the WM PEIS, how will such information be used in subsequent decisions.

Response
After DOE announces its waste management programmatic decisions, it will conduct more detailed sitewide or project-level analyses before making final decisions about the locations of waste management facilities on sites selected. Environmental analyses based on actual conditions and site resource surveys will be conducted to determine the nature and extent of any potential impacts to cultural resources. However, based on the WM PEIS land-use analysis, DOE believes that it will have sufficient flexibility in locating new facilities to avoid or mitigate any potential impacts to cultural resources.

5.9 Cultural Resources

Comment (3118)
Section C.4.10.3 states that, at the programmatic level, both the specific area of potential effects and the presence or absence of National Register eligible historic properties are at present unknown. How will such unknowns affect the decisions to be made?

Response
DOE does not expect the absence of detailed information on the specific area of potential effects or the location of historic properties to have a substantial effect on the WM PEIS decisionmaking process. There is sufficient information on the land-use requirements for proposed waste management facilities, existing cultural resources at sites, and the extent to which each site has been surveyed for cultural resources for DOE to make programmatic decisions. Based on the WM PEIS land-use analysis, DOE believes that it will have sufficient flexibility in locating waste management facilities to be able to avoid or mitigate cultural resources impacts.

Sitewide and project-level environmental analyses will determine the potential for impacts to cultural resources when specific locations for proposed waste management facilities have been identified. Cultural resources surveys will be conducted where appropriate to determine the extent and degree of any such potential impacts. DOE will evaluate the potential for cultural resources impacts in coordination with State Historic Preservation Offices, Tribal Governments, and site advisory boards, and will develop plans to avoid or mitigate impacts to cultural resources.

Comment (3119)
The statement in Section C.4.10.2 that adverse effects on historic properties include the introduction of visual, audible, or atmospheric elements that are "out of character" with the property or alter its setting would seem to preclude any uses.

Response
It is DOE policy to locate proposed facilities in a manner that avoids or minimizes impacts to cultural resources to the greatest extent possible. In addition to the other considerations noted in Section C.4.10.2, the potential to introduce visual, audible, or atmospheric conditions that are out of character with the property would be an important factor in determining the level of anticipated impact and the ability to avoid or mitigate those impacts. DOE believes that it will have sufficient flexibility to locate its facilities without seriously affecting the nature and character of existing cultural resources. More detailed sitewide or project-level NEPA analyses will explore these elements at specific sites.

Comment (3226)
Section 4.4.4. In addition to the Tribal lands identified in Figure I-4b, all of the Hanford lands are subject to Tribal Treaty Obligations. Many locations on the Hanford site are of religious significance to the Tribes. Native remains have also been found at many locations on the site.

Response
The presence of Native American cultural and religious properties of significance to local tribes at the Hanford Site is addressed in Volume I, Table 4.3-8 and Section 5.4.10, and in the WM PEIS Environmental and Socioeconomic Technical Report. The description of the affected environment for Hanford notes the presence of Native American settlements, and numerous recorded archaeological and traditional cultural properties. To date, archaeological surveys covering 21,358 acres of the site have

been completed. Section 1.4.5 in Volume I discusses DOE's Tribal treaty obligations and consultations with Tribes.

DOE recognizes that it must consider the interests of Native American groups and, as applicable, Federal and Sate regulations with regard to Native American and cultural resources, as well as any treaty obligations in the siting of any new facilities at the Hanford Site. The analysis of cultural resources and other land uses at the Hanford site indicates that there would be sufficient land area available for this purpose and that facilities could be located without disturbance to traditional, historic, or cultural properties. DOE will consult with Tribal Governments to assure that Tribal rights, including treaty rights, are considered prior to taking any actions. DOE will honor all applicable obligations under Tribal treaties.

Comment (3230)
The WM PEIS does not appear to assess the potential impacts on Tribal members exercising their rights under the Treaties. Tribal members often have diets significantly different from the general population. A Tribal risk scenario should be included similar to the resident farmer scenario.

Response
Section D.2.2.1 in Volume III of the WM PEIS states that DOE has not evaluated the human health risk to subpopulations that derive a portion of their food supply from native plants and animals that live near the DOE sites. The risk to human health from ingesting native plants and animals cannot be fully analyzed with confidence until the locations of facilities on the sites are known, the routes of exposure are explicitly defined, and the dietary habits of affected subpopulations are quantified. Therefore, analysis of health effects from subsistence consumption of fish, wildlife, and native plant species is not included in the WM PEIS, but would be considered in sitewide or project-level NEPA reviews.

Section C.4.7.2.4 in Volume III does contain a discussion of the vulnerability of minority and low-income populations to adverse health affects due to subsistence food consumption.

Comment (3984)
In agency consideration of Native American Resources (Chapter 5) access to sacred sites *preserved in their natural setting* is crucial to the mandates of American Indian Religious Freedom Act of 1978. Indigenous peoples cannot and do not separate the surroundings, including graves, from the sacred quality of the site itself. To allow waste disposal and treatment in the natural surroundings of these sites is to desecrate the site. Tribal peoples view the earth, their relationship to the natural world, and to their creator as a connected entity that cannot be dissected or disrupted without violating their religious beliefs.

Response
DOE recognizes that Native American cultural resources include a wide range of historic and traditional properties as well as regional locations, natural features, and sacred or traditional areas that are associated with the cultural practices or beliefs of a living community. The Native American Resources impacts discussion in Section 5.4.10 in Volume I of the Final WM PEIS has been revised in response to this comment. Section 5.4.10 now identifies impacts to Native American Resources to include reduced access to sacred sites preserved in their natural setting.

5.9 Cultural Resources

In general, cultural resource issues must be addressed at the site level due to the individual nature of the Tribes, the local cultural resources, and the ongoing and planned DOE activities. Sitewide or project-level NEPA analyses will more fully explore these concerns as they relate to specific sites. During these analyses, local DOE offices will continue to work with other agency and Tribal representatives, as well as other members of the public. It is during this next level of planning and project-level implementation that specific values and environmental considerations will be examined and appropriate mitigative measures developed. To facilitate communication between DOE and the Tribes, each local DOE office has a point of contact for Tribal issues and an ongoing cultural resources program to discuss such issues.

Comment (3985)
Agencies should attempt to identify sacred sites and burial sites in consultation with authorities recognized by the potentially impacted culture, rather than authorities with no knowledge of the specific impacts on that unique culture.

Response
DOE is aware of the sensitivity of these resources, especially Tribal traditional and religious properties, and is committed to minimizing any potential impacts wherever possible. In addition to close coordination with State Historic Preservation Offices and the Advisory Council on Historic Preservation, DOE's policy includes consultation with Native American Tribal Governments to inform these groups on current and potential activities at the sites. DOE has and will continue to provide every opportunity for participation in the NEPA process to Native American Tribes. Consistent with Federal cultural resource laws, the American Indian Religious Freedom Act, and Executive Order 13007 (Sacred Sites). Each DOE field office or site with areas of cultural or religious concern to Native Americans will consult with them about potential impacts of proposed actions on those resources and will avoid unnecessary interference with traditional religious practices.

Comment (4014)
The WM PEIS analysis of the impacts of waste management activities on cultural resources is inadequate because it fails to consider the consequences of restricted access to American Indian cultural resources. The analysis fails to consider that in addition to the physical disruption of land, the DOE facilities will require that access be restricted to a much larger amount of land surrounding the facilities. In general, most Tribes prefer that the remains of their ancestors be left undisturbed by archaeologists or construction activities, and appreciate the WM PEIS assurances that DOE will be able to avoid impacts to any known cultural resources or any identified during preconstruction site surveys. However, access is also important to the cultural vitality of the Indian people. The WM PEIS needs to consider the issue of restricted access to cultural resources at the programmatic level; at the site-specific level, there will be little or no opportunity to change the access policies.

Response
DOE is aware of the potential for impacts to cultural resources, including Native American religious and traditional properties, that the actions proposed by WM PEIS alternatives might have. As indicated in Volume I, Section 5.4.10 of the PEIS, the concern for impacts to these areas includes both direct physical impacts, such as destruction or reduced access to sacred sites preserved in their natural setting, and indirect social and economic effects, such as intrusion on religious beliefs or cultural practices that might be connected to the earth and its resources. It is DOE's policy to manage its operations to avoid or minimize such impacts. Moreover, DOE must comply with all treaties, laws, and regulations

protecting Native American cultural properties. The description of cultural resources presented in Chapter 4 for each of the 17 major sites considered in the PEIS includes an identification of Native American resources at the sites, qualified by the extent to which site land area has been surveyed.

Because the WM PEIS document does not propose specific locations for waste management facilities on sites, DOE has not evaluated cultural resources impacts in detail at this programmatic level. However, the PEIS land-use analysis indicates that the amount of land required for such facilities would be only a small fraction of the land available or designated for waste management facilities at the sites. As a result, DOE would have sufficient flexibility in siting these facilities to avoid impacts to cultural resources. Sitewide and project-level NEPA analyses will include an examination of both direct (damage, destruction, loss of access) and indirect (institutional control, disruption of religious or traditional practices) impacts to cultural resources.

In general, cultural resources impacts must be addressed at the site level due to the individual nature of the resource itself, unique or specialized local Tribal interests, and the ongoing and planned DOE activity at each site. To enable discussion between DOE and Native American Tribal groups, each local DOE office has a point of contact for Tribal issues, as well as an ongoing cultural resources program to address such issues as they arise.

5.10 Geology, Soils, Seismicity

Comment (20)
Commentors are concerned about earthquake impacts, including above-design-basis earthquakes, at LLNL. The proposal to establish a radioactive disposal site in a "hot bed" of seismic activity makes no sense. The PEIS neglected earthquakes, and decontamination of the waste treatment facility was not addressed in the WM PEIS. The Final WM PEIS should address the possible splay of the Las Placitis fault, and possible cracking and shaking at both sites. The PEIS should also address secondary effects like the number of farms and livestock in the area around Site 300.

Response
The WM PEIS is a national and programmatic study to help DOE formulate and implement a strategy to manage its radioactive and hazardous wastes. DOE identified 16 candidate low-level waste disposal sites for evaluation based on a screening it performed in coordination with the States under the Federal Facility Compliance Act. The screening applied three exclusionary criteria, one of which was that the waste disposal facility could not be within 200 feet of a seismic fault. Section 4.4.6 in Volume I does mention major earthquake faults in the LLNL area. A supporting document, the WM PEIS Affected Environment Technical Report, contains more detailed information on seismic activity near LLNL. This report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Appendix E in Volume IV of the PEIS describes the accident scenarios caused by seismic events (earthquakes) at the sites during which exposure to chemical or radiological constituents of the waste could occur. Facility accident results are presented in Sections 6.4.3 (low-level mixed waste), 7.4.3 (low-level waste), and 8.4.3 (transuranic waste). These analyses assume generic design and do not incorporate earthquake criteria in design (which would be required to ensure public safety).

Sections 6.4.3 and 7.4.3 in Volume I present the health risks from a treatment facility accident at LLNL that is induced by an earthquake. For low-level mixed waste, the probability of a maximum offsite maximally exposed individual radiation-induced cancer fatality from the earthquake-induced accident is 2E-06, and the probability of a chemical-related cancer incidence is 3E-08. (More recent data on waste volumes at LLNL for tritium indicates these estimates could increase by a factor of 3.) For low-level waste under the same accident scenario, the probability of a maximum offsite maximally exposed individual radiation-induced cancer fatality is 4E-04 (chemical related cancer incidence is not applicable for low-level waste). (More recent data on low-level waste volumes suggest these risk estimates could decrease by 4 orders of magnitude.)

Storage facility accidents were estimated to result in a radiation-induced incremental cancer fatality risk to the maximally exposed individual of about 5E-06 to 2E-03. The accident frequencies ranged from greater than 1E-02 per year for the low-consequence accidents to less than 1E-06 per year for the high-consequence accidents. Additional information on accident scenarios and health risks from accidents initiated by earthquakes is provided in Appendix F (Volume IV) and Appendix D (Volume III), respectively. Thus, DOE decisionmakers have information in the PEIS to account for seismic activity in the vicinity of LLNL when selecting the final integrated waste management configuration.

Sitewide or project-level NEPA reviews would consider specific design basis and exact location of the waste management facility, would be as well as potential earthquake impacts. DOE would design, construct, operate, and maintain waste management facilities in accordance with appropriate local seismic standards.

Secondary effects on farms and livestock are site-specific concerns that are best evaluated in sitewide or project-level NEPA documents. These reviews can provide a level of precision that is not attainable in a programmatic document such as the WM PEIS.

As described in Section 5.3.3, the program life-cycle cost estimates for the various WM PEIS alternatives include decontamination and decommissioning (D&D) costs. D&D costs include demolition of facilities, environmental closure, postclosure, and monitoring activities. Environmental impacts of D&D of waste management facilities were not included in the WM PEIS. These impacts would occur well in the future and D&D of waste management facilities would be subject to all applicable environmental requirements at that time. D&D impacts are not expected to exceed the impacts of construction and operation.

5.11 Cumulative Impacts

Comment (122)
Commentors are concerned about the impacts of treatment and disposal activities on the environments of areas that are already contaminated. More specifically, a number of commentors are concerned about the impacts to public health and safety if new wastes are added to the current pollution at Superfund sites.

Response
DOE analyzed the potential impacts of waste management activities at the 17 WM PEIS candidate sites. The baseline conditions for each site, against which the potential waste management impacts were measured, identified existing environmental contamination. Summaries of existing conditions at the sites are in Volume I, Chapter 4, of the PEIS. More detailed descriptions are contained in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final PEIS.

DOE has estimated the impacts of waste treatment, storage, and disposal activities added to other past, present, and reasonably foreseeable future actions (see Volume I, Chapter 11). To the extent that the impacts from environmental restoration sites, including Superfund sites, are known, they are identified in Chapter 11. DOE would undertake mitigation measures where necessary to meet regulatory requirements at sites where DOE would otherwise exceed the applicable standards.

The WM PEIS does not evaluate site-specific cumulative impacts in detail because DOE has not selected specific locations for waste management facilities on the candidate sites. Sitewide or project-level NEPA reviews would examine site-specific cumulative impacts in greater detail.

Comment (315)
The WM PEIS should include an analysis of the cumulative environmental impacts of the waste management facilities required across the country, including the transcontinental transportation of waste.

Response
Chapter 11 in Volume I of the WM PEIS describes the cumulative impacts that could result from the various alternatives under consideration. Section 11.20 discusses the cumulative impacts of transporting wastes. Appendix E in Volume IV of the PEIS discusses the transportation analysis.

Comment (1134)
The WM PEIS does not adequately address the potential cumulative impacts. It does not include the waste volumes generated as a result of environmental restoration activities, stockpile stewardship, fissile materials management, Naval and foreign research reactor fuels, and commercial high-level waste storage and disposal. In addition, the data in the Draft PEIS regarding many of the individual sites and their current environmental problems and future activities are wholly inadequate. Moreover, possible waste management technologies, including treatment and vitrification of high-level waste that could cause extensive exposures to workers and the public, are not adequately addressed. Consequently, potential cumulative impacts regarding waste management at individual sites or within the DOE complex as a whole are not adequately analyzed. Review and discuss the impacts that high-level waste reprocessing, plutonium and highly enriched uranium disposition, spent fuel, and other related treatment issues presented in different environmental impact statements will have on DOE waste treatment decisions.

Response
Section 1.8.1 in Volume I in the WM PEIS summarizes other DOE NEPA documents that address the activities identified in the comment. Section 1.8.1 also discusses the relationship between these NEPA documents and decisions to be made based on the WM PEIS analysis.

Cumulative impacts are evaluated in Chapter 11 (Volume I) of the WM PEIS. The WM PEIS considers the cumulative impacts of the proposed waste management actions, existing site conditions, and impacts of other reasonably foreseeable future actions to the extent possible. Consideration of cumulative impacts was necessarily limited in some respects because of the lack of data. The Draft WM PEIS did consider the cumulative impacts of spent fuel management, tritium supply and recycling, high-level waste treatment, and transuranic waste disposal. Plans for disposal of commercial spent nuclear fuel are not sufficiently developed to allow inclusion in the analysis. Additional information on stockpile stewardship and management, storage and disposition of weapons usable fissile materials, and disposition of excess highly enriched uranium that has become available since the Draft WM PEIS was prepared, is included in Chapter 11 of the Final WM PEIS.

The effects on the comparison among waste management alternatives of environmental restoration wastes for which responsibility would be transferred to the waste management system are qualitatively evaluated in the WM PEIS. The results of this analysis appear in Appendix B in Volume III and in Sections 6.15, 7.15, and 8.15 in Volume I.

Environmental restoration activities at most DOE sites cannot be meaningfully included in a cumulative impacts assessment at this time because information on environmental impacts of these activities at most sites is not available. For sites that do have adequate evaluations of environmental restoration actions, information on potential impacts is included in the cumulative impacts analysis presented in Chapter 11 in Volume I of the WM PEIS.

Comment (1360)
Cumulative impacts did not include surface-water quality, groundwater quality, or ecological/wildlife resources. DOE should have provided cumulative impacts on these three factors or detailed reasoning for their omission from the WM PEIS.

Response
DOE has revised the WM PEIS cumulative impacts analysis (Chapter 11 in Volume I) to identify the alternatives that could result in groundwater quality exceedances. Section 11.1 explains that DOE does not consider impacts to surface water and ecological resources because they depend on the specific location of facilities on sites and mitigation measures developed during design and regulatory review. DOE can better evaluate impacts to these resources in sitewide or project-level NEPA reviews.

Comment (1361)
The assessment of cumulative impacts for groundwater assumed that contaminants from each disposal site are separate and do not merge or commingle. However, it would be likely that within a single disposal site, if more than one of the waste types contaminates groundwater, the wastes will merge and commingle within the aquifer. Thus, DOE should have completed a cumulative impacts analysis of potential groundwater impacts at each disposal site.

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Response

At some sites, certain WM PEIS alternatives would require the construction of multiple disposal units (see Sections 6.4.1.9 and 7.4.1.8 in Volume I). DOE has revised Sections 5.4.1.2.2 and 11.1 in Volume I to clarify the following assumption. Concentrations of groundwater contaminants are assumed to be higher at 300 meters (984 feet) from the center of the disposal unit than at greater distances due to dispersion of contaminants. DOE assumes that contaminant plumes from multiple units will not commingle at the 300-meter wells, but that the likelihood of commingling increases with distance from the unit. However, at distances greater than 300 meters, the concentrations of groundwater contaminants in any given plume should be lower than those estimated at 300 meters as a result of dispersion and dilution. Sitewide and project-level NEPA reviews, and the performance assessment process required for the design and siting of disposal facilities (DOE Order 5820.2A), will consider site-specific conditions in more detail to ensure that groundwater resources are protected. Both the siting of the disposal facilities and the spacing of individual units can be selected by the designer to limit commingling of contaminant plumes that might increase pollutant concentrations beyond safe levels.

Comment (1520)

The WM PEIS fails to characterize the existing risk. DOE will not admit that current operations pose a risk to public health. DOE should address the existing public health problems from environmental restoration actions.

Response

Cumulative impacts are evaluated in Chapter 11 (Volume I) of the WM PEIS.

The WM PEIS has considered cumulative impacts from past, present, and reasonably foreseeable future actions to the extent possible. Factors that limited the consideration of cumulative impacts in some areas include lack of available data and schedule conflicts. DOE revised Chapter 11 to include a more comprehensive evaluation of other DOE actions that might affect the sites. Impacts of current activities are incorporated into the cumulative impacts analysis, since they contribute to the baseline (existing) conditions at each site.

The impacts of environmental restoration activities are generally not considered in the WM PEIS. However, the WM PEIS evaluates how environmental restoration wastes that might enter the waste management system could affect the comparison of waste management alternatives evaluated in the WM PEIS. The results of this analysis appear in Volume III in Appendix B, and in Volume I in Sections 6.15, 7.15, and 8.15. To the extent that the impacts from Superfund sites contribute to current estimates of dose and health risk, or were considered in sitewide EISs, these impacts are considered in the cumulative impacts chapter. Sitewide or project-level NEPA reviews will examine cumulative impacts in greater detail.

Comment (1737)

Risk factors and estimates should make it clear if any additional risks arising from the private sector have been considered. Some commercial facilities treat DOE wastes, are expanding their facilities, and are generating wastes as process by-products. ORR has several major commercial facilities supporting DOE waste management facilities.

Response

The WM PEIS evaluates the potential risks to members of the offsite population and to DOE site workers resulting from potential releases of radionuclides and hazardous chemicals from generic waste management facilities located on DOE sites. The health risk analysis does not consider impacts from the use of offsite commercial facilities because information about their locations and operations (e.g., process efficiency, number of workers, process release factor, etc.) would be required. Given the variety of potential commercial facilities available, such analyses are not feasible for this programmatic analysis. The Final WM PEIS includes a discussion of these and other privatization issues. See Section 1.7.4 in Volume I.

Comment (1751)

The WM PEIS assumptions do not obviously include all necessary parameters and are not conservative parameter levels for assessment studies (RADTRAN vs. ALOHA). For the general public to actively participate in the NEPA process, clear statements and uniformity in assumptions should be made for the levels of concern and the order of priority for the various parameters. For any technical document to lend itself to comparison and constructive criticism, the presentation of data must be explicit.

Referring to Volume I, Table 11-18, the commentor stated that the ORR health risk estimates dealing with the reduction and recycling PEIS for tritium in different waste types are much lower than the WM PEIS risk assessment figures. PEIS documents and EIS documents should include the impacts of earlier proposals as part of their analyses. Exclusion of such data tends to downplay the risk factors and is misleading to the public.

Response

Section 11.11 in Volume I of the WM PEIS contains a discussion of the impacts of combined waste management actions at ORR. This section also discusses cumulative impacts that could occur as a result of implementing waste management actions at the site in conjunction with other proposed or existing site actions. Table 11.11-1 presents the impacts from the combined management of low-level mixed waste, low-level waste, transuranic waste, and hazardous waste at ORR. A summary of this information is presented in Table 11.11-2, which addresses the cumulative impacts of the proposed combined waste management actions in conjunction with existing conditions at ORR and other proposed future actions. Note that the December 5, 1995, Record of Decision for the Tritium Supply and Recycling PEIS did not select ORR for these activities. Therefore, impacts would not occur at ORR from tritium supply and recycling activities. DOE removed the tritium supply and recycling impacts from the Final WM PEIS cumulative impacts analysis for ORR. The Final WM PEIS includes a more comprehensive analysis of other reasonably foreseeable future actions at the site, including management, storage and disposition of weapons-usable fissile materials.

It is not possible to estimate impacts from multiple EISs in the cumulative impacts analysis with a single methodology based on a single set of assumptions. Moreover, the analysis of cumulative impacts in the WM PEIS is, to some extent, limited by data availability.

Section 11.20 presents the combined and cumulative impacts analyses for transportation. The WM PEIS used different models to estimate potential health risks from routine transportation and transportation accidents. Section E.5.1 in Volume IV, describes the RADTRAN 4 and RISKIND models used to estimate collective population and maximally exposed individual risks from the transportation of radioactive waste. Section E.15.1.2.1 describes the ALOHA model used to estimate

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risks from the transport of hazardous waste and the chemical constituents of low-level mixed waste and transuranic waste. This section also describes some of the differences in the model assumptions. Uncertainty in the transportation risk assessments is discussed in Sections E.8 and E.18.

Comment (1811)
State officials believe that DOE must address the radiological exposure and health effects of all waste management activities planned in Nevada, in combination with past weapons testing at NTS, past low-level radiological waste disposal at Beatty, past and current hazardous waste disposal at Beatty, and current and prospective low-level waste disposal at NTS. The radiological health impacts of concern include the release of carbon-14 into the atmosphere and potential long-term leaching of other long-lived radionuclides into the regional groundwater system. DOE must address, in a single NEPA document, the potential cumulative groundwater contamination in the region of NTS, Yucca Mountain, and the Beatty low-level waste disposal site.

Response
The WM PEIS cumulative impacts analysis considers the potential impacts of the combined waste management actions for each of the five waste types evaluated in the context of both the existing site conditions and the potential impacts of other reasonably foreseeable site actions. DOE has revised Volume I, Section 11.10, to incorporate information for a number of these future actions at NTS, including the impacts of spent nuclear fuel management as described in the SNF/INEL PEIS, the Foreign Research Reactor Spent Nuclear Fuel EIS, the Stockpile Stewardship and Management PEIS, and the Fissile Materials PEIS. Impacts from the proposed Yucca Mountain high-level waste repository are not included because much of the required information is not available. Other NEPA documents, such as the Yucca Mountain Repository EIS and greater-than-Class-C and special-case wastes NEPA documents, to be published after the WM PEIS, will also address the potential cumulative impacts of the proposed future actions involving these waste types. The NTS Sitewide EIS contains more detailed information on impacts at NTS, including cumulative impacts.

The proposed waste management actions addressed in the WM PEIS are not expected to release significant amounts of carbon-14 into the atmosphere. The WM PEIS anticipates few impacts to groundwater quality and human health from the proposed waste disposal actions at NTS. Under the conservative assumptions in the low-level mixed waste impacts analysis, the hazardous solvents in some low-level mixed waste would end up in the disposal facility. Some of the low-level mixed waste contains these solvents in concentrations great enough to exceed standards when the wastes are disposed. In practice, however, DOE would meet EPA standards for low-level mixed waste treatment and disposal and, therefore, should not produce major impacts to groundwater quality.

Since DOE does not expect that the disposal of wastes at NTS would release significant concentrations of radionuclides into the regional groundwater system, and the proposed actions are separated by significant distance from other non-DOE waste management facilities (Beatty), those activities are not expected to significantly contribute to cumulative impacts at the site. The potential for leaching of contaminants into groundwater at NTS is extremely limited. All evaluations of the potential disposal sites at NTS have shown that, due to the very high rates of evaporation and transpiration by plants, combined with the low rainfall, water movement in the first 200 feet of the soil is upward, toward the land surface, not downward, toward the aquifers. A qualitative analysis of the vulnerability of offsite populations to risk from disposal units leading into groundwater, described in Volume I in Chapters 5, 6, and 7 of the WM PEIS, indicates that NTS poses one of the lowest risk situations of any of the potential disposal sites. Factors included in the analysis were depth to groundwater, annual groundwater recharge, and estimated time of travel of water from the surface to a downgradient well. Based on this information and analysis findings, contamination of the aquifers from waste disposal at NTS at any level of significant concern is not expected to occur. Recent DOE guidance requires that performance assessments for low-level waste disposal facilities conducted under DOE Order 5820.2A be supplemented with a composite analysis. The composite analysis will estimate the potential cumulative impacts to a hypothetical future member of the public from active or planned low-level waste disposal facilities and other sources of radioactive material in the ground that might interact with the low-level waste disposal facilities.

Comment (1874)
The WM PEIS indicates that ORR currently produces the highest population dose among the 54 DOE sites around the Nation. We believe that a large-scale low-level mixed waste and low-level waste disposal facility at ORR would add additional risk to an already unacceptable situation.

Response
Although implementation of a low-level waste or low-level mixed waste disposal facility would add some risk to that already resulting from existing facilities, and to risk potentially resulting from other proposed site actions, DOE will comply with all applicable regulations and DOE Orders intended to protect human health and environmental quality from multimedia exposure to radionuclide and chemical contaminants. DOE acknowledges that implementation of waste management actions at a given site might be limited because of potentially unacceptable cumulative impact risks. However, sitewide or project-level NEPA reviews can better address this issue, since the waste management risks reported in the WM PEIS are conservative estimates based on the use of conceptual facilities and do not account for potential mitigation.

Comment (2082)
While the effort to estimate cumulative effects is very valuable, it is somewhat incomplete. It does not include, apparently, the impacts of locating at SRS the de-enriching operations associated with disposal of highly enriched uranium. These impacts might not be great. However, as noted in the text, SRS is approaching the 10-millirem limit for air emissions of radionuclides without this additional effect. Some added discussion in the text of how impacts at SRS and at other highly impacted facilities could be mitigated would be a valuable addition to the document.

Response
To the extent possible, the Draft WM PEIS considered cumulative impacts from existing conditions, the proposed waste management actions, and other reasonably foreseeable future DOE waste management actions. However, in some areas the lack of available data and schedule conflicts limited the consideration of cumulative impacts. For instance, the Draft PEIS did not consider the impacts of high-level waste disposal at Yucca Mountain because that information is not available. The Draft PEIS considered the potential cumulative impacts at SRS of continued management of spent nuclear fuels; tritium supply and recycling; the transfer of nuclear weapons complex nonnuclear functions to SRS; the processing of F-Canyon plutonium solutions to plutonium metal; the interim management of nuclear materials; the operation of the Defense Waste Processing Facility; other site projects for the management of waste; and environmental restoration activities (see Section 11.17 in Volume I). The Final PEIS cumulative impacts analysis includes information that has become available since the publication of the Draft. Chapter 11 now contains information from the EISs on stockpile stewardship

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and management, fissile materials management, foreign research reactor spent nuclear fuel, and storage and disposition of excess highly enriched uranium. Based on the WM PEIS analyses presented in Chapter 11, LANL and WIPP are the only sites where the 10 millirem standard for air emissions of radionuclides is estimated to be exceeded. Sitewide or project-level NEPA reviews would examine site-specific cumulative impacts in greater detail. Chapter 12 in Volume I includes a discussion of general mitigation measures that could be used to mitigate impacts of managing wastes. If the cumulative impacts would approach or exceed standards, DOE added a discussion of mitigation measures to Chapter 11, Volume I.

Comment (2091)
A cumulative assessment of disposal of radioactive and hazardous wastes should be done, including other types of impacts in the BNL region (as this, for example, was a major driver for the Pine Barrens Protection Act).

Response
The WM PEIS evaluated the potential disposal of low-level mixed waste and low-level waste at BNL. The potential groundwater quality impacts from the combined disposal of low-level mixed waste and low-level waste at BNL are discussed in Volume I, Section 11.4.1. Section 11.4.2 addresses the potential cumulative impacts on groundwater quality from the proposed waste disposal actions and existing groundwater contamination at BNL.

The WM PEIS disposal analysis is a screening-level assessment. The objective of the assessment is to provide a relative comparison of the potential suitability of sites for disposal of low-level mixed waste and low-level waste as waste management alternatives are varied. The siting of a disposal facility at a specific location at BNL or any other DOE site would be subject to additional sitewide or project-level NEPA review, including a more detailed cumulative impacts analysis. Also, in the actual siting and design of a disposal facility, more detailed, site-specific analyses would be conducted in accordance with the requirements for a performance assessment specified in DOE Order 5820.2A. Recent DOE guidance requires that the performance assessment process be supplemented with a composite analysis. The composite analysis would estimate the potential cumulative impacts to a hypothetical future member of the public from active or planned disposal facilities and other sources of radioactive material in the ground that might interact with the disposal facility.

Comment (2194)
The WM PEIS does not effectively address the cumulative impacts of all the nuclear activities within the Portsmouth/Paducah area.

Response
The existing environmental conditions at PGDP and the Portsmouth Plant resulting from ongoing activities are described in Sections 4.4.10 and 4.4.12, respectively, in Volume I of the WM PEIS. The cumulative impacts are evaluated in Sections 11.12 and 11.14, respectively. The cumulative impacts analysis in Chapter 11 of the WM PEIS for each of the 17 major DOE sites incorporates the impacts of existing operations, combined waste management impacts, and the impacts of reasonably foreseeable future actions as identified in recent draft and final EISs. These impacts are placed in the context of the environmental conditions within the region (e.g., the air quality impacts analysis considers current air quality conditions). Where appropriate, the projected impacts of non-DOE activities that contribute to radiological dose within the region are also considered and included within the analysis. Chapter 11

was revised extensively pursuant to public comments. Sitewide or project-level NEPA reviews would examine site-specific cumulative impacts in greater detail.

Comment (2296)
Transportation accident rates are not covered in any cumulative way, and that needs to be rectified.

Response
The WM PEIS transportation risk analysis used accident rate statistics based on information from the U.S. Department of Transportation, as discussed in Section E.6.4 in Volume IV. These accident rates are State averages based on historical commercial carrier performance with all types of cargo under all weather conditions. Actual accident rates are expected to be slightly lower because commercial carriers of hazardous and radioactive waste have a higher awareness of transportation risk than the general public, and prepare their shipments accordingly. Cumulative accident risks are provided for each waste type for each alternative in Volume IV, Section E.7.

Comment (2391)
The WM PEIS provides only a portion of the information needed to evaluate cumulative impacts. The summary provided in Section 11.15 is cryptic and not comprehensive. The technical meaning of the summation and the data sources are obscure. DOE needs to make a better attempt to effectively integrate the projected impacts of DOE planned environmental restoration activities and Defense Programs-related future production work at SRS.

Response
DOE has extensively revised Chapter 11 of the WM PEIS to make the text both more readable and more comprehensive. Many additional draft and final EISs have been incorporated into the Chapter 11 discussion to ensure meaningful inclusion of reasonably foreseeable future actions at each of the 17 major waste management sites. Section 11.17.2 describes the activities considered as other reasonably foreseeable future actions at SRS. These include impacts related to defense waste processing, tritium supply and recycle, spent nuclear fuel management, foreign research reactor spent nuclear fuel management, interim management of nuclear materials, storage and disposition of weapons-usable fissile materials, stockpile stewardship and management, and disposition of highly enriched uranium. Environmental restoration activities for sites with adequate evaluations available were also incorporated in the WM PEIS cumulative impacts analysis.

Comment (2477)
The socioeconomic analysis is complicated by the possible consequences of other pending DOE actions at INEL. Until DOE indicates its preferred alternatives for each waste type, all that we really know is that the maximum increase in jobs at INEL could be as high as 4,925. Should any substantive proportion of the additional 4,384 jobs from pending actions be realized, INEL would experience an upsurge in jobs never before experienced in the area. To date, no one in the Idaho Department of Employment is projecting job growth of this magnitude at INEL.

It is very likely that there will be an overlap in the construction phases for the spent nuclear fuel and waste management projects at INEL. The overlap would temporarily inflate employment at INEL and in its region of influence (ROI); but once the overlap period ended, employment would rapidly decrease, subjecting employment at INEL and within its ROI to a yo-yo effect. Given the possibility of

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a construction overlap with other pending DOE projects, employment levels of this magnitude might be difficult to accommodate in the ROI.

The Draft WM PEIS Summary document states, "Both Council on Environmental Quality and DOE regulations for implementing NEPA require the assessment of cumulative impacts because significant impacts can result from several smaller actions that, individually, may not have significant impacts." The WM PEIS analysis of the cumulative effects of pending DOE actions is totally inadequate. It does not provide the State or the INEL ROI the information necessary to implement mitigation measures to reduce the disruptive effects of major changes in employment at INEL and within its ROI.

Response

The WM PEIS was prepared to help DOE develop a Department-wide strategy to treat, store, and dispose of DOE wastes in a safe and efficient manner, that minimizes impacts to the local environments around sites that might be associated with waste management. The PEIS has considered cumulative impacts for past, present, and reasonably foreseeable actions to the extent possible (see Volume I, Chapter 11). The analysis of cumulative impacts in the PEIS is, however, limited by certain factors such as data availability and schedule priorities and conflicts.

The cumulative impacts analysis presents a reliable basis for the comparison of alternatives for each waste type and includes consideration of other proposed activities at the individual site level. Although the analysis attempts to be sensitive to the unique character and local concerns of each individual ROI, it must be recognized that at the programmatic level, the information available will be very general. As a broad, Department-wide analysis, the PEIS, while sufficient for comparison of the effects of each of the waste type alternatives, might not provide enough information for local government and planning agencies at the regional and State levels to ascertain specific impacts or implement mitigation measures. Sitewide and project-level NEPA reviews will examine site-specific cumulative impacts, including socioeconomic impacts, in greater detail.

DOE recognizes the potential for project overlaps to cause rapid or temporary fluctuations in employment and spending in the ROIs and is especially concerned with the effect of "yo-yo" or "boom-bust" phenomena. The WM PEIS socioeconomic impact analysis was specifically designed as a conservative approach to highlight the potential for such phenomena at the programmatic level. Site-specific NEPA documentation would add a more detailed understanding and provide potential strategies for mitigating impacts. It is expected that a more definitive projection of the total number of jobs to be realized for all planned and reasonably foreseeable site activities would be incorporated into site-specific analyses. Any potential conflict with current or planned future growth at the local or State level will become evident during this process.

DOE revised Section 5.4.6.1 in Volume I and Section C.4.6.1.2 in Volume III of the WM PEIS to indicate DOE's recognition of the potential for a sudden increase in population migration from the potential overlapping of waste management activities and other DOE projects. These sections also state that because the actual timing of peak employment is not yet available, only a general discussion was possible in the WM PEIS. As noted in Section 11.2, the WM PEIS cumulative impacts analysis includes site employment impacts.

DOE has revised Chapter 11 to include a more comprehensive analysis of cumulative impacts from a number of future actions, including the impacts of spent nuclear fuel management, foreign research reactor spent fuel management, and storage and disposition of weapons-usable fissile materials, and information from the Navy's evaluation of container systems for the management of naval spent nuclear fuel.

Comment (2547)
Volume I, Section 11.18. The 80% figure needs referencing. It seems high.

Response
Note that Section 11.18 in the Draft WM PEIS was changed to Section 11.20 in the Final WM PEIS. The WM PEIS states that within this cumulative total number of potential fatalities, the general transport of radioactive material accounts for approximately 80% of radiation-related latent cancer fatalities. DOE derived the 80% figure from calculations based on the data in Table 11.20-4, as clarified in the accompanying text. Footnote "a" for Table 11.20-4 provides the source for the data, which is the SNF/INEL EIS.

Comment (2594)
For cumulative impacts, the WM PEIS considered impacts that are additive and did not include groundwater risks and contamination from disposal. This was based on the assumption that contaminants from each disposal site are separate and do not merge or commingle. Why is no mixing of groundwater plumes assumed? Why is existing disposal inventory and existing groundwater contamination not included? Depending on the geology, aquifer characteristics, disposal site location, and constituents, the impacts could be cumulative. Groundwater impacts should be analyzed on a cumulative basis.

Response
Section 4.4 in Volume I provides summaries of the affected environment at each major site, including levels of groundwater contaminants.

The WM PEIS screening-level analyses conducted to assess disposal risks required the use of several simplifying assumptions. As described in Section 5.4.1.2.2 in Volume I, the analyses assume that each disposal unit is a discrete structure and that no mixing of groundwater plumes from multiple units occurs. In addition, the analyses consider only new disposal units and do not account for existing disposal inventory or existing groundwater contamination. These assumptions were necessary because of the screening-level nature of the analyses used for this programmatic evaluation. No attempt was made to identify locations of disposal units on a site, and only limited site-specific data were used in the analyses of the 16 sites.

Sections 5.4.1.2.2, 6.4.1.8, and 7.4.1.7 in Volume I were revised to explain that disposal risks were analyzed for the hypothetical maximally exposed individual, who would be exposed through a drinking well located 300 meters (984 feet) from the center of a single disposal unit. At greater distances from the disposal units, where overlap of plumes is more likely, the concentrations in any given plume should be lower than those estimated at the 300-meter well as a result of dispersion and dilution.

DOE added groundwater impacts to the cumulative impacts analysis in Chapter 11 of the Final WM PEIS. However, DOE did not consider the combined and cumulative health risks resulting from the disposal of low-level mixed waste and low-level waste because the potential contaminants were assumed to neither merge nor commingle within 300 meters of a single unit.

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Site-specific studies, including the performance assessment analysis required by DOE Order 5820.2A, will better address issues such as commingling of groundwater plumes from multiple units and existing groundwater contamination. These studies will attempt to design and site new disposal units, so they will investigate these issues more rigorously than can be attempted in a programmatic document.

Although not part of the WM PEIS, the DOE Workgroup that is responding to Defense Nuclear Facilities Safety Board Recommendation 94-2 is moving forward with plans to revise DOE performance assessments for radioactive waste disposal sites to include existing contamination, and ongoing activities that contribute to groundwater contamination.

Comment (2595)
In the cumulative impacts analysis, why does the WM PEIS assume that contaminant plumes from each disposal site are separated and do not merge or commingle? Groundwater should be included in the cumulative impacts analysis.

Response
The WM PEIS hypothetical farm family scenario assumes that individual receptors are exposed through drinking water from a well 300 meters (984 feet) downgradient from the center of a single disposal unit. Concentrations of groundwater contaminants at the well are assumed to be higher than those that could be expected at greater distances from the unit due to dispersion and dilution. DOE expects that multiple units will need to be constructed at certain sites to process projected waste volumes. However, DOE believes it is reasonable to assume that each of the individuals located 300 meters from a disposal unit will be affected primarily by the contaminant plume from the unit closest to them.

DOE recognizes that the likelihood of commingling of contaminant plumes from multiple disposal units increases as the downgradient distance from the units increases, but anticipates that, at 300 meters, the highest concentration of contaminants is likely to come from the single closest plume. At greater distances from the disposal units, where significant plume overlap is more likely, dispersion, dilution, and decay should cause the concentrations in the overlapping plumes to be lower than those estimated at the 300-meter well for a single plume.

DOE revised the PEIS to clarify this point. See Volume I, Section 5.4.1.2.2. In addition, the cumulative impacts analyses in Chapter 11 (Volume I) now includes the potential for exceedances of drinking water standards in groundwater.

Comment (2624)
In Volume I, Section 11.5 and Table 11-10, why are the health impacts (other than cancer) associated with exposure to the hazardous chemical components in low-level mixed waste not included?

Response
The WM PEIS combined and cumulative impacts analyses presented in Chapter 11 of the WM PEIS did not use noncancer health effects from chemical exposure as an evaluation factor. Effects of other health effects were not used because these effects on the public would not be expected as a result of the treatment of low-level mixed waste, transuranic waste, and hazardous waste. Most mechanisms of noncancer toxic effects have thresholds below which no toxic effects are observed. For the alternatives evaluated for each waste type, the estimated exposure concentrations of noncarcinogenic chemicals were several orders of magnitude below the threshold concentrations presumed to be protective of

human health. Therefore, the combined effects would also be below the threshold values. Noncancer effects in waste management workers are of potential concern only as a result of hazardous waste treatment. Risks to individual waste management workers were not considered part of the combined analysis because each worker was assumed to work with a single waste type at a time.

Comment (2820)
The WM PEIS assumption for cumulative impacts is that they will be, at worst, additive. It is not certain that many land-use planners, ecological specialists, or contamination experts would agree that this is necessarily so. The possibility of synergistic effects should be addressed, especially in any discussion regarding environments already under some stress. It should be noted that BNL has the largest population in any region of influence under discussion, and that the mere presence of such a large population brings certain effects. In addition, BNL has already caused a great deal of environmental contamination, from past (and possibly from continuing) practices. The combination of these factors could indicate that BNL is unsuitable for further environmental insults, or that the effects from any further environmental stresses might not be merely additive.

Response
The WM PEIS uses generally accepted methods to estimate cumulative impacts. The PEIS analyzes the impacts of the general program alternatives using very conservative generic analyses of impacts. DOE does not believe it is appropriate to apply a synergistic effects analysis to this type of data. DOE did not evaluate potential synergistic and antagonistic effects resulting from exposure to mixtures of contaminants. As noted in Section D.2.5.1 in Volume III, risks from enhanced (synergistic) or diminished (antagonistic) toxicity from interactions among components of contaminant mixtures were not evaluated because not enough information exists on these effects. If synergism or antagonism is occurring, these effects should be operative at all sites under all alternatives. Therefore, although the WM PEIS health risk estimates might actually underestimate or overestimate potential risks, the uncertainty added by the inability to address synergistic or antagonistic effects is systematically inherent throughout the analysis. However, the relative differences in risk estimates among waste management alternatives should not be affected by errors associated with these systematic uncertainties.

DOE believes that it is unlikely that cumulative impacts would exceed the sum of the individual impacts of the actions considered in the cumulative impacts section because (1) individual impact estimates are generally conservative; (2) most impacts would occur at different locations; (3) most impacts would not overlap or would only partially overlap in time; and (4) most impacts would affect different endpoints. For example, each action might affect a different maximally exposed individual.

DOE revised Chapter 11 in Volume I of the WM PEIS to include a more comprehensive analysis of cumulative impacts. Where impacts from other programs have been documented, they are identified in the PEIS. Cumulative impacts for BNL are evaluated in Section 11.4. Sitewide or project-level NEPA reviews would contain more detailed cumulative impacts analyses.

Comment (2829)
The entire cumulative impacts analysis for BNL is tremendously flawed. For example, a footnote in Section 11.2 indicates that although it was known to be otherwise, outdated data stating that BNL produced no LLW was used in the analysis of LLW impacts. Yet, in spite of the fact that more recent data showed that LLW was being produced, the new data were ignored. Furthermore, as noted in previous sections, the analyses for BNL indicate that hazardous waste is produced at this site, yet this

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information was excluded. Accordingly, this entire section should be reconsidered in light of updated information.

Response
DOE has revised Chapter 11 to incorporate recent and comprehensive information. Estimates of waste generation at the sites are revised every year. The data used in the Draft PEIS represented the best available data at the time of the analysis. Since the Draft PEIS was issued, new information from updated databases has become available, including new integrated data base data for 1995. Appendix I in Volume IV of the Final PEIS presents new waste-volume data and discusses how these data might effect any of the impacts described in the PEIS.

Appendix I compares the updated estimates of low-level waste, low-level mixed waste, and transuranic waste generation to the estimates used in the Draft PEIS. Where these estimates vary significantly in volume, treatment category, or radiological profile, the new waste volumes were used to estimate potential impacts for those sites in the Final WM PEIS.

The 1992 Integrated Data Base, the source of LLW data for the Draft WM PEIS, did not provide LLW data for BNL. Thus, the evaluation in the Draft PEIS for BNL did not include impacts from management of LLW. However, Tables 1.6-2 and 7.1-1 in Volume I of the Final PEIS show that the projected LLW volume at BNL is approximately 5,600 cubic meters. The updated data were obtained from the 1995 version of the Integrated Data Base. Consideration of updated LLW estimates for BNL are included in Appendix I in Volume IV of the Final PEIS. Appendix I addresses the issue of how updated waste projections affect analyses in the PEIS.

Hazardous waste is generated, or is projected to be generated, at about 45 DOE sites. Based on RCRA uniform hazardous waste shipping manifests, facility reports, and hazardous waste generation and disposal information dating back to 1984, DOE estimates that more than 90% of the total hazardous waste (wastewater and nonwastewater) in a given year is generated by 11 or fewer of the 45 DOE sites, although not always the same sites every year. In general, only nonwastewater hazardous waste from these eleven larger sites was analyzed in this PEIS. Table 10.1-1 in Volume I of the PEIS provides the quantities of hazardous waste at the 11 largest DOE hazardous waste generators used for the evaluation of the PEIS alternatives. Because BNL is not one of the 11 largest generator sites, the PEIS does not specifically analyze hazardous waste at BNL, but the PEIS analysis is representative of DOE sites in general.

Comment (2879)
The separate evaluations, conducted by various groups within DOE, might not adequately account for the cumulative impacts of all the potential decisions that could affect INEL. The most serious example is the lack of a quantitative analysis of the impact of environmental restoration activities, even though estimates of the wastes to be produced by these activities are available.

Response
As stated in Volume I, Section 1.7.1, of the WM PEIS, DOE has concluded that remediation decisions, including the level of site remediation, must reflect site-specific conditions. While the WM PEIS does not analyze environmental restoration activities, it does contain information on the anticipated waste volumes generated as a result of environmental restoration activities and a qualitative discussion of the

extent to which those waste volumes could affect the comparison of waste management alternatives in the WM PEIS.

Although estimates of environmental restoration waste volumes are available, adequate characterization data are generally not available to allow meaningful assessments of environmental impact assessment as explained in Volume I, Section 1.7.1, of the PEIS. Therefore, for many sites, DOE was not able to include impacts from environmental restoration activities in the cumulative impacts analysis.

Comment (3093)
The Hanford Site cumulative impacts section should clarify the statement that combined alternatives would affect between 47 and 179 acres of land at the site, while other actions could affect another 70 acres. Are the 70 acres related to waste management? The PEIS should describe what other actions could affect another 70 acres.

Response
The Final WM PEIS cumulative impacts chapter (Chapter 11) contains a more comprehensive evaluation of the impacts of other reasonably foreseeable actions that might affect the sites. As described in Section 11.6.2 and Table 11.6-2, for the Hanford Site these actions include spent nuclear fuel management, the Hanford tank waste remediation system, disposal of decommissioned naval nuclear plants, safe interim storage of Hanford tank wastes, storage and disposition of weapons usable fissile material, and plutonium finishing plant stabilization. These actions could involve 1,949 acres more than the estimated 7 to 178 acres required for the waste management actions proposed at the Hanford Site.

Comment (3143)
The WM PEIS does not adequately address potential cumulative impacts because it uses out-of-date Integrated Data Base data, even though a more up-to-date Integrated Data Base was published months before the Draft WM PEIS was issued.

Response
DOE used the 1995 Integrated Data Base to obtain waste-volume data for the Final WM PEIS. The transuranic waste volume estimates reported in Section 8.1 in Volume I are not directly comparable to the values presented in the Integrated Data Base because the latter contains information about buried transuranic waste, which will be handled under the Environmental Restoration Program.

As part of the Final WM PEIS, DOE has performed an analysis to address how more recent data on low-level waste, low-level mixed waste, and transuranic waste might affect the analyses of alternatives in the PEIS (see Appendix I in Volume IV). For transuranic waste, for example, the analysis finds that, although transuranic waste inventory and projected generation volumes at each site vary to some extent, similar health risks would be expected at all sites except SRS. At SRS, radiological impacts would be lower. Any changes to health risk estimates or other impact parameters were incorporated into the combined and cumulative impacts analysis presented in Chapter 11 in Volume I.

Comment (3154)
The impacts of low-level waste and low-level mixed waste disposal at the Pantex Plant are dramatically underestimated because routine and accidental emissions from Pantex are not well documented.

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Response
Under some of the alternatives discussed in the PEIS, DOE would treat or dispose of low-level and low-level mixed wastes at Pantex. Under other alternatives, DOE would ship such wastes off the site for treatment and disposal. If DOE decided to locate waste management facilities at Pantex, it would prepare sitewide or project-level NEPA reviews, which would provide more detailed information on projected routine and accidental releases of radioactivity.

The PEIS human health and ecological risk assessments under both routine operations and accident conditions examined potential Waste Management Program effects on humans and the environment near the proposed waste management site at Pantex. DOE found that public health and environmental risks from waste management activities would be low under all alternatives, especially after implementation of radionuclide- or chemical-specific limits for disposal.

As identified in Chapter 11 (Volume I), Table 11.13-2, the maximum annual radioactive releases from the combined waste management alternatives of all waste types managed at Pantex (including transportation) would result in a slight increase in the dose to the offsite population from the Pantex Plant. However, maximum cumulative radioactive releases, which include releases from existing operations at Pantex, would still be well below the EPA standard of 10 millirems per year to the maximally exposed individual offsite.

Comment (3155)
Before the cumulative impacts of the disposal options at the Pantex Plant can be adequately considered, DOE must consider the proposed Pantex role as a major storage site for plutonium pits from dismantled warheads.

Response
DOE has revised Section 11.13 in Volume I of the WM PEIS, which discusses cumulative impacts for the Pantex Plant, to include impacts resulting from DOE's Stockpile Stewardship and Management PEIS and Fissile Materials Management PEIS. In addition, the impacts of actions analyzed in the draft *Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components Environmental Impact Statement*, including the role of the Pantex Plant as a storage location for plutonium pits, are now included in the Final WM PEIS cumulative impacts analysis.

If DOE decided to locate waste management facilities at the Pantex Plant, sitewide or project-level NEPA reviews would provide more detailed information on projected routine and accidental releases of radioactivity. The cumulative impacts section of such a site-specific document would incorporate more detailed information about any DOE plans for the proposed storage of plutonium pits at the Pantex Plant.

Comment (3167)
The State of Washington and U.S. EPA should not allow DOE or the U.S. Department of Defense to transfer to the Hanford Site any hazardous and radioactive waste unless the following criterion is met: Cumulative impacts (e.g., of other waste types) must be analyzed and considered in decisions concerning the movement and treatment of DOE wastes. DOE must fully disclose all projected waste types and quantities that might be shipped to Hanford prior to any consideration by the State of Washington of treatment, storage, or disposal permits for wastes generated at other facilities. This information must be part of the WM PEIS and Draft Site Treatment Plan public comment/public

participation process, and of an inter-regional and inter-site advisory board dialogue, prior to development of final Site Treatment Plans and any agreement by the State of Washington to accept offsite wastes.

Response
Section 11.6 in Volume I of the WM PEIS presents the combined and cumulative impact analyses for the Hanford Site. The combined impact analysis addresses the total potential impacts of the proposed alternatives of low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste at the site. The cumulative impact analysis considers the combined waste management actions and other proposed actions at Hanford, in addition to existing site conditions.

The Hanford Site has an existing agreement that exempts it from the FFCAct Site Treatment Plan requirement. At the Hanford Site, DOE, EPA Region X, and the State of Washington entered into the Hanford Federal Facility Agreement and Consent Order, commonly known as the Tri-Party Agreement, on May 17, 1989. The current document has been formally amended four times with the latest amendment issued in January 1995. The Tri-Party Agreement contains provisions pertaining to mixed waste treatment, including treatment conducted under the RCRA land disposal restrictions. Under the agreement, the Hanford Site submits annually an updated Land Disposal Restriction Plan for Mixed Wastes, with the most recent update issued in April 1995. Because the Hanford Site has a Federal Facility Agreement and Consent Order and the Land Disposal Restriction Plan is a part of these agreements, EPA and the Washington Department of Ecology have formally concurred that a Site Treatment Plant is not required.

Although the Hanford Site is exempt from the Site Treatment Plan requirement, it has actively participated in DOE's FFCAct compliance activities during the reporting period. These activities have included providing site representation on DOE's nationwide Policy Coordination Group and on a variety of working groups associated with DOE's FFCAct Task Force. Contributions were made within the Policy Coordination Group, Mixed Waste Inventory Data Group, Technical Support Teams, and the Disposal Workgroup.

The Hanford Site also performed the following tasks in support of DOE's FFCAct compliance efforts during fiscal year 1995:

- Hanford reviewed several proposed Site Treatment Plan submittals from both approved offsite mixed waste generators and other DOE sites.

- The Hanford Site assisted in the identification of "Likely Preferred Options" for DOE's complex-wide treatment analysis.

- Hanford participated in Public Hearings on the FFCAct in the local area and in Bremerton, Washington.

DOE's treatment option analysis resulted in an emerging nationwide treatment configuration for mixed wastes. Under this configuration the Hanford Site is considered an option to provide storage, treatment, and possible disposal for mixed wastes from other DOE sites. Therefore, the Hanford Site will participate in discussions with the State of Washington, other states, and other DOE sites concerning the acceptance of offsite wastes.

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Comment (3173)

NEPA requires the Federal Government to thoroughly consider the cumulative impacts of its proposed actions. At Hanford, cleanup and handling of wastes are being addressed in a series of EISs. Each of these could leave large quantities of waste in place. The contamination plumes from migration of these wastes will have impacts for tens of thousands of years across most of the Hanford Site. The risks from each of these EISs is cumulative and overlapping. These impacts and risks must also be included in the WM PEIS. The PEIS should comprehensively examine the cumulative impacts of all existing, planned, or considered Federal actions at each site.

Volume I, Section 2.2.3, neglects the immense quantities of plutonium discharged to the ground at many sites, including Hanford. DOE reports 1.521 metric tons of plutonium either in buried or stored solid waste, or liquid tank waste that was directly disposed of in the ground. Much of this material is in burial at Hanford in the 200 West area adjacent to the proposed location for the national low-level and mixed waste repository. The WM PEIS also should disclose impacts from DOE's proposals to ship weapons plutonium to Hanford for use in reactors, to create reactor fuel, or to vitrify it for disposal. The risks from these are cumulative along with the other proposed or potential site actions.

Response

The WM PEIS does not address weapons grade nuclear material such as "weapons plutonium" because it is not classified as waste and is not part of the Waste Management Program responsibility. Section 1.8.1 in Volume I of the WM PEIS identifies other DOE EISs and their relationship to the WM PEIS. Impacts from other programs and actions analyzed in other EISs are considered in the WM PEIS cumulative impacts analysis (Chapter 11 in Volume I). Other EISs are listed in Table 11.2-1.

DOE has revised the cumulative impacts analysis presented in Chapter 11. The Storage and Disposition of Weapons-Usable Fissile Materials EIS, which addresses plutonium disposition, has been added to the list of documents evaluated for information on impacts from other reasonably foreseeable actions at Hanford, as described in Section 11.6.2 in Volume I of the PEIS. Other actions considered include spent nuclear fuel management, management of K-Basin spent nuclear fuel, disposal of decommissioned Naval nuclear plants, safe interim storage of Hanford tank waste, and Plutonium Finishing Plant stabilization. The Hanford Remedial Action EIS addresses additional information about potential cumulative impacts at Hanford, including those from proposed environmental restoration actions.

Comment (3337)

The PEIS conveys assurances where there is no basis for them. DOE is "in the dark" about levels of contamination all over the country, so its "predictive speculations" are not convincing.

Response

The WM PEIS addresses the potential impacts of proposed waste management actions using best available data at the time of the analysis and state-of-the-art models. Conservative assumptions were used to develop estimates that would overestimate rather than underestimate impacts. Existing levels of contamination are discussed in Chapter 4. This information is also used in the cumulative impacts analysis presented in Chapter 11 to characterize existing site conditions.

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Comment (3343)
Before the Final WM PEIS is issued, each impact parameter should be analyzed on a case-by-case, site-specific basis, including past, present, and projected future activities. Some sites are "notoriously contaminated and out of control" (e.g., the danger of spontaneous combustion of sludge pools at Hanford; plutonium and tritium migration down the canyons and aquifer/Rio Grande at LANL; unknown levels of contamination at SRS, INEL, and NTS).

Response
Chapter 11 in Volume I of the WM PEIS discusses the combined impacts that could result from locating waste management facilities at each of the 17 major waste management sites, the cumulative impacts that could result at each of the 17 major sites and in their surrounding regions, and the cumulative impacts of transporting waste. Cumulative impacts are the impacts that result from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions. Both CEQ and the DOE regulations for implementing NEPA require the assessment of cumulative impacts because significant impacts could result from several smaller actions that, by themselves, might not have significant impacts. To conduct the WM PEIS cumulative impacts analysis, DOE first examined the combined impacts of waste management alternatives for the five types of wastes analyzed in the WM PEIS at each of the 17 major sites. To these combined impacts, DOE added the impacts of other past, present, and reasonably foreseeable future actions external to the WM PEIS analysis. To the extent possible, where data on environmental remediation of contamination at the sites, such as that described by the commentor, the impacts of remediation are included in the future actions evaluated in Chapter 11. Information pertaining to Hanford, INEL, LANL, NTS, and SRS can be found in Sections 11.6, 11.7, 11.9, 11.10, and 11.17, respectively, in Volume I of the WM PEIS. Sitewide or project-level NEPA reviews can better evaluate site-specific cumulative impacts.

Comment (3353)
The WM PEIS cumulative impacts analysis is "grossly deficient." Each section on the impacts of various waste types states that each site is assumed to build and operate facilities with capacities sufficient to handle only a particular type of waste. This avoids linking results of one waste type to decisions not yet made in another and results in conservative estimates of risk, cost, and impacts. It appears that DOE based the cumulative impacts analysis on segmented impacts analyses.

Response
The major effect of adding together impacts that were estimated for one waste type without consideration of the other waste types, is that impacts are overestimated. Chapter 11 (Volume I) of the WM PEIS discusses the combined impacts that could result from locating more than one waste management facility at each of the 17 major sites for the applicable waste management alternatives. In addition, Chapter 11 identifies the cumulative impacts that could result at each of the 17 major sites and in their surrounding regions as a result of the proposed waste management actions, existing site operations, and the impacts of other reasonably foreseeable actions at the sites.

The DOE Waste Management Program is distinct from other programs, and DOE believes that it is appropriate to analyze it in this separate programmatic NEPA document. The WM PEIS is complex and covers five major types of radioactive and hazardous waste. It does not include some wastes that DOE believes are not ready for the decisionmaking process. The WM PEIS also does not include some other materials (e.g., spent nuclear fuel) because they are not wastes, nor does the WM PEIS include

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other DOE programs; however, the impacts of managing these materials and those other programs have been included in Chapter 11, wherever possible.

Comment (3354)
DOE analyzes the so-called cumulative impacts on each individual "major site," rather than discussing the cumulative effects of all of the applicable actions across the country.

Response
Most of these impacts affect only the region of influence of each site. The focus of the cumulative impacts analysis is on site-specific impacts, because it is at this level that cumulative impacts of the Waste Management Program and other programs are most relevant and could be relatively more severe. An example of impacts at a nationwide or global level would reveal a much less significant contribution to cumulative impacts from waste management because the dilution of impacts across a much larger area. Transportation impacts were analyzed on a national rather than site-specific basis. As shown in Volume I, Section 11.20 of the WM PEIS, shipping waste by truck would result in a combined total of between 12 and 69 potential fatalities from shipping low-level mixed waste, low-level waste, transuranic waste, and hazardous waste over the next 20 years, and for shipping high-level waste over the next 40 years, as shown in Volume IV, Appendix E, and Section 11.20. Shipping low-level mixed waste, low-level waste, transuranic waste, and high-level waste by rail, and hazardous waste by truck would result in a combined total of between 2 and 6 potential fatalities over the same periods.

The results of the transportation analyses conducted in Appendix E show that impacts relating to the transport of waste analyzed in the WM PEIS, which include fatalities from radiation exposure, diesel exhaust emissions, and physical trauma from accidents, are low when compared to nationwide vehicle transportation yearly impacts. Comparatively, from 1971 to 1993, over one million persons were killed by physical trauma in vehicular accidents in the U.S.

Comment (3355)
NEPA requires that the incremental impacts of the proposed action added to other past, present, and reasonably foreseeable future actions be assessed. In spite of this, DOE admits that the combined human health risks resulting from the disposal of low-level waste and low-level mixed waste were not considered. In addition, the cumulative impacts analysis does not include the impacts of the No Action Alternatives for low-level mixed waste, transuranic waste, and high-level waste because they do not comply with existing law.

Response
For purposes of the screening-level assessments conducted for the WM PEIS, several simplifying assumptions were made with respect to the potential for low-level mixed waste and low-level waste disposal to contaminate groundwater. At some sites, the construction of multiple disposal units would be required under certain alternatives (see Volume I, Sections 6.4.1.9 and 7.4.1.8). One of the simplifying assumptions made to aid in the analyses was that groundwater plumes from multiple units do not mix at the well 300 meters (984 feet) from the center of the disposal unit. DOE revised Section 5.4.1.2.2 and Section 11.1 in Volume I of the WM PEIS to clarify this assumption. Related to this assumption, existing disposal inventory and/or existing groundwater contamination at a site were not considered in the human health risk analysis because the locations of the future waste management disposal facilities are not known. These assumptions are not believed to compromise the comparison of

the programmatic alternatives. In addition, the PEIS addresses groundwater quality using the disposal modeling results to estimate where exceedances of contaminant-specific standards might occur in the future.

Additional analyses that will incorporate site-specific conditions in place of these assumptions will be conducted as part of sitewide or project-level NEPA reviews and the performance assessment process required for the operation of disposal facilities under DOE Order 5820.2A. Recent DOE guidance requires that performance assessments be supplemented with a composite analysis. The composite analysis will develop reasonably conservative estimates of the cumulative impacts from active and planned low-level waste disposal facilities and all other sources of radioactive contamination that could interact with the disposal facility to affect the dose to future members of the public.

DOE revised Chapter 11 (cumulative impacts) of the PEIS to include the No Action Alternatives and to include cumulative impacts of contamination on groundwater quality.

Comment (3356)
The PEIS states that the human health risks to the offsite population and the maximally exposed individual are reported as annual exposures and annual risk, rather then for the entire period of operation. The cumulative effects of some of the radionuclides and chemical contaminants would last far beyond the expected life of the facility. These contaminants do not disappear from the body in 1 year, and the effects from such exposure do not go away in 1 year. They bioaccumulate and biomagnify, with ever-increasing effects as time goes on. If synergistic effects are possible they need to be disclosed. If DOE is not capable of disclosing these effects, they must disclose them as scientific uncertainty, and disclose this to the public in the PEIS.

Response
DOE revised the WM PEIS cumulative impacts analysis (Chapter 11 in Volume I) to include collective doses for the offsite public and site workers for the 10-year waste management processing period combined with exposure from existing site activities and other reasonably foreseeable future actions. This analysis includes collective doses attributable to the entire operating period assumed for the proposed facilities.

DOE did not evaluate potential synergistic and antagonistic effects resulting from exposure to mixtures of contaminants. As noted in Section D.2.5.1 in Volume III, risks from enhanced (synergistic) or diminished (antagonistic) toxicity from interactions among components of contaminant mixtures were not evaluated because not enough information exists on these effects. If synergism or antagonism occur, these effects should be operative at all sites under all alternatives. Therefore, although the WM PEIS health risk estimates might actually underestimate or overestimate potential risks, the uncertainty regarding the inability to address synergistic or antagonistic effects is systematically inherent throughout the analysis. However, the relative differences in risk estimates among waste management alternatives should not be affected by errors associated with these systematic uncertainties.

Comment (3376)
Under land use, DOE forgets to mention the abandoned Kentucky Ordnance Plant adjacent to PGDP. This plant is severely contaminated and is either proposed or listed as a Superfund site. There could be significant cumulative impacts from this plant and any future actions associated with it. Also, within the PGDP region of influence and fairly close to the site is a commercial hazardous waste incinerator

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located at Calvert City, where there are also several other major chemical plants, all discharging millions of pounds of toxics and carcinogens annually. There is a cement kiln burning hazardous waste in Cape Girardeau, Missouri. There are numerous other chemical plants in the region of influence. There is also a major paper mill, Westvaco, in Wickliffe, Kentucky, not far from PGDP. In addition, there are several significant coal fired plants in the region of influence, two of the largest of which are right across the river from PGDP. All of these facilities are significant to the affected environment and could have cumulative impacts.

Response
Impacts of existing facilities (such as those identified in the comment) in the PGDP region of influence are reflected in the air monitoring data from the site. These monitoring data are summarized in Section 4.4.10 in Volume I of the WM PEIS and described in detail in the WM PEIS Affected Environment Technical Report. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. These monitoring data form the basis for the existing conditions information in Chapter 11 (Volume I) and are used in assessing waste-type specific and cumulative air quality impacts in the PEIS. Sitewide or project-level NEPA reviews would examine cumulative impacts in more detail, including the effects of nearby facilities.

Comment (3411)
The WM PEIS fails to disclose the cumulative impacts of importing vast quantities of waste including waste from other weapons plants and high-level nuclear waste from foreign and naval reactors on (1) the public along transportation routes; (2) Hanford's ability to cleanup its own wastes; (3) using the vast land area of valuable habitat to bury wastes at Hanford. The law requires that we get to see the cumulative impacts now.

The Hanford Site cumulative impacts section fails to mention impacts from the environmental restoration disposal facility (165 acres, potentially up to 1,024 acres); the safe interim storage EIS (74 acres); the 240 access road (18 acres); the solid waste retrieval complex (46 acres); and the tank waste remediation system EIS (148 acres); which, taken together with waste management impacted land, might affect 1,489 acres or 25% of the 6,000 acres designated by the Hanford Future Uses Working Group. Most of the habitat has been designated as Priority Habitat by the Washington Department of Fish and Wildlife. Further, Chapter 11 does not address the cumulative impacts of high-level waste leaks at the Hanford Site.

Hanford plans now call for 1,791 football fields worth of nuclear national sacrifice zone for disposal. If environmental restoration wastes and waste management wastes follow Hanford's own wastes, where is the room, what are the land-use impacts, what are the human health impacts, what are the long-term impacts on treaty rights, and what are the impacts on Future Site Use Working Group report values that call for release of that land for public use?

Response
DOE has revised the cumulative impacts analysis presented in Chapter 11 in Volume I of the WM PEIS to include new information available on other DOE actions at Hanford. The Hanford Tank Waste Remediation System EIS, the Hanford Remedial Action EIS, and the CERCLA documentation for the Environmental Restoration Disposal Facility were added to the list of documents evaluated for information on impacts from other reasonably foreseeable actions at the site, as described in Volume I, Section 11.6.2. Other EISs considered in Section 11.6.2 include spent nuclear fuel management,

management of K-Basin spent nuclear fuel, disposal of decommissioned Naval nuclear plants, safe interim storage of Hanford tank wastes, storage and disposition of weapons-usable fissile materials, and plutonium finishing plant stabilization. These actions might involve 1,949 acres more than the estimated 7 to 178 acres required for the combined waste management actions proposed for the Hanford Site. Assuming a footfall field of approximately 1.25 acres, the anticipated actions at Hanford would require acreage on the order of the 1,791 noted by the commentor. So far as the "nuclear national sacrifice zone for disposal" at the Hanford Site, the commentor is likely referring to land irreversibly committed to environmental remediation waste disposal. The Draft Hanford Remedial Action EIS and Comprehensive Land Use Plan indicates that under the Restricted (R2) and Exclusive Future Land-Use Alternative, the capped areas of the Reactors on the River, Central Plateau, and All Other Areas geographic areas would be irreversibly and irretrievably committed. The caps in several waste sites would irreversibly commit environmental resources (geologic and groundwater) in the Reactors on the River (137 hectare [339 acres]), Central Plateau (1,138 hectare [2,812 acres]), and All Other Areas (73 hectare [180 acres]) geographic areas for long-term disposal of environmental remediation wastes.

The area required on the Central Plateau for environmental wastes commits less than half the acreage. More than 3,000 acres would remain to support other activities on the Central Plateau, including the proposed waste management activities. The Hanford Future Site Use Working Group Report and its values are not threatened by any alternative in the WM PEIS. No alternative in the WM PEIS will require additional land use for waste management facilities outside the 200 Area at Hanford.

The State of Washington has designated large and small blocks of shrub-steppe as priority habitat because it possesses unique or significant value to many species. The State made this determination based on the quality of the following attributes: comparatively high fish and wildlife density, comparatively high fish and wildlife species diversity, important fish and wildlife breeding habitat, important fish and wildlife seasonal ranges, important fish and wildlife movement corridors, limited availability, high vulnerability to habitat alteration, and unique or dependent species.

Almost the entire Hanford Site is classified as shrub-steppe and is, therefore, priority habitat. However, much of the site's habitat, including the habitat of the Central Plateau, the site of nearly all of Hanford's waste management operations, is previously disturbed. The site is criss-crossed with dirt roads; old concrete water tanks are scattered throughout the site; an abandoned gravel pit is centrally located on the site; and an old laydown yard (used during construction of the REDOX plant) is on the western end of the site.

Unlike the U.S. Fish and Wildlife Service's designations of critical habitat, Washington State's priority habitat designations have no associated legal requirements for habitat protection. However, DOE Order 430.1, Life-Cycle Asset Management, requires that DOE consider ecosystem management and preservation values during all phases of Hanford Site operations. DOE intends to limit disturbances to priority habitats through the designation of future Hanford Site land uses. The Draft Hanford Remedial Action EIS and Comprehensive Land Use Plan (DOE/EIS-0222D), which is currently undergoing public review and comment, takes into account the preservation of valuable natural resources when developing broad classes of future land uses. When the Record of Decision for this EIS is issued and land uses are designated, a Hanford Biological Resources Management Plan will be finalized (it is currently in draft form) to provide direction regarding the protection and enhancement of the natural environment.

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The Foreign Research Reactor Spent Nuclear Fuel EIS evaluates alternatives for the management of reactor fuel irradiated in foreign reactors, including the risks associated with its transportation. In addition, the SNF/INEL EIS evaluates DOE spent nuclear fuel management at the programmatic level, just as this PEIS evaluates the DOE Waste Management Program. As documented in the SNF/INEL EIS Record of Decision, DOE decided to regionalize spent nuclear fuel management by fuel type at three sites--the Hanford Site, INEL, and SRS. Hanford production reactor fuel will remain at the Hanford Site. In addition, the Record of Decision for the Foreign Research Reactor Spent Nuclear Fuel EIS. indicates that neither Tacoma, nor Seattle, Washington, would be used to receive foreign research reactor spent nuclear fuel. DOE believes that these extensive documents cover their subjects, including transportation, thoroughly and completely. In addition, Section 11.20, Volume I, of the WM PEIS contains the cumulative impacts analysis for transportation.

Comment (3548)
The first paragraph of Section 5.4.13 in Volume I of the WM PEIS only mentions cumulative impacts from the Waste Management Program, while excluding cumulative impacts from other actions (e.g., environmental restoration).

Response
Section 11.2 in Volume I of the WM PEIS describes the cumulative impacts analysis. The analysis considers the potential impacts of the proposed waste management actions in the context of existing site conditions and the impacts of other reasonably foreseeable future actions at each site. Environmental restoration activities at most DOE sites cannot be meaningfully evaluated in terms of cumulative impacts at this time, since environmental restoration actions are too uncertain for most sites. However, several sites currently have adequate evaluations available for environmental restoration activities. Environmental restoration impacts for these sites have been incorporated into the cumulative impacts analysis presented in Chapter 11 of the WM PEIS. The PEIS does consider the effects of environmental restoration waste volumes on the comparison among waste management alternatives (see Chapters 6, 7, and 8 in Volume I and Appendix B in Volume III). In general, the PEIS does not consider impacts of environmental restoration activities, which DOE believes are specific to each affected location. Sitewide or project-level NEPA reviews would analyze cumulative impacts in greater detail.

Comment (3571)
DOE's course of evaluation through the WM PEIS process must entail consultation with each Native Nation - government to government - in order to understand the big picture effects and needs of Native Peoples. The stated reliance in the WM PEIS on site-specific analysis for cultural impacts will not address the cumulative impacts on Native Peoples as Nations or as a minority group. DOE facilities have already greatly impacted Native Peoples. Overall, of any "ethnic" group, Native Peoples have suffered the most under the nuclear complex. To ignore this history and the current and future cumulative impacts on Native Nations from DOE management of nuclear and hazardous materials is to contribute to "genocide and crimes against humanity."

Response
DOE policy recognizes the sovereignty of Native American Tribal Governments and the unique government-to-government relationship with the Federal Government as defined by history, treaties, statutes, court decisions, and the U.S. Constitution. DOE recognizes that it must fulfill its obligations

under Treaties with Native American Tribal Governments, and must fulfill the Federal Government's trust responsibility toward Tribes when making decisions.

DOE's policy is to consult with Tribal Governments to ensure that Tribal rights and interests are considered; that the potential impacts of proposed DOE actions on cultural or religious resources are disclosed; and that any unnecessary interference with traditional religious practices is avoided. DOE is committed to incorporating this policy into its ongoing and long-term planning and management processes, including the NEPA process, and has worked through its site representatives to notify the Tribes of the WM PEIS scope and availability for comment. Section 1.4.5 in Volume I of the Final WM PEIS addresses DOE's consultation obligations and activities and acknowledges the Tribal/Federal Government-to-Government relationship and U.S. trust and treaty obligations. Section 5.4.10 discusses the unique nature of Native American cultural and religious resources.

The WM PEIS classifies Native Americans as minority populations in a numerical context to describe the demographic characteristics of the regions surrounding the DOE sites. This designation is not intended to contradict the discussion of the unique government-to-government relationship between the U.S. and Tribes nor the Federal Government trust responsibility.

The WM PEIS analysis focuses mainly on alternatives addressing national-level strategic issues. The individual character of Native American cultures at DOE's sites, and the specialized nature of each Tribe's concerns in site activities, while considered in the WM PEIS at the programmatic level, is more productive as part of a site-level analysis. Sitewide or project-level NEPA reviews would more fully explore specific concerns related to Native American issues such as the protection of sacred lands, cultural properties, and Tribal and religious practices. During these reviews, local DOE officials will continue to work with Tribal representatives to listen to their concerns regarding need for and location of any necessary facilities and related activities, such as transportation requirements, and to consider specific Tribal values, potential environmental impacts, and appropriate mitigative measures. Some DOE Operations Offices have cooperative agreements in place with Tribal Governments about a range of environmental issues, and the sites' Tribal contacts will assist in the consultation process for site-specific and transportation issues for the WM PEIS.

The WM PEIS considers cumulative impacts from past, present, and reasonably foreseeable future actions to the extent possible (see Chapter 11 in Volume I). At individual sites, DOE believes it will have sufficient flexibility to avoid or minimize any human health or environmental impacts found to be potentially significant, including those that could have the potential to pose disproportionately high and adverse impacts to Native American Tribes, minorities, or low-income populations, through selection of a different waste management technology or facility location.

Comment (3573)

The Clinton memorandum (and Executive Orders) are attached for your review to help guide you in re-configuring your process for re-analyzing the impacts on Native Nations. The potential number of Native Nations that could be impacted is over 60, dependent upon transportation routes taken. Minus transportation, approximately 18 to 20 Native Nations are already impacted directly by just DOE's weapons production, etc., and could be further impacted by future "management" schemes of nuclear and hazardous materials by the DOE.

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Response
DOE believes that the analytic process used for the WM PEIS is correct and that impacts to Tribal Nations do not need to be reevaluated. The WM PEIS has considered cumulative impacts from past, present, and reasonably foreseeable future actions to the extent possible. Factors that have limited the consideration of cumulative impacts in some areas include lack of available data and schedule conflicts. Additional information that became available after the Draft WM PEIS was prepared, has been included in Chapter 11 in Volume I of the Final WM PEIS. The WM PEIS analysis based on this available information shows that the impacts on human health and the environment from facility or transportation accidents associated with the management of waste types would be low under any alternative. Where cumulative impacts approach or exceed standards, a brief discussion of mitigation measures is provided.

Comment (3575)
To fully address the radiological and chemical health risks, it will be necessary to analyze the global pathways for ingestion, inhalation, direct radiation, and indirect radiation on all populations. Hopefully, at some point DOE will realize there is a limit to the total amount of radiation (from all added human sources to naturally occurring radiation) in the environment, where the cellular structures of life will be altered to the permanent and unrecoverable detriment of human and many other life-forms. The assumption that the continuation of production of radiation, radiological materials, and weapons is propitious, is no longer acceptable.

Response
The WM PEIS did analyze health risks from all relevant pathways. DOE determined that the airborne pathway was dominant and that consideration of other pathways would not affect the relative comparison of the alternatives. Other pathways will be considered in sitewide or project-level studies prior to implementing any waste management decisions. The cumulative impacts of waste management activities and other past, present, and reasonably foreseeable future actions at particular DOE sites are discussed in Chapter 11 in Volume I of the WM PEIS.

Comment (3691)
The CEQ regulations at 40 CFR 1508.7 and 1508.8 state that impacts on the environment include direct effects, which are caused by the action and occur at the same time and place; indirect effects, which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable; and cumulative impacts, which result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions. The CEQ regulations at 1508.7 define cumulative impact as the impact on the environment that results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The CEQ regulations at 1508.25(a)1) state that to determine the scope of EISs, among other things, agencies shall consider three types of actions as "connected." Actions are connected if they automatically trigger other actions that might require environmental impact statements; cannot or will not proceed unless other actions are taken previously or simultaneously; are interdependent parts of a larger action and depend on the larger action for their justification. For high-level waste, we feel DOE has not complied with the above NEPA regulations.

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Review and discuss the impacts that high-level waste reprocessing, plutonium and highly enriched uranium disposition, spent fuel, and other related treatment issues presented in different environmental impact statements will have on DOE waste treatment decisions.

Response
Chapter 9 describes the impacts of the management of high-level waste. The PEIS analyzes only the impacts of stored vitrified high-level waste. DOE assumed vitrification of high-level waste as a prerequisite to the WM PEIS analysis of high-level waste storage. Section 9.1.1 describes DOE's decision to vitrify high-level waste.

The WM PEIS considers cumulative impacts of existing conditions, proposed waste management actions, and reasonably foreseeable future actions to the extent possible. Factors that have limited the consideration of cumulative impacts in some areas include lack of data and schedule conflicts. For instance, impacts of high-level waste disposal at Yucca Mountain were not considered in the WM PEIS because this information is not yet available. The Draft WM PEIS considers the cumulative impacts of spent nuclear fuel management, tritium supply and recycling, high-level waste treatment, and transuranic waste disposal. Additional information on stockpile stewardship and management, fissile materials management, and storage and disposition of excess highly enriched uranium that has become available since the Draft WM PEIS was prepared is now included in Chapter 11 of the Final WM PEIS.

Comment (3736)
The WM PEIS fails to consider the cumulative impacts of transporting the vast quantities of LLW from weapons plants to the Hanford Site, along with mixed, high-level, Class C, hazardous, and transuranic wastes.

Response
Cumulative impacts are presented in Chapter 11 in Volume I of the WM PEIS. For the Final WM PEIS, DOE revised Chapter 11, which now contains a more comprehensive evaluation of other DOE actions that might affect the sites. Section 11.20 contains the cumulative impacts analysis for transportation, which considers all sites and waste types examined in this document. Section 11.6.2 contains the cumulative impacts analysis for the Hanford Site, including cumulative transportation impacts. For the waste types considered in the WM PEIS, a maximum of approximately 100 shipments per day would occur at Hanford. The transportation infrastructure in the Hanford area can easily handle such a load. Annual radiological doses to a maximally exposed individual are projected to be within regulatory limits.

The WM PEIS combined and cumulative impacts analyses analyze the management of low-level mixed waste, low-level waste, transuranic waste, high-level waste and other materials such as spent nuclear fuel and nuclear materials, as appropriate for each site. Class C waste refers to the NRC classification of commercial radioactive waste, which is not DOE's responsibility. DOE is responsible for managing "greater-than-Class-C" waste. However, as discussed in Section 1.5.6 in Volume I DOE has not performed the detailed analysis required to develop options for this waste stream.

Comment (3986)
How can DOE make final determinations of preferred alternatives for waste treatment and management without considering the cumulative impacts of the proposed actions at these major sites?

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How can DOE reasonably select sites as suitable for treatment and disposal alternatives without addressing cumulative impacts? How can a site be determined suitable without addressing past and present impacts? Existing site conditions would appear to have great importance in determining appropriate agency actions at that site.

Response
Chapter 11 in Volume I includes an analysis of the cumulative impacts of all_alternatives analyzed in the WM PEIS. The combined impacts of the proposed waste management actions, the impacts of existing site conditions, and the impacts of reasonably foreseeable future actions are addressed in Chapter 11. DOE has revised Chapter 11 to include additional ongoing and reasonably foreseeable actions that were not included in the Draft PEIS.

Comment (3999)
With an anticipated aqueous treatment facility being listed in the WM PEIS for the Portsmouth Plant, but discussed in a separate document; with no agency consideration in change of operations that the DOE can reasonably be expected to foresee (downblending of highly enriched uranium and spent nuclear fuel); with remedial actions by other agencies; and with recent considerable upgrades to the onsite sewage treatment system at the Portsmouth Plant combined with changes in Ohio EPA antidegradation regulations for industrial wastewater discharge in process; DOE has considerable impacts to consider that are both cumulative and combined.

How is the agency addressing combined impacts in its decisionmaking process? DOE must consider actions by other agencies and private corporations in the context of current site conditions at the Portsmouth Plant in its decisionmaking. DOE is apparently considering only DOE actions at Portsmouth rather than operations currently occurring onsite under USEC.

Response
The impacts of waste management actions at Portsmouth Plant combined with past, present and reasonably foreseeable future actions are described in Section 11.14 in Volume I of the WM PEIS. This section was revised for the Final WM PEIS to include additional present and reasonably foreseeable actions. Section 4.4.12 in Volume I describes existing environmental conditions at the Portsmouth Plant. Those existing conditions are the result of, among other activities, the uranium enrichment process and USEC activities. The current resource use and effluent discharges at the Portsmouth Plant are described in Section 4.4.12 and the WM PEIS Affected Environment Technical Report. The existing conditions, including resource use and effluent discharges, form the baseline against which potential waste management impacts are compared. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I.

As stated in Section 11.14, DOE has no other actions planned at the Portsmouth Plant, except environmental restoration activities. No other actions are planned in the Portsmouth region that would contribute to the impact of waste management alternatives. The impacts of existing operations at the Portsmouth Plant, including USEC activities, within the context of cumulative impacts, is presented in Table 11.14-2 in Volume I.

Impacts from environmental restoration activities at the Portsmouth Plant are not sufficiently known to allow full incorporation into the cumulative impacts analysis. Such information will be incorporated in sitewide or project-level NEPA reviews.

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The planned facility for aqueous waste treatment at the Portsmouth Plant will be covered by a separate sitewide or project-level NEPA review; however impacts have been modeled in the WM PEIS using conceptual treatment facilities, if insufficient capacity was available onsite.

Comment (4021)
In the cumulative impacts analysis, the WM PEIS provides collective occupational and collective general population dose information based on historical transportation (see Table 11-39), but Appendix E does not explain how population dose from historical transportation is calculated or measured.

Response
DOE has revised the cumulative impacts analysis for transportation presented in Section 11.20 in Volume I. As stated in footnote "a," the data presented in Table 11.20-4 were taken from Section I-10.1 in Volume 1 of the SNF/INEL PEIS. The methodology for calculating these doses can be found in that PEIS as well. DOE obtained collective doses from historical shipments of spent nuclear fuel to Hanford, SRS, INEL, ORR, and NTS from a number of sources. For example, shipment data were linearly extrapolated for years for which such information was unavailable; population densities were based on census data for 1990; and transportation routes were based on the 1993 configuration of the U.S. highway and rail system.

Comment (4070)
DOE should be truthful and produce a thorough inventory of all traces of contamination in its facilities, waste sites, adjoining waters, and drainages. DOE should employ simple analytical methods rather than coverup tricks (e.g., mathematic subtraction of a presumed background.)

Response
Information on existing contamination is discussed in Chapter 4 in Volume I. In addition, this information is included in the cumulative impacts analysis to characterize existing site conditions. No attempt was made to factor out background concentrations.

Cumulative impacts are evaluated in Chapter 11 (Volume I) of the WM PEIS. The WM PEIS considers the cumulative impacts of the proposed waste management actions, existing site conditions, and impacts of other reasonably foreseeable future actions to the extent possible. Factors that have limited the consideration of cumulative impacts in some areas include lack of available data and schedule conflicts. For instance, impacts of proposed high-level waste disposal at Yucca Mountain were not considered in the Draft WM PEIS because this information is not yet available. The Draft WM PEIS did consider the cumulative impacts of spent fuel management; tritium supply and recycling, high-level waste treatment, and transuranic waste disposal. Additional information on stockpile stewardship and management, fissile materials management, and storage and disposition of excess highly enriched uranium that has become available since the Draft WM PEIS was prepared is included in Chapter 11 of the Final WM PEIS.

Impacts from environmental restoration actions at most DOE sites cannot be meaningfully evaluated in a cumulative impacts assessment at this time because they are too uncertain. For those sites that do have adequate evaluations of environmental restoration actions, information on potential impacts has been included in the cumulative impacts analysis presented in Chapter 11.

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Comment (4133)
The WM PEIS should fully disclose the quantities of and cumulative impacts from all mixed wastes, including wastes from environmental restoration and decontamination and decommissioning of the nuclear weapons complex, that might be imported into Washington State for treatment or disposal, including at privately owned facilities built to serve Hanford. The public has a right to know what wastes will be managed locally and the resulting potential exposures and risks.

Response
DOE has revised the cumulative impacts analysis presented in Chapter 11 in Volume I of the WM PEIS. To the extent that information on the impacts from environmental restoration exists, it has been included for each site. Decontamination and decommissioning of the nuclear weapons complex is incorporated in the WM PEIS in cases where it is also incorporated in other EISs. The Hanford Tank Waste Remediation System and Hanford Remedial Action EISs, and the CERCLA documentation for the Environmental Restoration Disposal Facility were added to the list of documents evaluated for information on impacts from other reasonably foreseeable actions at the site, as described in Section 11.6.2 in Volume I of the WM PEIS. Other actions considered in Section 11.6.2 include spent nuclear fuel management, management of K-Basin spent nuclear fuel, disposal of decommissioned Naval nuclear plants, safe interim storage of Hanford tank waste, storage and disposition of weapons-usable fissile materials, and Plutonium Finishing Plant stabilization.

For the purposes of this document a distinction is made between private facilities and commercial facilities. Private facilities are those DOE operations/facilities privatized on DOE sites. The impacts of using a privatized facility on a DOE site would be the same as those using a DOE facility at the same site. Commercial facilities are facilities operated off DOE sites. None of the alternatives proposed for waste management in the WM PEIS analyze treatment of waste at commercial facilities. However, shipment of wastes to commercial facilities is not prohibited and may be considered at the site level. DOE revised the WM PEIS to include a discussion of privatization issues (see Section 1.7.4 in Volume I).

Comment (4375)
DOE failed to integrate and disclose related actions and cumulative impacts for transportation such as the spent nuclear-fuel program, under which DOE wants to import high-level nuclear waste from throughout the world through the ports of Tacoma, Seattle, or Portland. We know that in the Northwest there will be fatal cancers if DOE imports the total number of shipments proposed. But DOE shoves that aside so it can conveniently only look at this little piece--so you can say, not many impacts.

DOE should rule out shipping high-level nuclear waste on commercial freighters through public ports in the Puget Sound. This is a military problem that should be dealt with through a military port.

Response
DOE addressed related actions to the extent possible in Volume I, Chapter 11, of the Final WM PEIS. Table 11-2 in Volume I identifies other EISs whose impacts were included in the WM PEIS cumulative impacts analysis and the sites where these impacts would apply. Table 11-2 indicates that the SNF/INEL PEIS impacts would apply to the Hanford Site, INEL, and SRS. The Foreign Research Reactor Spent Nuclear Fuel EIS impacts would apply to INEL and SRS. The impacts associated with

the preferred alternatives in these and other DOE EISs and EAs were included in the WM PEIS cumulative impacts analysis.

The Foreign Research Reactor Spent Nuclear Fuel EIS evaluates alternatives for the management of reactor fuel irradiated in foreign reactors, including the risks associated with its transportation. In addition, the SNF/INEL PEIS evaluates DOE spent nuclear fuel management at the programmatic level, just as the WM PEIS evaluates waste management at the programmatic level. Based on the SNF/INEL PEIS, DOE decided to regionalize spent nuclear fuel management by fuel types at three sites: the Hanford Site, INEL, and SRS. Hanford production reactor fuel will remain at the Hanford Site. In addition, the Record of Decision for the Foreign Research Reactor Spent Nuclear Fuel EIS indicates that Portland, Tacoma, and Seattle would not be used to receive foreign research reactor spent nuclear fuel.

Comment (4400)
The entire WM PEIS document fails to adequately assess or consider all past, present, and future impacts including cumulative, connected, direct, indirect, and synergistic effects of DOE's waste management activities of nuclear and hazardous wastes as required under CEQ Section 1508 *et seq.*

Response
Cumulative impacts are those that result from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions. Both CEQ and DOE regulations for implementing NEPA require assessment of cumulative impacts because significant impacts can result from a combination of actions that, by themselves, might not have significant impacts.

Chapter 11 in Volume I of the WM PEIS discusses the combined impacts that could result from locating waste management facilities at each of the 17 major waste management sites, the cumulative impacts that could result from waste management and other actions at each of the 17 major sites and in their surrounding regions, and the cumulative impacts of transporting waste.

Connected actions (CEQ regulations at 40 CFR 1508.25) are those closely related actions proposed by an agency that should be discussed in the same impact statement because (1) they automatically trigger other actions which may require an EIS, (2) they cannot proceed unless other actions are taken previously or simultaneously, or (3) they are interdependent parts of a larger action and depend on the larger action for justification. For example, shipment of large volumes of untreated waste would not occur unless a number of new waste management facilities are constructed at receiver sites. DOE has captured all of the connected actions of its overall Waste Management Program in the impacts analyses under each waste type, including construction of new facilities at various sites, shipment of wastes between sites, treatment of wastes, and storage and disposal of wastes where they are within the scope of the particular waste-type program. Impacts of actions such as treatment of high-level waste, which may be argued to be connected actions, but which are addressed in other NEPA analyses, are evaluated in the cumulative impacts chapter.

Factors that limited the consideration of cumulative impacts in some areas include lack of available data and schedule conflicts. For instance, impacts of proposed high-level waste disposal at Yucca Mountain were not considered in the WM PEIS because this information is not yet available. The Draft WM PEIS did consider the cumulative impact of spent fuel management, tritium supply and recycling, high-level waste treatment, and transuranic waste disposal. Additional information on stockpile

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stewardship and management, fissile materials management, and storage and disposition of excess highly enriched uranium that has become available since the Draft WM PEIS was prepared is included in Chapter 11 of the Final WM PEIS. Impacts from environmental restoration actions at most DOE sites cannot be meaningfully evaluated in a cumulative impacts assessment at this time because they are too uncertain. For those sites that do have adequate evaluations of environmental restoration actions, information on potential impacts is included in the cumulative impacts analysis presented in Chapter 11. Sitewide or project-level NEPA reviews would include more detailed cumulative impacts analyses.

Synergistic effects are those exaggerated effects that cannot be predicted based solely on adding the separate effects of the separate actions that may combine to cause them.

In general, synergistic effects of waste management actions were not evaluated because environmental impacts are not expected to be greater than additive. In particular potential synergistic and antagonistic effects resulting from exposure to mixtures of contaminants were not evaluated. As noted in Section D.2.5.1 in Volume III, risks from enhanced (synergistic) or diminished (antagonistic) toxicity from interactions among components of contaminant mixtures were not evaluated because not enough information exists on these effects. If synergism or antagonism is occurring these effects should be operative at all sites under all alternatives. Therefore, although the WM PEIS health risk estimates may actually underestimate or overestimate potential risks, the uncertainty added by the inability to address synergistic or antagonistic effects is systematically inherent throughout the analysis. However, the relative differences in risk estimates among waste management alternatives should not be affected by errors associated with these systematic uncertainties. The risks there will be accordingly under- or overestimated.

Comment (4415)
The Draft WM PEIS provides an ambiguous summary of cumulative health impacts with insufficient detail to make waste management siting decisions. It fails to show the cumulative impacts of all combinations of alternatives, giving only a range for each site and for transportation; fails to show the cumulative impacts of transportation combined with stationary sources and trade-offs between risks; fails to cover most of the cumulative exposure from all significant routes of exposure for many existing sites; calculates fatalities from existing sites as if people were only in the vicinity of the sites for 1 year (and does not clearly indicate this fact); and fails to include the impacts of changes in site impacts from DOE actions not considered in the WM PEIS (defense reconfiguration, spent nuclear fuel, stockpile maintenance, high-level waste treatment, etc.).

Response
Analysis of all combinations of alternatives would involve calculating 11,760 different estimates of health risk and other environmental effects at the 17 major sites. DOE considered this to be unreasonable in terms of the time and resources required to do such analyses and in terms of the infeasibility of presenting the results of such a large number of analyses in an appropriate, understandable way that would aid in decisionmaking.

DOE has revised the WM PEIS cumulative impacts analysis (see Chapter 11 in Volume I), which includes the information on existing site conditions presented in Chapter 4 in Volume I and summarizes the impacts of the combined management of each waste type presented in Chapters 6 through 10. In addition, DOE has expanded the discussion of other reasonably foreseeable future actions at the sites to include information from its EISs on stockpile stewardship, fissile materials management, storage and disposition of excess highly enriched uranium and others, and on environmental restoration actions (for sites for which information is available).

DOE has not combined transportation and stationary source risks because the receptors for the two sources are different; that is, the maximally exposed individuals for transportation occur along the transportation routes and those for stationary sources occur in the offsite populations of individual DOE facilities.

The PEIS does analyze health risks from all relevant pathways. The analysis determined that the airborne pathway was dominant and that consideration of other pathways would not affect the relative comparison of the alternatives. Sitewide or project-level NEPA reviews would consider other pathways.

The revised cumulative impacts analysis includes collective doses for members of the offsite public and workers from waste management activities, combined with exposures from existing site activities and other reasonably foreseeable future actions. This analysis includes collective doses attributable to the entire assumed operating period for the proposed waste management facilities, not just one year.

Comment (4471)
The Draft WM PEIS does not evaluate cumulative impacts because it does not add in the impacts of other reasonably foreseeable future actions such as defense programs reconfiguration, environmental restoration, high-level waste treatment, spent nuclear fuel, etc., along with transportation risks.

Response
Cumulative impacts are evaluated in Chapter 11 (Volume I) of the WM PEIS. To the extent possible, the WM PEIS considers the cumulative impacts of proposed waste management actions, existing site conditions, and impacts of other reasonably foreseeable future actions. Factors that limited the consideration of cumulative impacts in some areas include lack of available data and schedule conflicts. For instance, the PEIS did not consider impacts of proposed high-level waste disposal at Yucca Mountain because this information is not yet available. The Draft WM PEIS did consider the cumulative impacts of spent fuel management, tritium supply and recycling, high-level waste treatment, and transuranic waste disposal. Chapter 11 now includes information on stockpile stewardship and management, fissile materials management, and storage and disposition of excess highly enriched uranium that became available after the preparation of the Draft PEIS.

DOE cannot meaningfully evaluate impacts from environmental restoration actions at most of its sites in a cumulative impacts assessment at this time because such impacts are too uncertain. For sites that do have adequate evaluations of environmental restoration actions, information on potential impacts is included in the cumulative impacts analysis in Chapter 11.

Comment (4553)
Previous modeling of the impact of treating high-level waste (HLW) indicates disproportionate impacts from treatment of HLW at WVDP compared to other sites.

If there is better information in the EISs cited than in the modeling for HLW treatment, that information should be tabulated and included in the cumulative impacts section of the WM PEIS. The results of modeling for HLW treatment should also be provided. An explanation of why the

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information from many site-specific EISs is better than that provided for the environmental restoration and WM PEIS should also be provided and should consider differences in the conservatism of the modeling and associated assumptions in the different EISs for HLW treatment at the various sites and associated uncertainties.

The cumulative impacts section of the Draft WM PEIS asserts that vitrification is assumed to result in the same levels of human health risks, air quality, resource commitments, and employment as included under existing conditions. However, no convincing justification for this assertion was provided. In addition, this assertion does not cover the pretreatment of the waste, which could cause significant adverse impacts on human health if emissions of radionuclides are not adequately controlled.

Previous modeling of HLW treatment at WVDP predicted that the pretreatment and vitrification of waste at WVDP could be a serious threat to the health of the general public.

According to modeling of WVDP, HLW treatment and vitrification would cause seven fatalities from cancer (not the 0.0000012 reported as the site impact in the Draft WM PEIS) and a cancer risk to the maximally exposed individual (MEI) of the general public of 0.0003 (not the 0.00000000015 risk reported in the Draft WM PEIS).

A quick review of the HLW treatment EIS for WVDP also revealed high impacts. For other sites modeled, total fatalities predicted were about 0.014 and highest risk of cancer was 3×10^{-7} to the MEI in the general public.

The modeling for other sites was based on the assumption that the HLW treatment at the other sites would have much better pollution control, designed to reduce risks to less than one in one million for the MEI in the general public. The only air pollution control assumed for WVDP HLW treatment was reported to be high-efficiency particulate air filters (which fail to collect volatile emissions at the operating temperatures assumed).

The best available information from all sources, including documentation provided to NRC should be used to quantify the expected impact of HLW pretreatment and vitrification at WVDP (and at other sites). These results should be included in the WM PEIS, as cumulative impacts and as part of the alternatives involving the treatment of HLW, along with mitigating measures.

The Draft WM PEIS reports the annual radiation dose to the MEI as 2.9E-4 mrem; and the 1992 WVDP Site Environmental Report reports an annual dose to the MEI of 4.6E-2 mrem from eating 42 pounds of fish (an exposure 159 times higher than the exposure from air emissions reported in the Draft WM PEIS).

The dose to the population near WVDP from liquid effluents (and associated fish contamination) was estimated in the Site Environmental Report to be 0.0092 mrem. This should be added to the 0.0024 mrem air exposure to give a total dose of approximately 0.011 mrem.

Response
The commentor is referring to preliminary, unreviewed, and unpublished analyses that were developed during the scoping period for the WM PEIS. Since site-level analyses were planned or completed for the treatment of HLW at the Hanford Site, SRS, and WVDP, HLW treatment was removed from the

initial scope of the WM PEIS. Site-level analyses are better able to estimate the potential impacts of HLW treatment at these sites than this programmatic document. Anticipated impacts related to HLW treatment are included in the cumulative impacts analysis for the Hanford Site, INEL, SRS, and WVDP presented in Chapter 11 in Volume I of the PEIS.

The HLW vitrification facility at WVDP began operation in July 1996. Offgases from the vitrification process are routed through a series of treatment steps to remove radioactivity and nitrogen oxides. The pollution control system for the main stack includes multiple banks of HEPA filters. The goal of the offgas treatment system design is to key emissions to the lowest reasonable level.

Emissions from the main stack have been continuously monitored since HLW vitrification began at WVDP. Actual emission data and weather data are input into computer models used to estimate the highest possible dose to an offsite individual from HLW treatment emissions. Projections based on data collected in the first few months following startup estimate potential maximum exposure to an offsite individual at 0.025 mrem, far below the 10 mrem limit.

The radiological airborne releases from the vitrification facility are expected to be primarily cesium-137, strontium-90, and their short-lived daughters, barium-137_m and yttrium-90.

The consumption of contaminated wildlife and other multimedia exposure scenarios will be addressed as parts of site-specific analyses. These pathways would be relevant only for certain specialized populations (e.g., subsistence hunters and fishermen), and would require additional information or assumptions about their dietary habits. In contrast, the WM PEIS estimated risks to offsite populations through pathways that are more relevant for the general population (i.e., airborne releases from facilities leading to inhalation exposure, and deposition of contaminants to soil followed by uptake in crops and livestock and ingestion by receptors). The MEI exposure and risk estimates for these pathways are more applicable to most members of the general public.

Comment (4554)

A commentor provided a table showing the predicted number of radiation fatalities among the general public for the sites analyzed in the Draft WM PEIS:

NUMBER OF RADIATION FATALITIES AMONG THE GENERAL PUBLIC

	For a Lifetime of Exposure from All Onsite Waste Treatment		From 1992 Site Environmental Reports		
Site	Max	Min	Lifetime	1-Yr exp	1992 From WM PEIS (1-Yr)
Argonne	0.0013	1.0E-5	0.53	0.0076	0.0085
Brookhaven	1.2E-5	5.2E-8	0.18	0.12	0.0014
Fernald	0.23	1.4E-7	0.046	6.5E-4	6.5E-4
			But radon-255 higher, implying		
VERY ROUGH ESTIMATE-----------→			12	0.16	
Hanford	0.11	0.0014	0.028	0.0040	3.0E-4
Idaho	0.042	0.0000058	0.0011	7.0E-4	1.5E-5
Lawrence Livermore	0.55	4.3E-6	0.0098	1.4E-4	8.5E-4
Los Alamos	0.65	2.8E-4	0.039	0.0055	7.0E-4
Nevada Test Site	1.5E-10	1.1E-10	0.0015	2.1E-5	1.5E-5
Oak Ridge	0.094	1.3E-5	1.5	0.022	0.022
Paducah	1.2E-4	8.3E-7	6.0E-5	8.5E-7	8.5E-6
Pantex	3.5E-5	2.4E-6	1.8E-6	2.5E-8	2.5E-8
Portsmouth	0.019	1.8E-8	0.11	0.00015	0.0015
Rocky Flats	0.11	1.6E-5	0.0035	5.0E-5	7.0E-5
Sandia	0.0014	1.7E-6	70E-4	1.0E-5	1.0E-5
Savannah River	2.6	6.4E-5	0.61	0.0088	0.0032
			+ game, which would be for MEI hunter		
			0.0017	2.5E-5	--
WIPP	0.61	0			
WVDP	2.5E-7	1.7E-7	3.9E-4	5.5E-5	1.2E-6

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NUMBER OF RADIATION FATALITIES AMONG THE GENERAL PUBLIC
(Cont'd)

Site	For a Lifetime of Exposure from All Onsite Waste Treatment		From 1992 Site Environmental Reports		1992 From WM PEIS (1-Yr)
	Max	Min	Lifetime	1-Yr exp	
Trucks					
Radiation	14	3.7	Not Available		Not
Accident	42	5.2	Not Available		Avail.
Trains					
Radiation	1.9	0.56	Not Available		Not
Accident	0.55	0.055	Not Available		Avail.

The Draft WM PEIS shows only the range of transportation fatalities from radiation and from mundane accidents for trucks. No information is provided on how the cumulative transportation impacts vary for the various combinations of alternatives shown for the maximum and the minimum impacts at sites.

Estimates in the Draft WM PEIS of the impacts of the alternatives at sites may not be realistic. There were no indications in the Draft WM PEIS that any additional emissions above those associated with normal process operations (assuming everything runs perfectly) and a few severe accidents were included in the estimates of the impacts of the alternatives.

DOE environmental studies do not adequately account for common deviations from assumed normal operating conditions, and the actual impacts of facility operation were severe due to common process upsets, inadequate maintenance of pollution control equipment, problems with the design and operation of process equipment, etc. These excess emissions caused severe environmental impacts around the Solvent Refined Coal site in Washington State, while the associated DOE environmental impact studies indicated no significant impacts.

Similar problems have occurred at DOE nuclear sites, including FEMP, where an estimated 3.5 million tons of uranium were emitted into the air due to improper design, operation, and maintenance of baghouse facilities; similar releases were reported at other sites in the December 21, 1995, Issue #473, of *RACHEL'S Environment & Health Weekly*. (Commentor provided information attributed to the article cited.)

No information on the population dose from radon was provided in the 1992 FEMP Site Environmental Report. As a result, the 12 fatalities for FEMP were estimated, including radon, by scaling up the predicted number of fatalities from non-radon exposure (based on exposures reported in the 1992 FEMP Site Environmental Report), by multiplying this number by the ratio of the impact on the MEI including radon divided by the exposure to the MEI, not including radon. Although the degree of accuracy of the estimate is unknown, it suggests that the radon emissions reported in 1992 could have significant impacts. More accurate estimates of the number of fatalities from the radon at FEMP might be available from the Dose Reconstruction project, which took place in the Spring of 1996.

Impacts of the reduced radon emissions should be evaluated in the revised Draft WM PEIS, along with the impact of radon emissions at ANL-E before and after whatever programs might exist to reduce them are implemented. This is very important for the affected environment and the cumulative impacts section of the WM PEIS.

The number of fatalities for the general public provided in the table are associated with site conditions as reported in Chapter 11 of the Draft WM PEIS. These figures are for one year of exposure to site conditions as they were in 1992.

These estimates of the number of fatalities associated with DOE sites would be valid only if no members of the general public were anywhere within 50 miles of the sites at any time, except during the year 1992. However, the impacts of the alternatives at sites were computed for exposures well into the 21st century, for the entire population within 50 miles of the sites during the entire duration of the alternatives considered in the WM PEIS. Under the circumstances, it would be more appropriate to calculate fatalities from existing sites using a 70-year lifetime exposure and 1992 demographics and annual exposure. It would be best to do modeling and adjust the population figures based on the best estimates of existing and future cumulative populations and their distribution around the sites.

The site risks presented in the WM PEIS are highly misleading, especially when presented in the context of the impacts of the alternatives. The commentor has no confidence in the accuracy or representativeness of the predicted impacts of the alternatives in the WM PEIS (except that trains should be used to haul DOE's radioactive waste instead of trucks, to reduce environmental impacts significantly).

Because site risks presented in the Draft WM PEIS are misleading, especially when presented in the context of the impacts of the alternatives, the accuracy or representativeness of the predicted impacts of the alternatives in the WM PEIS is suspect.

A detailed, independent, well-funded analysis of the assumptions and models used for predicting the impacts of the alternatives would be needed for the modeling to be credible. Furthermore, the amount of time necessary for such a venture would require a considerable extension to the deadline for comments on the Draft WM PEIS (1 year, at least). The technical support documentation in the Draft WM PEIS does not appear adequate for such an analysis, but perhaps it is buried in the library of technical support documents cited.

Response

The combined waste management impacts and cumulative impacts analyses presented in Volume I, Chapter 11, of the WM PEIS have been revised. Health risk estimates are presented both as annual radiation doses and risks for the hypothetical offsite maximally exposed individual and as collective radiation doses and risks received by the offsite public over the entire 10- to 20-year period of waste management operations.

Section 11.20 of the Final WM PEIS, which addresses transportation combined and cumulative impacts, has also been revised. This section discusses the range of combined and cumulative impacts that occur regionally and nationally from the transportation of waste, including the estimated combined impacts of the routine transportation of waste by truck and rail for the waste management alternatives.

The WM PEIS cumulative impacts analysis, consistent with practice in other major EISs, does not consider facility accidents. A range of potential conceptual facility accidents were evaluated (see Appendices D and F). Potential health risk estimates from representative risk dominant accidents are presented in Sections 6.4.3, 7.4.3, 8.4.3, 9.4.3, and 10.4.3 in Volume I. Quantitative estimates are presented for both the consequences (if the accidents were to occur) and the estimated probabilities of occurrence of the accidents. Facility accident impacts for each waste type are not summed across waste types in Chapter 11. Note that it is not possible to predict accident occurrences.

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The commentor's "estimate" of 3.5 million tons of airborne releases of uranium at FEMP is clearly in error. Recent estimates of total airborne releases of uranium from all sources at FEMP while it functioned as the Feed Materials Production Center are from 400,000 to 70,000 pounds (Addendum (Special-UC-702) to *History of FMPC Radionuclide Discharges* (FMPC-2082, 1987); C. Miller and J. Smith, "Why Should We Do Environmental Dose Reconstructions?", *Health Physics*, 71(4), 10/96)

Radon accounts for about 200 mrem of the estimated 300 mrem average annual background radiation dose received in the United States. These exposures are not associated with site activities. At some DOE sites, the storage of wastes containing uranium, thorium, and radium might constitute an additional, source of radon exposure because radon forms when these radionuclides decay. The WM PEIS Affected Environment Technical Report supporting the WM PEIS (META/Berger-SR-01) contains estimates of this type of radionuclide exposure, which, for example, totaled 51 mrem at the fenceline at FEMP in 1992 and 0.3 mrem at ANL-E in 1993. The main radon emission at FEMP came from radium-bearing materials stored in the K-65 silos. Radon releases from Building 200 at ANL-E were due primarily to radioactive contamination from the "proof-of-breeding" program. These contaminated areas are undergoing remedial actions, which should reduce or eliminate these releases.

DOE revised Table 4.2-2 in the Final PEIS to note radon doses related to actions at FEMP and ANL-E and noted these estimates in the cumulative impacts tables in Chapter 11 in Volume I for these sites.

Model uncertainty results from the general limitations of mathematical models' ability to simulate an infinitely complex process using a finite number of variables. Model uncertainty also results from the inappropriate application of a model to a particular scenario. Maximum consequence assumptions can be made where model uncertainty is high.

These modeling issues, or uncertainties, were determined during a September 1993 risk assessment model review at ORNL to provide additional information on models such as MEPAS. Peer reviewers from across the country reviewed the models and provided comments and criticisms. This review included discussion of the consistency of the models used in the WM PEIS with each other and uncertainties associated with each model. The peer reviewers' comments and recommendations about these uncertainties were presented at a national workshop held in December 1993 in Washington, D.C.

Appendix D, in Volume III of the WM PEIS and Appendices E and F in Volume IV discuss in detail the health risk assessment assumptions and models used to estimate risks at the sites and in waste transportation. These appendices are supported by the technical reports listed in Section 15.2 in Volume I. These technical reports are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the WM PEIS. The WM PEIS risk analysis used currently accepted state-of-the-art models and conservative assumptions to produce risk estimates that tend to overestimate rather than underestimate risks. The health risk methods were subjected to peer review before being used in the WM PEIS.

Comment (4557)
The analysis of cumulative impacts should be more detailed than that presented in the Draft WM PEIS, which provides only extremes as separate numbers for unspecified combinations at individual sites, for transportation in general, and for existing site impacts. This information should be displayed in one table to make it more understandable. All reasonable combinations of alternatives should be included. If deaths are predicted, the predicted numbers of deaths should be added, after accounting for

differences in the conservatism of the models used to compute these cumulative impacts. While thousands of combinations of alternatives are possible, the results could be easily displayed graphically.

(The commentor provided a design for a graph and offered suggestions, as follows, on how to use the graph format to depict cumulative impacts.)

Combinations of alternatives could be organized to show the pattern for given indicators of environmental impacts and the relationships among them. Uncertainties and the differences among models shown to be factored into the process, and other methods of compiling, displaying, and analyzing the results of this analysis should also be used.

Cumulative impact graphs could also show the impacts of the combinations of alternatives in the WM PEIS. The existing site impacts and impacts of alternatives not in the WM PEIS could also be displayed (on the same axis as the combinations of alternatives, as if they represented combinations of alternatives). Such graphs could facilitate an understanding of how the cumulative impacts of the alternatives in the WM PEIS compare to current site impacts and non-WM PEIS impacts at the site.

Uncertainties in the predicted numerical indicators of risk should be quantitatively analyzed so that the adequacy of available information for decisionmakers and the value of the numbers predicted can be understood; an exhaustive probabilistic risk assessment would be desirable. Insights on the magnitude of uncertainties in the key impact indicators could be gained from appropriate sensitivity analysis.

Without such information, the numbers in the WM PEIS lack not only scientific credibility, but also general credibility, because no one has sufficient information to understand how seriously the numbers should be taken.

Informed decisionmaking on where to place waste treatment, storage, and disposal facilities can involve trade-offs among different impact indicators, such as risks to workers versus the public, costs versus impacts, risks to the maximally exposed individual versus total fatalities (a not uncommon trade-off), etc.

The probability that the more expensive combinations of alternatives would cause lower impacts than the less expensive should be factored into the evaluation of such trade-offs.

Response
Chapter 11 does not include summary tables or graphs that enable comparisons among sites or alternatives, but it does contain summary tables for impact categories at individual sites. DOE chose this presentation method because it enables the public to understand more fully the impacts anticipated at each DOE facility. This approach also includes the expected impacts. Thus, if the alternative with the maximum impact would result in acceptable exposure levels, all other alternatives would be acceptable.

DOE revised Chapter 11 to provide additional information about other proposed actions at DOE sites. The impacts of the combined waste management actions are considered in the context of existing site conditions, as well as the potential impacts of other reasonably foreseeable actions at the sites.

5.11 Cumulative Impacts

Because of the programmatic nature of the document, and the fact that waste management facility locations have not been selected, DOE did not conduct a detailed analysis of uncertainties and their potential effects on impacts estimates for the WM PEIS. DOE also did not attempt to factor estimates of uncertainty into the analysis to establish ranges of effects. DOE did conduct a qualitative analysis of uncertainties for the human health risk assessment (see Volume III, Sections D.2.15 and D.4). More importantly however, DOE structured the PEIS analyses of human health risks and environmental impacts to ensure both that the effects would not be underestimated and that they would be estimated consistently from alternative to alternative.

Consistency and conservatism in the human health risk assessment were ensured by:

- Using the best, most recent data available on toxicity, accident frequencies, contaminant-specific environmental characteristics, and other important parameters;

- Using environmental-setting data on site meteorology and geohydrology developed by Pacific Northwest Laboratories specifically for risk assessment purposes;

- Using conservatively structured risk exposure scenarios to estimate maximally exposed individual and population doses.

Uncertainty for different types of risk estimates is also qualitatively discussed in Section 5.4.1.1 in Volume I.

DOE decisions on where to place waste management facilities will likely involve consideration of just the kinds of trade-offs the commentor suggests. A discussion of the criteria DOE is considering in waste management program decisionmaking is provided in Section 1.7.3 in Volume I of the WM PEIS.

Comment (4558)
Cumulative impacts calculated in the Draft WM PEIS seem to involve adding risks from one year of exposure to a site's misrepresented 1992 impacts to risks from a lifetime of exposure to the alternatives.

Concerning the absolute and the relative number of fatalities associated with the alternatives in the WM PEIS, perhaps another indication of the uncertainties in the magnitude of the risks would be appropriate, once this magnitude of uncertainties is known. Without this information, how would the estimated fatalities and other important indicators of impacts in the WM PEIS be used to make informed decisions?

Even if the uncertainties were known and biases accounted for, information concerning cumulative impacts of transportation and stationary source risks for enough combinations of alternatives to make informed siting decisions is not provided in the WM PEIS.

Response
To the extent possible, Chapter 11 in Volume I of the WM PEIS considers the cumulative impacts of waste management actions combined with existing site conditions and other reasonably foreseeable future actions. DOE has revised the cumulative impacts analysis to include collective doses for members of the offsite public and workers attributable to the entire assumed operating period for the proposed waste management facilities.

5.11 Cumulative Impacts

Because of the programmatic nature of the document, and the fact that waste management facility locations have not been selected, DOE did not conduct a detailed analysis of uncertainties and their potential effects on impacts estimates for the WM PEIS. DOE also did not attempt to factor estimates of uncertainty into the analysis to establish ranges of effects. DOE did conduct a qualitative analysis of uncertainties for the human health risk assessment (see Volume III, Sections D.2.15 and D.4). More importantly however, DOE structured the PEIS analyses of human health risks and environmental impacts to ensure both that the effects would not be underestimated and that they would be estimated consistently from alternative to alternative.

Consistency and conservatism in the human health risk assessment were ensured by:

- Using the best, most recent data available on toxicity, accident frequencies, contaminant-specific environmental characteristics, and other important parameters;

- Using environmental-setting data on site meteorology and geohydrology developed by Pacific Northwest Laboratories specifically for risk assessment purposes;

- Using conservatively structured risk exposure scenarios to estimate maximally exposed individual and population doses.

Uncertainty for different types of risk estimates is also qualitatively discussed in Section 5.4.1.1 in Volume I.

The WM PEIS used different types of models to estimate potential risks from stationary sources, such as waste management facilities, versus those from wastes transported under the Regionalized and Centralized Alternatives. The risk analyses for waste management workers considered the effects of shielding on limiting exposures to direct radiation from stationary sources. However, the transportation assessment could not use shielding as a factor in reducing exposures because of uncertainties about potential locations of the receptors (e.g., the offsite population) in relation to the shipments. As a result, the transportation radiological risk estimates are conservative (i.e., they are higher than would be likely to occur on the implementation of the alternatives). This difference in conservatism does not complicate the risk management decisionmaking process because transportation radiological risk estimates are routinely lower than transportation physical trauma risks. Therefore, the risk manager must balance potential risks to offsite populations associated with exposure to radionuclides released from waste management facilities under the various alternatives against potential transportation risks associated mainly with physical trauma from accidents.

Transportation and stationary source risks are not combined because the receptors differ between the two sources. The maximally exposed individuals for transportation occur along the transportation route, whereas, the maximally exposed individuals for stationary sources occur in the offsite populations of individual DOE facilities. Combined and cumulative impacts for stationary sources are presented on a site-specific basis in Chapter 11 in Volume I. Section 11.20 contains the combined and cumulative impacts discussions for transportation risks. Combined impacts for transportation are presented in an alternative rather than a site-specific basis.

5.12 Environmental Justice

Comment (689)
Protect Native Americans from waste facility emissions and effluents at LLNL.

Response
The Final WM PEIS analyzes potential human health risks to minority and low-income populations in a revised environmental justice analysis. For the purposes of this analysis, Native Americans were included as minority populations. Sections 6.10, 7.10, 8.10, 9.10, and 10.10 in Volume I describe any potential disproportionate impacts to these populations identified by the analysis. The analysis indicated that in no instance would any minority or low-income population in the region surrounding LLNL potentially experience high and adverse health effects from waste management for any waste type managed at the site.

Comment (1504)
The WM PEIS is not accurate regarding environmental justice. DOE has inaccurately estimated the percentages of the minority populations around the sites discussed in the PEIS.

Response
DOE has revised the WM PEIS environmental justice analysis to provide a more in-depth analysis of the potential impacts of the waste management alternatives on low income and minority populations. The methodology for the analysis is summarized in Section 5.4.7 (Volume I) and detailed in Section C.4.7 (Volume III). The percentages presented in Section 4.3.7 in Volume I reflect the overall proportions of minority and low-income individuals within a 50-mile radius of the center of smaller DOE sites and 50-mile radius of existing waste management facilities at larger DOE sites. The analysis of health effects, however, addressed potential health effects at the census tract level, not at the regional level. Census tracts within 50 miles of each site center were categorized as minority or low-income if their proportions exceeded the national averages for those groups even though the regional population overall might not. The maps in Section C.4.7 illustrate all minority and low-income census tracts at the 17 sites that exceed the national average criteria. Results of the analysis are presented by waste type in Sections 6.10, 7.10, 8.10, 9.10, and 10.10 in Volume I. Site-specific NEPA reviews would evaluate environmental justice issues in greater detail.

Comment (1506)
The PEIS Summary document should describe what DOE will do to mitigate environmental justice impacts at LANL.

Response
DOE revised the WM PEIS environmental justice analysis, as described in Section 5.4.7 in Volume I of the Final PEIS (see Section C.4.7 in Volume III). The results of the analysis, discussed in Sections 6.10, 7.10, 8.10, 9.10, and 10.10 in Volume I, identify any locations where minority populations could potentially experience disproportionately high and adverse health risks or environmental impacts. The analysis indicated that in no instance would minority or low-income populations in the region surrounding LANL potentially experience high and adverse health effects from waste management actions for any of the waste types managed at LANL. Site-specific NEPA reviews would evaluate proposed waste management facility locations at LANL and related environmental justice impacts, and would also discuss appropriate mitigation. Examples of mitigation include selecting treatment and disposal facility locations within the fenceline, changing treatment and disposal technologies or modifying engineering designs in order to minimize risk.

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Comment (1508)
A commentor does not believe that DOE is concerned about environmental justice. DOE needs to assure the public that Native American and Hispanic workers shoveling waste alongside white scientists on the sites in New Mexico will be treated equally with regard to health and safety.

Response
Executive Order 12898 directs Federal agencies, including DOE, to incorporate environmental justice as part of their missions. The Executive Order specifically directs agencies to identify and address, as appropriate, potential disproportionately high and adverse human health or environmental effects on minority and low-income populations that could result from the agencies' programs, policies, and activities.

In addition, DOE is working with the public, including minority and low-income populations, through Site-Specific Advisory Boards and other forums. These groups provide excellent opportunities to discuss operational issues that might be beyond the scope of this PEIS, but are still extremely important.

It is DOE policy that all employees be treated equally and that DOE and it's contractors comply with all applicable worker health and safety requirements. Instances of known or suspected noncompliance should be reported through the appropriate channels at each site.

Comment (1528)
DOE has not paid enough attention to environmental justice in the WM PEIS.

Response
DOE is committed to the principles of environmental justice, as defined in Executive Order 12898. The WM PEIS presents a broad evaluation of environmental justice, which is suitable for a programmatic review. The PEIS analyzes human health and environmental impacts associated with the alternatives for the five waste types. This analysis focuses on risks to the hypothetical maximally exposed individuals in offsite populations around the sites, and on environmental impacts, such as those to air quality, that could have direct impacts on offsite populations. The WM PEIS then compares the locations of minority and low-income populations to the predicted locations of impacts to the maximally exposed individuals and environmental impacts. Environmental justice concerns occur if the analysis indicates that the maximally exposed individual resides in an area that meets the criteria established in Executive Order 12898.

To address potential environmental justice impacts, DOE mapped the minority, low-income, and where applicable, Native American populations within an 80-kilometer (50-mile) radius of an existing waste management facility or the geographic center for each of the 17 sites evaluated for waste management activities. The maps in Volume III, Section C.4.7, are based on analyses of 1990 U.S. Census Bureau Tiger Line files, which contain political boundaries and geographical features, and Summary Tape Files 3A from the U.S. Census Bureau, which contain demographic data. The evaluation resolved data to the census-tract level. Section C.4.7 contains more information on mapping procedures and minority population identification.

No potential disproportionately high and adverse impacts were predicted for the general population under routine waste treatment operations at any DOE facilities. However, the potential for

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disproportionate impacts to minority and low-income populations is discussed in Sections 6.10, 7.10, 8.10, 9.10 and 10.10 in Volume I. Sitewide or project-level NEPA reviews will include in-depth assessments of environmental justice and other factors pertinent to individual sites.

Comment · (1714)
According to 1990 census data, minorities comprise 8.35% of the population around ORR, and 10.6% of the population is below poverty level. Volume I, Table 4-7, in the Draft PEIS provides no statistics by age group or employment level within the subgroups to allow meaningful interpretations of environmental justice. The proposed waste management sites should have been presented as a part of the justice factor to ensure such sites are not principally concentrated among low-income or minority groups (e.g., Scarboro community in Oak Ridge, Tennessee).

Response
DOE is committed to the principles of environmental justice, as defined in Executive Order 12898. Accordingly, the WM PEIS provides an evaluation of environmental justice suitable for a programmatic review.

The analysis of environmental justice impacts in the PEIS uses census tract statistics for minorities or low-income populations, although county-level summary statistics were provided in Volume I, Section 4.3.7, of the Draft PEIS. Other population subgroups, such as children, the elderly, and the unemployed are not called out in Executive Order 12898, and were not explicitly included in the PEIS analysis of environmental justice impacts. However, these subpopulations were implicitly addressed in the human health risk and economic impacts analyses.

To address environmental justice impacts, DOE mapped the minority, low-income, and Native American Tribal lands within an 80-kilometer (50-mile) radius of the site center for each of the 17 sites evaluated for waste management activities. The revised maps in Volume III, Section C.4.7, are based on analyses of 1990 U.S. Bureau of the Census Tiger Line files, which contain political boundaries and geographical features, and Summary Tape Files 3A from the U.S. Census Bureau, which contain demographic data. The evaluation of health risks resolved data to the census-tract level. Section C.4.7 contains more information on mapping procedures, minority population identification methods, and analysis of health risks used for the PEIS environmental justice analysis. Using methods identified in Appendix C, Section C.4.7, health risks were distributed spatially to identify potential disproportionately high and adverse effects. Results of the environmental justice analysis are presented by waste type in Volume I, Sections 6.10, 7.10, 8.10, 9.10, and 10.10. The analysis indicated that in no instance would minority or low-income populations in the region surrounding ORR potentially experience high and adverse health effects from waste management actions for any of the waste types managed at ORR.

Sitewide or project-level NEPA reviews would include more detailed assessments of the potential for environmental justice impacts, including disproportionate health risks and environmental and socioeconomic impacts pertinent to a specific onsite waste management facility location.

Comment (2087)
According to recent census data, there are a number of minority populations in the BNL area; this might create environmental justice issues.

Response
The PEIS assessment of potential environmental justice impacts from waste management activities is detailed by waste type in Section 6.10, 7.10, 8.10, 9.10 and 10.10 in Volume I. The analysis indicated that in no instance would any minority or low-income population in the region surrounding BNL experience potential disproportionately high and adverse health effects because of waste management activities for any waste type managed at BNL. Sitewide or project-level NEPA reviews would analyze environmental justice and other socioeconomics concerns in detail.

Comment (2144)
The study considers housing statistics and minority populations, although income or race should not have anything to do with the siting of a disposal site.

Response
Executive Order 12898 directs Federal agencies, including DOE, to incorporate environmental justice as part of their missions. The Executive Order specifically directs agencies to identify and address, as appropriate, potential disproportionately high and adverse human health or environmental effects on minority and low-income populations that could result from the agencies' programs, policies, and activities.

Comment (2236)
The PEIS does not adequately analyze ecological impacts, especially in terms of Native American uses of land at Hanford for a food source. Doses to offsite populations do not consider the doses and pathways for the Tribes.

Response
DOE did not specifically evaluate the human health risk to populations near the sites that may derive a portion of their food supply from native plants and animals that exist near DOE sites, or that obtain water from nearby contaminated surface water bodies. This is a complex analysis which cannot be performed with confidence until locations of the facilities on the sites, as well as additional information about the specific dietary habits involved, are known. These types of analyses would be included in sitewide or project-level NEPA reviews. DOE did evaluate the relative potential for subsistence lifestyle exposures to lead to increased human health risk at each of the 17 major sites and found that Hanford and other sites with Native American groups present would have a higher possibility of experiencing increased risks through subsistence consumption. This information was added to Section 5.4.7.2 (Volume I) of the Final PEIS and Section C.4.7.2.4 (Volume III), along with a discussion of the risk analyses for the maximally exposed individual.

Comment (2384)
Discuss the meaning of the data presented on environmental justice; as now presented, the inclusion of numerous demographic maps of minority populations without explanation only serves to confuse the public.

Response
Executive Order 12898 directs Federal agencies, including DOE, to incorporate environmental justice as part of their missions. The Executive Order specifically directs agencies to identify and address, as appropriate, potential disproportionately high and adverse human health or environmental effects on

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minority and low-income populations that could result from the agencies' programs, policies, and activities.

In the Final WM PEIS, DOE has attempted to make the discussion on environmental justice more meaningful. The expanded discussion now describes the methods used to evaluate the distribution of low-income, minority, and Native American populations, as shown in the maps in Section C.4.7 in Volume III, in relation to the results of the health and air quality impact analyses. These maps present more relevant demographic profiles. Minority population in the Final WM PEIS refers to any census tract (within the region of influence) with a minority population greater than the national average of 24.4%. The revised summary of the environmental justice methodology is presented in Section 5.4.7 in Volume I. Section C.4.7 was revised to present a more detailed description of the environmental justice impact methodology.

Comment (2544)
Volume I, Section 9.10.1.3: For the first two definitions (and throughout), please define the word "significantly."

Response
The environmental justice discussion contained in Section 9.10.1.3 in Volume I and elsewhere in the WM PEIS has been substantially revised. The words "significant" and "significantly" are not used in the revised discussions because their meanings would be unclear within the context of the environmental justice analysis.

Comment (3138)
The Appendix I analysis of the distribution of minority and low-income populations should address ecological impacts (e.g., habitat destruction, degradation). Sites with arid climates will be affected much more than sites that receive adequate precipitation.

Response
As discussed in Volume I, Sections 6.7, 7.7, 8.7, 9.7, and 10.7, the WM PEIS ecological impacts analysis determined that no significant habitat impacts are likely to occur as a result of waste management activities because of the limited land required for waste management facilities and the flexibility DOE has in locating facilities on sites. Sitewide or project-level NEPA reviews would evaluate ecological impacts, including those that could affect minority and low-income populations, in greater detail.

Note that the maps showing the distribution of minority and low-income populations around DOE sites are included in Volume III, Section C.4.7, of the Final WM PEIS.

Comment (3295)
The distribution of low-income populations at NTS, as represented in Figure I-25, is misleading. The map identifies census tracts within 50 miles of the site center with median income of $12,674 or less. This does not capture the fact that 25.6% of persons in Armagosa Valley, one of the communities closest to NTS operations, are below poverty level. The WM PEIS environmental justice analysis, therefore, might be inadequate.

Further, the minority and low-income zone of impact maps (Figures I-8 and I-25) appear to inaccurately illustrate the location of county boundaries, showing NTS in Nye, Lincoln, and Clark Counties. NTS is completely located in Nye County. Again, this questions the basis of the analysis and, therefore, the validity of the conclusions.

Although Tribal lands are referenced, there is no corresponding Figure I-8b, as referenced in Section 4.4.8.

Response
Since the WM PEIS assessment is conducted at the programmatic level and without reference to any specific location for waste management facilities at individual sites, the environmental justice analysis approaches the assessment at a very broad, general level. Data for this analysis are presented at the census tract level, rather than a more specific level. Analyses at a more specific level would not be productive for a programmatic analysis. The revised environmental justice analysis presented in the Final WM PEIS (see Section C.4.7 in Volume III), indicates that Armagosa Valley is included within a census tract for which low-income populations exceed the national average. Also, the revised analysis shows that NTS is located solely within Nye County.

A definition of the low-income population parameters used in the preparation of this study is provided in Section C.4.7.2.1. The baseline figure of $12,674 represents the national definition of poverty for the basic four-person family unit. It provides a standard that can be consistently applied to the analysis of each of the 17 major site regions of influence assessed in the WM PEIS. Individual sites may differ slightly based on current regional economic conditions or prevailing standards of living. Also, where family size is generally larger or smaller, the definition of poverty would apply to respectively different levels of income.

DOE determined that Tribal lands are not located within 50 miles of an existing waste disposal facility at NTS as used in the analysis of environmental justice.

Comment (3567)
We request that DOE define precisely, in legal, scientific, risk assessment, and lay terms, what "disproportionate" means.

Response
The definition of a "disproportionately high or adverse impact" is provided in Volume I, Section 5.4.7.1. Neither DOE nor the Federal Working Group on Environmental Justice have yet issued final guidance on interpreting the provisions of the Executive Order on environmental justice (Executive Order 12898), nor has there been a judicial interpretation of the term "disproportionate" within the context of environmental justice.

For purposes of the environmental justice analysis in the WM PEIS, "disproportionate" refers to any distribution of impacts across minority, low-income, or Native American census tracts that might be substantially greater in magnitude or quantity than that experienced by the general populations, as described in Section 5.4.7.1 and Section C.4.7.2 (Volume III).

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A high or adverse impact (or risk or rate of impact) for a low-income, minority, or Native American community is disproportionate when it exceeds the risk or rate of occurrence in the general population (for health impacts).

Comment (3576)
By using the 50-mile "zone" approach, the WM PEIS has oversimplified analyzing impacts on not just minority populations, all human populations as well as ecological communities. For the WM PEIS to approach adequate analysis of managing DOE wastes, DOE must reevaluate the current and cumulative impacts not just on minority communities, but on all populations.

Response
The WM PEIS provides a broad programmatic review of the human health and environmental impacts associated with the alternatives for the five waste types. This analysis focuses on risks to the hypothetical maximally exposed individuals around the sites, and on environmental impacts such as those to air quality, that could have direct impacts on members of minority and low-income populations based on the predicted locations of impacts to the maximally exposed individuals and the environment.

DOE does not agree that the WM PEIS has oversimplified analyzing impacts on the general public living near the sites and on ecological receptors. The use of the offsite population living within an 80-kilometer (50-mile) radius of an existing waste management facility or the geographic center of each site was chosen to represent the populations that would be most likely to be exposed to contaminants released to the atmosphere during waste treatment activities. The airborne pathway was assumed to be the most important potential exposure route for human and ecological receptors.

Comment (3582)
The maps of minority populations "are completely out of order, which reflects a disrespect for the communities who live within, have been and will be impacted by DOE facilities. The disarray also makes it difficult to analyze the maps [without] tearing them out." In addition, DOE's assertion regarding the absence of disproportionately high and adverse health risks to minority or low-income groups is invalid without the inclusion of available surveys and comparisons.

Response
The maps provided in Appendix I of the Draft WM PEIS illustrated the geographic location of minority populations, Tribal lands, and low-income populations surrounding each of the 17 major sites. The maps were arranged alphabetically by site for minority populations, then alphabetically by site for low-income populations. Maps of Federally recognized Tribal lands were inserted in the series of minority population maps to highlight the importance of those groups. In the Final WM PEIS, these maps have been incorporated in the same order into the discussion of environmental justice impacts in Section C.4.7, in Volume III. The organization reflects no disrespect for any group; on the contrary, the environmental justice analysis demonstrates DOE's high degree of concern for those groups. A discussion of mapping procedures employed in the analysis is provided in Section C.4.7.2.1.2. In the Final WM PEIS, the environmental justice analysis has been revised to include a more detailed examination of potential effects on minority and low-income populations (see Volume I, Sections 6.10, 7.10, 8.10, 9.10, and 10.10).

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Comment (3585)
The figure for a low-income family of four is outrageous and unrealistic in today's economy. We believe this figure is based on antiquated baseline formulas utilized by the U.S. Bureau of the Census. We strongly urge that DOE reevaluate and formulate a more accurate baseline figure for determining a low-income family of four. In doing so, we contend that the low-income family populations will increase in some areas (e.g., INEL, LANL, NTS, SNL-NM) by several fold.

Response
The baseline income figure of $12,674 represents the national definition of poverty for the basic four-person family unit. It provides a standard indicator that can be consistently applied to the analysis of each of the 17 major site regions of influence assessed in the WM PEIS. Individual sites might differ slightly based on current regional economic conditions and prevailing standards of living. Also, where family size is generally larger or smaller, the definition of poverty would apply to respectively different levels of income.

Use of the low-income indicator is intended to identify areas in a region with a disproportionately large low-income population; it is not intended to be a comprehensive analysis of poverty-related issues in the region. See Section C.4.7.2.1 in Volume III, for a definition of the low-income population parameters used for the WM PEIS environmental justice analysis.

Comment (3586)
We question the narrowed focus on low-income families alone and feel that exclusion of low-income individuals is unprecedented and results in an insufficient analysis of potential impacts on low-income persons. In fact, no explanation is given in the WM PEIS as to why only a family of four is focused upon, at the exclusion of individuals, married couples, families larger than four, single women head of household populations, etc., incomes. The issue of single women head of household populations is another area where minority issues/populations interface. We do not have figures at this moment to accurately portray the higher percentage of low-income women as minority heads of household or women as non-minority heads of households, but feel it is incumbent on DOE to analyze the potential disproportionate impacts on all such populations.

Response
The criterion used to establish the threshold income for the definition of "low-income" households was based on the average household size in the U.S., which is 3.84 persons (or four). Although DOE recognizes the limitations inherent in using averages for this analysis, use of average household size does provide an adequate basis for the comparison of the effects of the alternatives. The criterion is used for this analysis as an "indicator" of those areas in which the low-income population is above average and not as a study of the poverty conditions per se. The analysis assumes that where the number of four-person household units living in poverty exceeds the national norm, then the poverty figures for all other such groupings, including single persons, will also be high and therefore defines a low-income area.

Choice of the size of low-income households did not influence the findings of the environmental justice impacts analysis. The findings are based on whether any individual might experience high and adverse impacts. Where that was concluded to be the case, as discussed in Sections 6.10, 7.10, 8.10, 9.10, and 10.10 in Volume I, it was also concluded that minority or low-income groups could potentially be

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disproportionately affected, but that sitewide or project-level analyses would be required to determine if this would be true.

Comment (3587)
The "eco-justice" analysis in regards to Native Nations is not only insufficient but inaccurate. Collectively, the impact of the nuclear weapons industry on Native Peoples is already disproportionate. There are approximately two million Native Peoples in the U.S., of which 1/2 reside on reserve lands and another 1/4 frequent reserve lands. With this basic context in mind, 7 out of 17 of just the major sites are within 50 miles of Native Nations. All of the major sites are contaminated and have serious environmental restoration problems. At NTS alone, 14 individual Native Nations live, and have lived in this area before the U.S. existed. (Benton Paiute Reservation, Timbisha Shoshone Reservation, Bishop Paiute Shoshone Reservation, Big Pine Paiute Indian Colony, Chemehucvi Reservation, Colorado River Reservation, Paiute Indian Tribe of Utah, Kaibab Paiute Reservation). This in and of itself is an existing and historical impact particular to Native Nations and no other minority group in the entire U.S. The potential cumulative impacts in addition to past impacts could lead to devastating results to any one of the Native Nations near the major sites or along the transportation routes.

Response
Most DOE facilities were sited in the 1940s and 1950s, during World War II and the Cold War. The locations for DOE facilities were chosen based in large part on security concerns, which contributed to the choice of locations that are remote from populated areas. DOE's site waste management strategies are being developed to address potential future releases at all DOE sites to minimize health and environmental effects. The WM PEIS focuses on the potential impact of decisions to be made regarding future waste management activities. Cumulative impacts from past, present, and reasonably foreseeable future actions at each DOE site are discussed in Chapter 11.

To identify the potential for disproportionate impacts to minority and low-income populations, the WM PEIS includes an environmental justice analysis as required by Executive Order 12898. The WM PEIS addresses Native Americans as minority populations in the environmental justice analysis. This analysis indicates that in no case are minority or low-income populations in the region surrounding NTS expected to experience high and adverse health effects from waste management actions for any waste type managed at NTS.

Comment (3588)
The "eco-justice" analysis does not satisfy the unique considerations, needs, and rights of Native Nations as communities or as Nations. It is important to remember that Native Nations include people who continue a land-based lifestyle and the natural resources that sustain this lifestyle such as wildlife, surface waters, medicinal plants, timber, fish such as salmon, etc., are protected by treaties, are rights, and often these resources are protected on unceded lands. This is particularly applicable to the Pacific Northwest where the Hanford Site is located and impacts two-thirds of the Yakama Nation's treaty protected unceded lands and one-third of the Umatilla Nation's unceded treaty protected lands.

As stated by Mary Christian Atwood in *Fulfilling the Executives Trust Responsibility Toward the Native Nations on Environmental Issues: A Partial Critique of the Clinton Administration's Promises and Performance*, "Statutory protection is often woefully inadequate to protect tribal interests, particularly in environmental matters. The statutes passed by Congress have, by and large, failed in significant ways to arrest the deterioration of the environment in many regions of the country. Moreover, the standards they contain were promulgated to meet the needs of a highly industrialized majority society with vastly different needs than those of tribes continuing a land-based way of life. Due to the unique nature of tribal land tenure and tribal culture, tribes cannot simply relocate to new areas when their reservation lands become contaminated, or their water polluted, or their wildlife resources decimated as a result of ecological abuse by the non-Indian sector. The transience and mobility that provide short-term solutions to members of the majority society do not provide options to tribes where their way of life is threatened."

Response
DOE's site waste management strategies are being developed to minimize the health and environmental effects from potential future releases. DOE is committed to continuing to address the concerns and interests of stakeholders at the DOE sites in all its decisionmaking. DOE seeks input from Native peoples through the NEPA process and has instituted and follows the DOE American Indian Policy, as well as the American Indian Religious Freedom Act, the National Historic Preservation Act, the Native American Graves Protection and Repatriation Act, and Executive Order 13007 regarding sacred sites, in addition to any separate agreements DOE has entered into with particular Native American Tribes. For the WM PEIS, extensive scoping meetings were held for stakeholders to discuss and influence the course of the project prior to document preparation. All Federally recognized Tribes were sent a copy of the Notice of Intent to prepare the PEIS and a notification of the scoping meetings. After the Draft PEIS was issued, DOE held another extensive series of public hearings, and Federally recognized tribes received invitations to comment. DOE Field Offices routinely consult with interested Tribal Governments on DOE activities and plans. These consultations have included briefings on the development of the WM PEIS.

The WM PEIS compares waste management alternatives on the basis of added risk from proposed waste management operations. The exposure pathways that were examined used conservative assumptions that include the potential for exposure to the general public from airborne contaminants. However, DOE did not evaluate effects of exposures through land-based life-style (subsistence) routes of exposure, such as the commentor has suggested, in the PEIS. Such analyses can be credibly conducted only at the site or project level, where specific facility locations, waste source terms, and unique dietary exposure scenarios can be analyzed. DOE did qualitatively examine the relative potential for such subsistence life-style effects to occur at the 17 major sites, and determined that Hanford and other sites where Native American lands occur near the sites are more likely to experience such risks and that the potential for those risks should be considered in further site-level decisionmaking. The results of the WM PEIS assessment of facility land requirements indicate that DOE would have sufficient flexibility in locating proposed waste management facilities on the sites to avoid disproportionately affecting Native Americans at the sites. Sitewide or project-level NEPA reviews would analyze any potential impacts on Native Americans at specific sites in more detail.

Comment (3590)
Because Native Peoples consume fish, plants, wildlife, etc., and depend on surface waters that harbor fish, the relationship of Native Peoples with the land, air, and water is much more intimate than non-Native Populations. Thus, Native Peoples are at higher risk of exposure and cumulative health impacts from both regulated and unregulated releases. For instance, according to the Umatilla Nation, the

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Pacific Northwest Nations can consume up to 10 times more fish out of the Columbia River than the "average" non-Native. These basic facts cannot be glossed over and ignored, or relegated as insignificant.

According to the Umatilla Nation, the salmon runs in the Colombia river have shrunk from approximately 200,000 million per run per year to 2 million. What is particularly important about the Hanford area and the Columbia River is that the only free-flowing water appropriate for salmon spawning is located within the 52 mile stretch along the Hanford Site.

Response
DOE is committed to the principles of environmental justice, as defined in Executive Order 12898. The WM PEIS provides an evaluation of environmental justice suitable for a programmatic review. The PEIS analyzes human health and environmental impacts associated with the alternatives for the five waste types. The analysis focuses on risks to the hypothetical maximally exposed individuals in offsite populations around the sites, and on environmental impacts, such as those to air quality, that could affect offsite populations. Environmental justice concerns are noted in the PEIS (see Volume I, Sections 6.10, 7.10, 8.10, 9.10, and 10.10) where the analysis indicates that the maximally exposed individual might experience high and adverse impacts, or where other environmental impacts might be significant. This applies at any site where Native American groups or minority or low-income populations are present within 50 miles from the center of each of the smaller DOE sites or 50 miles from existing waste management facilities at each of the larger DOE sites, such as the Hanford Site. However, DOE did not evaluate the potential human health risk to subpopulations that may derive a portion of their food supplies from native plants and animals. Because the results of such an analysis depend on the locations of facilities within sites and the specific exposure routes and dietary habits involved, this analysis would be included in the scope of site-specific and/or project-level NEPA reviews. Section 5.4.7.2.2 in Volume I was revised to clarify this information.

Based on the programmatic analysis of land requirements at the sites to implement any of the waste management alternatives, DOE believes it will have sufficient flexibility to avoid or minimize any environmental or human health impacts found to be significant, including any shown to potentially pose disproportionately high and adverse impacts to Native Americans, minorities, or low-income populations, through selection of different waste management technologies or facility locations.

Comment (3591)
Because the WM PEIS suggests that the Hanford Site might become an interim storage site for high-level waste in addition to other activities, it is particularly important to look at past and potential cumulative impacts. Waiting for a site-specific analysis would not be in compliance with NEPA requirements where impacts must be evaluated *before* resources are committed. Moreover, because the Hanford Site is one of the Nation's most severe Superfund sites, the area is not ready to deal with additional waste problems. The same applies to the NTS site, which is located on Western Shoshone unceded lands.

Each Native Nation is unique as a culture and as a Nation. The location of one DOE nuclear industrial site by just one Native Nation is absolutely disproportionate. There is only one Yakama Nation (Hanford), one Shoshone-Bancock Nation (INEL), one Umatilla Nation (Hanford), one San Idelfonso Nation (LANL), one Western Shoshone Nation (NTS), etc., whose lives and lands loom in the shadow of the nuclear weapons industry and have suffered from past and current contamination. One accident, regulated releases, continual use of sites for production, etc., all can have and already are having substantial long-term impacts on Native Nations socially, economically, environmentally, etc.

Response
Most DOE facilities were sited in the 1940s and 1950s, during World War II and the Cold War. The locations for DOE facilities were chosen based in large on security concerns, which contributed to the choice of locations that are remote from populated areas.

Section 4.4.4 in Volume I of the WM PEIS summarizes existing environmental and human health conditions at the Hanford Site, which are accounted for in the impacts analysis for that site. The existing environmental conditions at the Hanford Site (and other sites) include those resulting from other DOE and non-DOE activities. The estimated health risks in the WM PEIS from the implementation of the proposed waste management actions are generally quite small. Therefore, they would present little additional incremental risk to the existing baseline risks at the various sites.

The WM PEIS classifies Native Americans as minority populations in a numerical context to describe the demographic characteristics of the regions surrounding the DOE sites. This information is used in the environmental justice analysis, as summarized in Section 5.4.7, Volume I, and detailed in Section C.4.7 in Volume III. This designation is not intended to contradict the discussion of the unique government-to-government relationship between the U.S. and Tribes or the Federal Government trust responsibility. Results of the environmental justice analysis are contained in Volume I, Sections 6.10, 7.10, 8.10, 9.10, and 10.10. In only a single instance, in the case of INEL under transuranic waste Regionalized Alternative 3, do any of the four sites noted by the commentor show a potential for high and adverse health effects disproportionately affecting minority or low income populations under any of the proposed waste management alternatives. The Hanford Site, INEL, and LANL are also considered to have a higher possibility of subsistence consumption of fish or wildlife; NTS an intermediate possibility, as described in Section 5.4.7.2 in Volume I. Potential health effects from subsistence pathways of exposure would be addressed in additional NEPA analyses.

The WM PEIS analysis focuses mainly on alternatives addressing national-level strategic issues. The individual character of Native American cultures at DOE's sites, and the specialized nature of each Tribe's concerns in site activities, while considered in the WM PEIS at the programmatic level, is more productive as part of a site-level analysis. Sitewide or project-level NEPA reviews will be better able to address existing baseline health risk information, including any ongoing dose reconstruction studies.

The WM PEIS has considered cumulative impacts from past, present, and reasonably foreseeable future actions to the extent possible (see Volume I, Chapter 11). At individual sites, DOE believes it will have sufficient flexibility to avoid or minimize any human health or environmental impacts found to be potentially significant, including those that otherwise could potentially pose disproportionately high and adverse impacts to Native American Tribes, minorities, or low-income populations, through selection of a different waste management technologies or facility locations.

Comment (3592)
The environmental justice discussion in Section 5.4.7.2 in Volume I states that special exposure pathways were evaluated with respect to subsistence consumption of fish, game, or native plants. Given the conclusions of the environmental justice analysis, the assertion of this process is highly doubtful, if not largely inadequate. In fact, the WM PEIS contradicts that such evaluations were

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conducted. Specifically, in Appendix D, DOE identifies "Potentially Exposed Populations." These populations do not include subsistence families or other persons the WM PEIS states have been evaluated. This is an unacceptable omission.

In addition, the WM PEIS assumes that exposure to offsite populations will result from primarily airborne contaminants and states that the consumption of fish was eliminated as an exposure route of concern for the PEIS because postulated surface-water contamination was found to be minimal. In addition, it was assumed that all members of the offsite populations have the same dietary habits and consumption rates. Further, the WM PEIS states that from the perspective of human health risk, there would be little reason to assess risks differently for minority or low-income populations unless dietary habits or other factors were to cause their exposures to be substantially different from that of the population as a whole. DOE has conveniently excused itself from looking at the reality of the current and potential impacts of its weapons facilities and waste management schemes by eliminating fish as an exposure route to Native populations (nonetheless, misrepresenting evaluating these impacts). DOE further excuses itself from a more comprehensive analysis of environmental justice impacts through the assertion that such an analysis would require detailed site-level information beyond the scope of the programmatic document.

DOE's excuse for not fully assessing such impacts as fish consumption on Native Peoples is not acceptable. This discussion should be separate from overall "minority" issues.

Response
DOE is committed to the principles of environmental justice, as defined in Executive Order 12898. The WM PEIS provides an evaluation of environmental justice suitable for a programmatic review, in its evaluation of human health and environmental impacts associated with the alternatives for the five waste types. The analysis focuses on risks to the hypothetical maximally exposed individuals in offsite populations around the sites, and on environmental impacts, such as those to air quality, that could affect offsite populations. Environmental justice concerns are noted in the PEIS (see Volume I, Sections 6.10, 7.10, 8.10, and 10.10) where the analysis indicates that the maximally exposed individual might experience disproportionately high and adverse health effects or where other environmental impacts might be significant at any site where Native American groups or minority or low-income populations are present within 50 miles of an existing waste management facility or the geographic center of the site.

DOE did not specifically address impacts to aquatic life or to subsistence fishermen at the sites because of the array of assumptions that would have to be made about site-specific variables involved in such an analysis. This level of analysis would require identifying specific locations of proposed waste management facilities, which is not part of the programmatic decisionmaking. Further, because the analysis would be subject to extreme variability based on the analysis assumptions and facility location selection, DOE believes that the results of such an analysis would not factor into programmatic decisionmaking. Sitewide and project-level NEPA reviews would be the appropriate context for this type of analysis. DOE is currently consulting with the Seneca Nation on just such a sitewide NEPA review, the EIS for completion of the West Valley Demonstration Project and closure or long-term management of the Western New York Nuclear Service Center. However, DOE did qualitatively compare the 17 major sites in terms of factors that would be associated with subsistence consumption of fish and wildlife, including the presence of Native American groups and generally rural populations.

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This analysis is described in Volume III, Appendix C, Section C.4.7 and summarized in Volume I, Chapter 5 of the PEIS.

Based on the programmatic analysis of land requirements at the sites to implement any of the waste management alternatives, DOE believes it will have sufficient flexibility to avoid or minimize any environmental or human health impacts found to be significant, including any shown to potentially pose disproportionately high and adverse impacts to Native Americans, minorities, or low-income populations, through selection of different waste management technologies or facility locations.

Comment (3594)
As the document indicated, Executive Order 12898 requires that the review of impacts must also address environmental justice concerns. It is important to note that the West Valley Demonstration Project is located upstream on the Cattaraugus Creek from the Cattaraugus Reservation of the Seneca Nation of Indians. Evaluation of this site should pay particular attention to any environmental impacts that may affect this Reservation, such as adverse impacts to the river and resident aquatic life where its residents do subsistence fishing. In addition, it is important to ensure that the Reservation is given full opportunity to participate in the National Environmental Policy Act process.

The hypothetical farm family is an assumption that could be costly and dangerous not only to Native Peoples, but all populations that depend on or incorporate livestock as a primary source of food or economic means. The WM PEIS hypothetical farm family does not satisfy current assessments of the health conditions of livestock-dependent peoples and cumulative impacts from the past, present, and future exposure from regulated and unregulated releases on livestock and livestock-dependent peoples. DOE used primarily a Euro-centric model of agriculture as a basis for analysis of subsistence lifeways, exposure routes to humans, and no models for livestock lifeways exposure routes are considered. What is also missing is an analysis of lifeways that depend on gathering and hunting, another direct and high risk exposure route. The narrow focus of this model, thus, excludes Native Peoples who are at high risk from exposure routes from sheep herding and various livestock lifeways, as well as gathering and hunting.

We recommend that all of the above considerations and critical factors be incorporated into DOE's cumulative impacts analysis. We would also like to remind DOE that there are particular cultural considerations that must be regarded and incorporated. For instance, some Native Nations feel that the liver and other livestock soft-tissue organs (which absorb radionuclides and concentrate in such organs) must be given to the elders of the Nation, community, and/or family. Thus, the elders are exceptionally at risk from exposure to radionuclides. DOE must be mindful of such cultural nuances and absolutely respectful in analyzing such cultural patterns that could result in higher risk exposure. We recommend that DOE cooperate fully with the Nations and accept assessments and recommendations from the Nations themselves so that cultural integrity can be maintained and respected. DOE would be in violation of treaty and trust obligations if it ignores or diminishes the concerns and needs of Native Nations.

Response
DOE encourages all of its stakeholders to participate fully in the NEPA process. DOE has and will continue to provide Native American Tribes every opportunity for participation in the NEPA process, in accordance with the CEQ regulations on scoping and public involvement (40 CFR 1503.1 and 1506.6, respectively). The Seneca Nation of Indians was invited to comment on the Draft WM PEIS

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and will continue to receive information pertinent to the WM PEIS. Further, the West Valley Area Office conducts regular consultations with the Seneca Nation, including the Cattaraugus Tribe, on current and potential activities affecting the West Valley Site. Section 1.4.5 in Volume I of the WM PEIS acknowledges DOE's trust and treaty obligations to Native American Tribes, and identifies the consultation requirements between DOE and Tribes under NEPA and other statutes, with which DOE has fully complied. Section 1.4.5 also describes the consultation activities DOE has undertaken in recent years with Tribes.

DOE is committed to the principles of environmental justice, as defined in Executive Order 12898. The WM PEIS provides an evaluation of environmental justice suitable for a programmatic review. The PEIS analyzes human health and environmental impacts associated with the alternatives for the five waste types. The analysis focuses on risks to the hypothetical maximally exposed individuals in offsite populations around the sites, and on environmental impacts, such as those to air quality, that could affect offsite populations. Environmental justice concerns are noted in the PEIS (see Sections 6.10, 7.10, 8.10, 9.10, and 10.10 in Volume I) where the analysis indicates that the maximally exposed individual might experience high and adverse impacts or where other environmental impacts could be significant at any site where Native American groups or minority or low-income populations are present within 50 miles of the site. However, DOE has not evaluated the human health risk to subpopulations that live near DOE sites that might derive a portion of their food supply from native plants, animals, and fish because of the array of assumptions that would have to be made about site-specific variables involved in such an analysis and because the analysis would depend on the specific locations of proposed waste management facilities, which is not known, and is not appropriately part of the programmatic decisionmaking. Because the analysis would be subject to extreme variability based on the analysis assumptions and the actual location of facilities, DOE believes that the results of such an analysis should not factor into programmatic decisionmaking. Sitewide and project-level NEPA analyses would be the appropriate context for this type of analysis. DOE is currently consulting with the Seneca Nation on just such a sitewide NEPA review, the EIS for completion of the West Valley Demonstration Project and Closure or Long-Term Management of the Western New York Nuclear Service Center. Further, based on the programmatic analysis of the relatively small land requirements for waste management facilities at the sites, DOE believes it will have sufficient flexibility to avoid or minimize any environmental or human health impacts found to be significant, including any that could have the potential to pose disproportionately high and adverse impacts to Native Americans, minorities, or low-income populations, through selection of different waste management facility locations.

Comment (3662)
The WM PEIS states that the assessment of potential environmental justice impacts associated with transuranic waste management indicated no substantive potential for disproportionately high and adverse health risks or environmental impacts to minority and low-income groups at any of the transuranic waste sites except WIPP. This statement is unfounded. The WM PEIS also states that the potential at WIPP can be mitigated by selection of an alternative treatment technology or employment of more efficient emissions controls. Will DOE have to prepare another NEPA document to do this? What alternative treatment technology or emissions controls will be used that are not part of the current plan?

Response
DOE is committed to the principles of environmental justice, as defined in Executive Order 12898. The WM PEIS provides an evaluation of environmental justice suitable for a programmatic review in

its assessment of human health and environmental impacts associated with the alternatives for the five waste types. In the Final WM PEIS, the environmental justice analysis has been revised to include a more detailed, census-tract level examination of the potential for high and adverse health effects to regional minority and low-income populations. The analysis, detailed in Section C.4.7 in Volume III, focuses on risks to the general public and to hypothetical maximally exposed individuals in offsite populations around the sites, and on environmental impacts, such as those to air quality, that could affect offsite populations. Environmental justice concerns are noted in the PEIS where the analysis indicates that the general public or a maximally exposed individual might experience high and adverse impacts or where other environmental impacts might be significant at any site where Native American groups or minority or low-income populations are present within 50 miles of a sites geographic center or existing waste management facility.

The revised transuranic waste environmental justice analysis indicated that, depending on the alternative, INEL or WIPP may have a minority or low-income population that experiences high and adverse health effects as a result of transuranic waste treatment. Effects at WIPP would occur under the Centralized Alternative when WIPP treats all transuranic waste. Because disproportionate health risks and air quality impacts might occur at those sites, use of an alternative technology or more efficient emission controls than assumed for the generic treatment facility would reduce the impacts. Sitewide or project-level NEPA reviews would include in-depth assessments of potential environmental justice impacts.

Comment (3944)
DOE's assumption of no disproportionate high risk and adverse health impacts to minority and low-income populations does not include DOE's and its predecessors' decisions to site major nuclear defense facilities near rural and low-income populations.

Response
Most DOE facilities were sited in the 1940s and 1950s, during World War II and the Cold War. The locations for DOE facilities were chosen based in large part on security concerns, which contributed to the choice of locations that are remote from populated areas.

The WM PEIS focuses on the potential impact of decisions to be made regarding future waste management activities. Cumulative impacts from past, present, and reasonably foreseeable future actions at each DOE site are discussed in Volume I, Chapter 11.

Comment (3946)
DOE's "poverty-level" selection of a family of four with an income of $12,764.00 is arbitrary and does not accurately reflect the poverty level of impacted regions within 50 miles of DOE sites. By DOE definition neither Brown nor Adams Counties in Ohio are considered "pockets of poverty" even though by Ohio statewide standards these two counties rank among the poorest of 88 counties.

Response
There are several measures of poverty status available to a study such as the WM PEIS, and the level of income at which poverty is defined also varies by the size of the family or household unit. For a study of this size, given the total number of sites, counties in the site regions of influence, and census tracts within counties, it was necessary to develop analytical criteria and threshold limits that could be universally and uniformly applied to all 17 sites on a national basis. Therefore, for purposes of this

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analysis, DOE did not attempt to adjust for local cost of living or to use relative state rankings in its determination of poverty status communities. DOE used national, rather than State or local, statistics to assure that the criteria and method of collection were the same for all sites, thus allowing for a fair comparison of impacts across all of the sites considered. Data provided by the U.S. Bureau of the Census satisfies this requirement.

Since the average household size in the U.S. is 4 persons (3.88 rounded), median income level for a household unit of four was assumed to represent a standard measure to compare sites. (See WM PEIS Volume III, Section C.4.7, and the WM PEIS Environmental and Socioeconomics Impacts Technical Report, Section 6.7, for additional information about this analysis.)

DOE recognizes the potential for variation from the national statistics at individual sites. Although, the WM PEIS focuses primarily on national-level comparison of the relative effects of alternatives, sitewide and project-level NEPA reviews would more fully explore site-specific concerns, such as "pockets of poverty," which may be considered important at specific sites.

Comment (3965)
DOE's use of "minority population" as more than 50 % of the total population based on figures collected by the U.S. Bureau of the Census fails to identify significant minority populations in the regions surrounding the PGDP and the Portsmouth and sites. The Appalachian region, which includes both facilities, consists of a population of Appalachian heritage and culture and is a minority within the larger U.S. population.

Response
For the Final WM PEIS, DOE has revised the criteria for the environmental justice analysis to define minorities and low-income populations to consist of census tracts where those populations are greater than their respective national averages. Minority populations were identified as census tracts with 24.1% or greater minority populations rather than the 50% criterion for individual census tracts. Section C.4.7.2.1.1 in Volume III was revised accordingly.

The identification of minority sub-cultures is subject to multiple and sometimes contradictory definitions, depending on the perspective of the observer. However, for purposes of the WM PEIS, it was necessary to employ a categorization that was uniform and universally applicable to all sites across the complex. Data provided by the U.S. Bureau of the Census met these criteria and, because minority status is self-reported by individuals during the census, avoids any inherent bias in the identification process itself. The importance of regional sub-cultures would be addressed in more detailed sitewide or project level NEPA reviews.

Comment (3968)
DOE use of "minority population" to categorize various and diverse Native American cultures in regions surrounding DOE facilities throughout the West is erroneous and minimizes the impact of the loss of a unique culture when one Native American Tribal community is severely impacted.

Response
DOE's characterization of Native American populations for the WM PEIS recognizes the unique government-to-government relationship that each Native American Tribal Government has with the Government of the United States. This relationship is defined by treaties, statutes, court decisions, and

the U.S. Constitution. DOE is committed to continuing to address the concerns and interests of stakeholders at the DOE sites in all its decisionmaking and recognizes that each Tribal entity has significant interests at a number of DOE sites. DOE recognizes that it must consider not only the interests of Native American groups and their Tribal lands as represented by recognized Native American Tribal Governments, but also the interests of individual Native Americans who are minority members of the community at large. To ensure this, DOE reviewed both the presence of recognized Native American Tribes and U.S. Bureau of the Census data on minorities, which include residents who identify themselves as Native American, whether or not they are actually included in specific regional tribes. The WM PEIS classifies Native Americans as minority populations in a numerical context to describe the demographic characteristics of the region surrounding DOE sites.

Comment (3970)
DOE identifies a poverty level of 19.9% for the Portsmouth Plant and 12.4% for PGDP. Do these levels apply only to counties where 90% of the work force resides or where sites are located?

Response
The summary information provided in WM PEIS Volume I, Table 4.3-3, for the Portsmouth Plant and PGDP facilities represent aggregate data for all counties included in the 80-kilometer (50-mile) site radius defined as the region of influence for the environmental justice analysis. A more detailed county-by-county breakdown of the information contained in this table can be found in WM PEIS Affected Environment Technical Report, Section 2.9.5 for PGDP and Section 2.11.5 for Portsmouth. The methodology used in the environmental justice analysis is described in Section 5.4.7 (Volume I) and Section C.4.7 (Volume III).

Comment (4000)
I truly believe that certain DOE alternatives, including its alternative of 100% of treated waste to be sent for disposal at NTS, does disproportionately impact one population identified by DOE as a "minority," but which is composed of unique Native American cultures living in close relationship to the Earth who must care for their traditional homes in spite of past and present environmental abuses for the national defense.

Response
DOE's site waste management strategies are being developed to minimize the health and environmental effects from potential future releases across the complex. The WM PEIS compares waste management alternatives on the basis of added risk from proposed waste management operations. The exposure pathways that were examined used conservative assumptions that include the potential for ingestion of radioactivity. DOE does not have specific data, however, to address past health effects across the complex.

In developing the Final WM PEIS, a more detailed evaluation of potential environmental justice impacts was conducted. For the WM PEIS, DOE mapped the minority, low-income, and Native American Tribal communities within an 80-kilometer (50-mile) radius of an existing waste management facility or the geographic center for each of the 17 sites, including NTS, that were evaluated for waste management activities. The results of the risk analysis, which identified adverse or high risks to the maximally exposed individual were compared with these maps to evaluate whether any disproportionate impacts would occur. The methodology for this analysis is described in Section C.4.7 in Volume III, with the results by waste type discussed in Volume I, Sections 6.10, 7.10, 8.10, 9.10 and 10.10.

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However, DOE is aware of the impacts, including those on Native American cultures, that DOE site activities have had on the surrounding environmental settings. The results of the WM PEIS assessment indicate that DOE would have sufficient flexibility in locating proposed facilities on the sites to avoid disproportionately affecting minority or Native American interests at the sites, including NTS. Sitewide or project-level NEPA reviews would analyze any potential impacts on Native American Tribal cultures at the sites in more detail.

Environmental remediation to cleanup past releases is being addressed separately at each DOE site. The CERCLA process ensures that stakeholders at NTS, including potentially affected Native American groups, have input in the remediation decisionmaking.

Comment (4008)
The environmental justice considerations in the WM PEIS are critically flawed and must be addressed at the programmatic level because: (1) Although the total number of American Indians on reservations in the U.S. is 900,000, or only 0.35% of the total U.S. population, more than half of the DOE sites (9 out of 17) that are candidates for managing high-level waste, receiving offsite waste, or hosting disposal facilities are located adjacent to a concentrated population of American Indians. (2) The WM PEIS employs a convoluted analysis that minimizes human health risk and then concludes that there are no disproportionate risks because no adverse health impacts are expected from the management of waste. An environmental justice analysis should be used to evaluate the risks, however large or small, to see if they fall disproportionately on a particular segment of the population.

Response
Most DOE facilities were sited in the 1940s and 1950s during World War II and the Cold War. The locations for DOE facilities were chosen based in large part on security concerns, which contributed to the choice of locations that are remote from populated areas.

DOE is committed to the principles of environmental justice as defined in Executive Order 12898, which directs Federal agencies to address, as appropriate, potential disproportionately high and adverse human health or environmental effects on minority and low income populations as a result of the agency's actions. The WM PEIS demonstrates this concern in its evaluation of environmental justice undertaken for each of the 17 major sites considered at the programmatic level. In the Final WM PEIS, DOE tried to make this discussion more meaningful. A discussion of the environmental justice methodology is contained in Section 5.4.7 in Volume I. The expanded discussion now describes the methods used to evaluate the distribution of Native American populations and Tribal lands, as shown in the maps in Volume III, Section C.4.7, in relation to the results of the health and air quality impacts analysis. It also discusses the implications of the analysis in relation to the populations of interest in the regions around the sites. (See Section C.4.7.2 in Volume III). DOE is committed to continuing to address the concerns and interests of Native Americans and Tribal Governments at the DOE sites in all its decisionmaking.

The number and proximity of Tribal lands to DOE sites are considered in the environmental justice analysis as an important aspect of the assessment. The presence of these lands and cultural properties is documented in the affected environment for each site and considered separately from the general distribution of minority groups in the region of influence.

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DOE's waste management strategies will address the potential for future releases across the complex with the goal of minimizing and mitigating health and environmental effects. The PEIS analyzed human health and environmental impacts associated with the alternatives for the five waste types. This analysis focuses on risks to the hypothetical maximally exposed individuals in offsite populations around the sites, and on environmental impacts, such as those to air quality, that could have a direct impact on people living nearby. The WM PEIS compares waste management alternatives on the basis of added risk for waste management operations. Cumulative health risk from current and planned DOE operations other than waste management are addressed in Chapter 11 in Volume I.

Comment (4010)
Commentors stated that the environmental justice analysis of transportation is flawed because of the conclusion that the collective population fatalities are expected to be approximately uniformly distributed along the transportation corridors, and because the impacts are randomly distributed, disproportionate impacts are not expected on any particular segment of the population. This conclusion ignores the natural concentration of transport vehicles at sites at the beginning and end of each trip. This means that transportation risks are concentrated at DOE's waste management sites and are in addition to any risks from the storage or disposal of the waste at the sites. Therefore, the high concentrations of American Indians near DOE receiving sites will suffer a disproportionate risk from transportation of wastes. One commentor observed the use of the term "significant" several times in Section 8.10 of the PEIS.

Response
The tendency of waste shipments to concentrate into transportation "funnels" at receiver sites was addressed in the WM PEIS analysis. The potential for increased risk and other impacts to resident populations and a description of the environment around transportation funnels where shipments from several sites concentrate is considered by the analysis. However, DOE did not attempt to determine the likelihood that the exposed individuals may be members of minority or low-income communities. Tables E-13, E-18, E-25, and E-31 in Volume IV address cumulative dose and lifetime risk to the maximally exposed individual along a site entrance route. These tables indicate risk related impacts for the top five sites, in terms of total shipments (both incoming and outgoing) for each of four major waste types. Table 10.20-1 in Volume I identifies the site with the maximum number of shipments for each waste type. The analysis assumes these sites conservatively represent conditions at all other sites. Sites having fewer total shipments would experience correspondingly lower impacts.

U.S. Department of Transportation routing regulations for public highways are contained in 49 CFR 397 (also known as HM-164). There are no corresponding Department of Transportation rail regulations. A truck transporting a shipment of radioactive materials is required to use the interstate highway system, except under defined circumstances. Carriers are required to use interstate circumferential or bypass routes, if available, to avoid populous areas. Any State or Native American Tribe may designate other "preferred highways" to replace or supplement the interstate systems.

The term significant was used in Section 8.10 of the Draft WM PEIS (environmental justice impacts for transuranic waste). However, Section 8.10 and other discussions of environmental justice in the Final WM PEIS were revised to delete the use of this term, since its meaning was unclear within the context of the analysis.

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Comment (4452)

The analysis of risks to minorities is supposed to focus on risks to the maximally exposed individual, according to Section 3.2.6 in the Draft WM PEIS Summary document. DOE should provide in the WM PEIS quantitative information on such risks to minorities (some of whom eat large quantities of fish and wildlife), and differences in exposure assumptions for minority populations and individuals compared to members of the general public due to differences in behavior (some people eat considerably more wild game and plants, or fish, than others because of differences in lifestyle). For example, African-American subsistence fishermen and their families eat bass contaminated by SRS, resulting in potential exposure of 3.1 mrem, according to the 1992 Site Environmental Report; Seneca Indian subsistence fishermen and their families eat large quantities of fish from a creek contaminated by WVDP; members of the Fort Hall Shoshone-Bannock Nation should be evaluated for patterns of exposure to contaminated wildlife from INEL that are greater than exposure patterns in the majority population. Some minority populations might be at a higher risk than indicated by exposure patterns based on studies of the general public. This needs to be taken into consideration when exposures are estimated to such populations and when environmental justice considerations are evaluated. DOE should follow the Presidential Order concerning environmental justice.

In addition, DOE should include in the PEIS numbers of fatalities in minority versus general population, as well as the average chance of fatality for minorities versus other members of the general public within 50 miles. Furthermore, socioeconomic impacts on minority populations should be evaluated, particularly as they relate to measures such as keeping indigenous people off Tribal land on which a treatment, storage, and disposal facility might be located, versus assuming access. Associated legal and treaty issues also need to be covered.

Response

Subsistence consumption was not analyzed because of the array of assumptions about site-specific variables involved in such an analysis and because the analysis would require identifying specific locations of proposed waste management facilities, which is not part of programmatic decisionmaking. Because the analysis would be subject to extreme variability based on the analysis assumptions and location selection, DOE believes that the results of such an analysis should not factor into programmatic decisionmaking and, therefore, that analysis is not appropriate in the WM PEIS. Sitewide and project-level NEPA reviews would be the appropriate context for this type of analysis. DOE did not specifically assess impacts to aquatic life or to subsistence fishermen at the sites. DOE conducted a qualitative review of factors that would be related to the likelihood of risk through subsistence hunting or fishing exposure. A qualitative evaluation of site factors in Chapter 5, Section 5.4.7 in Volume I and Appendix C, Section C.4.7 in Volume III indicates most sites with Federally recognized Native American groups would have a higher possibility of subsistence consumption.

DOE is committed to the principles of environmental justice as defined in Executive Order 12898, which directs Federal agencies to address, as appropriate, potential disproportionately high and adverse human health or environmental effects on minority and low income populations as a result of the agency's actions. The WM PEIS demonstrates this concern in its evaluation of environmental justice impacts undertaken for each of the 17 major sites considered at the programmatic level. In the Final WM PEIS, DOE has tried to make this discussion more meaningful. A discussion of the environmental justice impacts methodology is contained in Section 5.4.7 in Volume I. The expanded discussion now describes the methods used to evaluate the distribution of Native American populations and Tribal lands, as shown in the maps in Volume III, Appendix C, in relation to the results of the health and air quality impacts analysis. It also discusses the implications of the analysis in relation to the populations of interest in the regions around the sites. (See Section C.4.7 in Volume III).

The WM PEIS provides an evaluation of environmental justice suitable for a programmatic review in its evaluation of human health impacts associated with the alternatives for the five waste types. The Final WM PEIS contains a revised environmental justice analysis, that evaluates at the census-tract level health risks to the offsite population receptor group (population risk) and to the offsite population maximally exposed individual (MEI risk) from the routine operation of waste treatment facilities. Specific estimates of risk were used as screening criteria for triggering environmental justice analysis (a population risk greater than or equal to one latent cancer fatality from treatment facility operations or an MEI cancer fatality probability of 1×10^{-6} or greater from incident-free treatment facility operations). The results of the environmental justice analysis are provided in Volume I, Sections 6.10, 7.10, 8.10, 9.10, and 10.10 of the WM PEIS.

Based on the programmatic analysis of land requirements at the sites to implement any of the waste management alternatives, DOE believes it will have sufficient flexibility to avoid or minimize environmental or human health impacts found to be potentially significant, including any shown to potentially pose disproportionately high and adverse impacts to Native Americans, minorities, or low-income populations, through the selection of different waste management technologies or facility locations. Sitewide or project-level NEPA reviews would be conducted that would more fully address specific Native American concerns, including Tribal land access and treaty and legal issues, related to the respective sites.

Comment (4550)
A population impact of less than 0.5 is not *de minimis*. DOE should address in the environmental justice analysis whether minority populations would be exposed to disproportionate risks compared to the general population.

Response
DOE revised the WM PEIS environmental justice analysis, as described in Section 5.4.7 in Volume I. The results of the analysis, listed in Sections 6.10, 7.10, 8.10, 9.10, and 10.10, identify any locations where minority or low-income populations could potentially experience disproportionately high and adverse health risks or environmental impacts. If the maximally exposed individual at a candidate site would be at low risk, DOE concluded that no individual at that site would be at high risk, even an individual from a minority or low-income population. If risk potential was identified, the 80-kilometer (50-mile) radius of an existing waste management facility on the site or the geographic center of the site was evaluated for potential disproportionately high and adverse impacts to minority and low-income populations.

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6. Other Topics of Interest to the Public

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(No comments were received for this section)

6.1 Emergency Preparedness and Response

Comment (23)
Commentors are concerned about costs to local communities to pay for damage resulting from waste treatment, storage, and disposal activities (including accidents) at the DOE sites. One commentor asked, if an accident at a DOE site makes the area uninhabitable, who will pay the tax bill? Who will pay the tax bills for our State? According to another commentor, DOE should analyze the negative effects on property values and potential liability to DOE in the event of an accident.

Response
Potential damage resulting from waste treatment, storage, and disposal activities (including accidents) was analyzed for DOE sites in the WM PEIS. Sections 6.4, 7.4, 8.4, 9.4, and 10.4 in Volume I of the WM PEIS describe that health risk impacts can result from exposure to radiation and/or chemicals and from physical trauma associated with constructing and operating treatment and disposal facilities or transporting waste. Health effects were evaluated for routine operations and accidents. Appendix F describes the accident analysis. The WM PEIS analysis shows the risk of damage occurring during routine treatment, storage, and disposal activities of any of the five waste types analyzed would generally be low.

With respect to accidents, DOE sites already have plans and equipment to respond to damage on sites resulting from treatment, storage, and disposal accidents. DOE requirements for emergency response preparedness are described in DOE Order 151.1, described in Section 1.4.3 in Volume I of the WM PEIS. Most minor damage can be responded to at a site level. If major damage were to occur as a result of a radioactive waste accident, DOE could use the statutory indemnity described by the Price-Anderson Act (42 USC 2210). The Price Anderson Act provides for indemnification by DOE for liabilities that may arise from a nuclear incident as a result of activities undertaken by DOE's contractors. This means that if a nuclear incident were to occur, such as a release of radioactive materials from a facility, and damages were incurred as a result of the incident, DOE would indemnify its contractors from liability. In other words, DOE would take responsibility for ensuring that such damages were appropriately compensated under the liability provisions of the Price Anderson Act. In addition, the Price Anderson Act Amendments of 1988 subject indemnified contractors to civil and criminal sanctions if they violate any applicable nuclear safety requirements at any facility under the contractor's control. Potential damage to the environment can also be reduced or mitigated through the implementation of programmatic and site-specific mitigation measures described in Volume I, Chapter 12.

DOE recognizes the possibility of negative public perceptions associated with its Waste Management Program. For example, the proximity of a DOE waste management facility might be perceived negatively. It is possible, therefore, that the value of real estate in the vicinity of the facility might decline and land development patterns and tourism might be negatively affected. However, assessing the impact of "stigma" generally is problematic because it does not necessarily depend on the actual physical effects or risks of the proposed action, but on the negative perception of these effects or risks by certain members of the public. Moreover, the extent of impacts from such perceptions is extremely speculative, and NEPA does not require analysis of potential impacts that are speculative; therefore, analysis of such stigma and the possible mitigation of its impacts is inappropriate for inclusion in NEPA reviews, including this WM PEIS. DOE works with local communities to understand and mitigate potential negative perceptions of DOE operations.

6.1 Emergency Preparedness and Response

Comment (49)
Commentors are concerned about emergency response and medical and emergency equipment in case of a nuclear incident at a site. One commentor stated that DOE needs to inform the public about school evacuation plans in the event of an accident.

Response
DOE sites already have emergency plans and equipment to respond to accidents and other emergencies. DOE requirements for emergency response preparedness are contained in DOE Order 151.1, Comprehensive Emergency Management System (1995), which is described in Section 1.4.3 in Volume I of the WM PEIS. DOE participates with other Federal agencies, Tribal Nations, and State and local authorities to sponsor and occasionally fund radiological emergency response training in the United States. Training is usually provided for those responsible for public safety and emergency response to natural disasters or accidents. DOE provides Radiological Assistance Program teams of trained experts who are equipped and prepared to respond quickly to an accident involving a shipment of radioactive material and assist local emergency response personnel, if requested. DOE, the U.S. Department of Transportation, and the Federal Emergency Management Agency assist in review and modification of State and local emergency response plans, if requested.

Comment (1819)
Provide advance notification to municipalities before transporting wastes through their regions. For example, any transportation of wastes through the Hampton Roads metropolitan area should be preceded with advance notification to the Virginia Department of Emergency Services and the affected localities so that adequate safety precautions can be taken. The localities should be notified in advance of any notification to the news media.

Response
DOE complies with all applicable hazardous and radioactive materials transportation regulations. The regulations are described in Section 1.4.4 in Volume I of the WM PEIS. National transportation activities for DOE are described in Section 4.3.10. Transportation regulations do not require advance notification for hazardous waste, low-level waste, or low-level mixed waste shipments. However, DOE works with State, Tribal, and local authorities to develop notification requirements on a site by site basis prior to beginning shipping activities. Advance notification is required for transuranic waste and high-level waste.

DOE believes emergency planning and preparedness is best done when actual shipping activities are in the planning stages. More detailed transportation planning will be performed at the site level when specific actions are decided. Such site-level plans will be better able to appropriately address the emergency planning measures required as determined by the specific waste to be shipped and the actual route(s) to be used, as described in Appendix E, Section E.4.2, in Volume IV of the WM PEIS. At large DOE sites, there is already a high level of emergency planning and preparedness in place, as discussed in Appendix E, Section E.9. Notification protocols for State, Tribal, and local authorities for large shipping activities will be determined during site transportation planning activities.

Comment (2314)
The WM PEIS should provide a table listing the number and type of nuclear waste shipment accidents and how they could be handled in the future.

6.1 Emergency Preparedness and Response

Response

DOE has not included such a table in the Final WM PEIS because the few accidents involving radioactive shipments over the years are not a large enough sample to predict future accidents. Like other kinds of shipments, radioactive materials in transit have been involved in accidents. In most cases, there was no release of any radioactive material into the environment. When releases have occurred, the material has been cleaned up with no identifiable harm to people or to the environment. No one has ever been killed or seriously injured in an accident involving radioactive materials because of the nature of the cargo.

Emergency planning and preparedness is best done when actual shipping campaigns are in the planning stages. This includes coordinating notifications to State, Tribal, and local authorities where required. The WM PEIS is a programmatic document that uses representative routes (see Section E.4.2 in Volume IV) and source terms (Section E.6.1) to obtain a nationwide perspective on the risks associated with transporting hazardous waste within the DOE complex. More detailed transportation planning will be performed at the site level when specific actions are decided. Such planning will be able to appropriately address the emergency planning measures required as determined by the specific waste to be shipped and the actual route(s) to be used, as described in Section 4.2 in Volume I. Especially for the large DOE sites, there is already a high level of emergency planning and preparedness in place, as discussed in Section E.9 in Volume IV.

State and local police and fire departments have primary responsibility for responding to events that could endanger the health and welfare of their citizens. Most States maintain specialized teams capable of responding to hazardous materials incidents. Through the capabilities these teams currently possess for dealing with potential accidents involving other hazardous materials (e.g., hazardous chemicals), they should already have the capability to deal with most plausible accidents involving low-level waste and low-level mixed waste. Thus additional training for low-level waste and low-level mixed waste would most likely be minimal. However, some states would require additional training to respond to potential radioactive hazards resulting from transuranic waste or high-level waste transportation accidents. Currently, to assist in planning and preparedness for an unlikely, but theoretically possible, transportation emergency involving any radioactive shipments, DOE does offer a variety of emergency response resources and information to complement existing emergency preparedness programs, and would continue to maintain a comprehensive emergency management system, particularly for radiological emergencies. The emergency management system includes training courses, Regional Coordinating Offices, and DOE Radiological Assistance Program teams.

Comment (2930)

Regarding Brookhaven National Laboratory (BNL) as a potential waste management site, a commentor stated that the WM PEIS fails to note that an operating certificate was denied to the Long Island Lighting Company's Shoreham nuclear power plant because of the impossibility of devising an adequate evacuation plan for the at-risk population.

Response

The accidents that could occur at waste treatment, storage, and disposal facilities are very different in type and magnitude than potential accidents from a commercial nuclear power plant. Therefore, the comparison of BNL to Shoreham is not valid.

BNL has measurable quantities of low-level mixed waste and low-level waste. The current small waste inventories at BNL (see Appendix I in Volume IV of the WM PEIS) and the physical forms of the waste would not result in the need to rapidly evacuate the surrounding area in response to any waste management facility accident. For example, as indicated in Section 6.4.3 in Volume I of the WM PEIS, the maximum reasonably foreseeable low-level mixed waste treatment facility accident at BNL was estimated to result in an offsite population dose of 20 person-rem and a radiation dose of 2 mrem for the maximally exposed individual. These exposures would result in less than one excess latent cancer fatality in the offsite population. The maximally exposed individual would have a probability of excess latent cancer fatality of about 1 in 1 million in their lifetime as a result of the exposure. These estimates assume that the accident will occur. However, the estimated annual frequency or probability of occurrence for the accident evaluated is between 1 in 1 million and 1 in 10,000. Details of the waste management facility accident analyses are presented in Appendix F in Volume IV of the WM PEIS. Under the protective action guides (PAGs) developed by EPA and adopted by DOE, an evacuation of the general population would not be appropriate unless the projected dose to an offsite individual reached 1 rem. The estimated dose here is a factor of 500 lower for the worst low-level mixed waste facility accident. Therefore, there is very little likelihood of an evacuation of the public from such an accident.

Comment (3129)
In Appendix E, it would be very helpful to emergency responders if the maximally exposed individual in accident conditions were related to the risks associated with initial emergency response.

Response
It should be understood that the WM PEIS accident consequence estimates for maximally exposed individuals following a potential accident are not intended for emergency response. As discussed in Section E.5.1.2.2 in Volume IV, the estimates are made for assumed weather conditions to give readers an idea of what might happen to a member of the general public during the maximum consequence accident analyzed. The accidents generally involve fire, which causes greater dispersion due to initial plume rise and deposition further downwind, affecting more people. The maximally exposed individual is located in the worst possible position, that is, where the plume initially comes back down to ground level. For a transportation accident, there is no forewarning and the plume from such an accident would pass the maximally exposed individual location within approximately a few seconds to minutes, depending on weather conditions, generally too little time for mitigative response at that location. Also, the risks are highly dependent on the specific nature of the radioactive material being transported. The WM PEIS transportation risks are based on average compositions for a given site and are unlikely to correspond directly with any one actual shipment. It should be noted that none of the postulated transportation accidents in the WM PEIS would result in acute radiological fatalities (i.e., generally occurring within weeks to months) following an accident.

Emergency responders are trained to deal with transportation accidents to protect themselves and the public, especially during the initial stages of emergency response to an accident.

Comment (3711)
DOE would need to provide financial support to local communities for training and special equipment if Argonne National Laboratory-East (ANL-E) were to have permanent storage facilities.

Response
DOE sites have emergency plans and equipment to respond to accidents and other emergencies. DOE requirements for emergency response preparedness are contained in DOE Order 151.1 described in

6.1 Emergency Preparedness and Response

Section 1.4.3 in Volume I of the WM PEIS. DOE participates with other Federal agencies and State and local authorities to sponsor and occasionally fund radiological emergency response training throughout the United States. Training is usually provided for those responsible for public safety and emergency response to natural disasters or accidents. DOE provides Radiological Assistance Program teams of trained experts who are equipped and prepared to respond to an accident involving a shipment of radioactive materials and assist local emergency response personnel, if requested. DOE, the U.S. Department of Transportation, and the Federal Emergency Management Agency assist in review and modification of State and local emergency response plans, if requested.

Comment (3897)
DOE needs to explain if there is a coincidence between the new Army facility near ANL-E and DOE's proposal. Should the public be concerned about espionage and theft?

Response
There is no relationship between an Army Reserve Training Center, which is used to maintain heavy vehicles, and DOE's planning for waste management. The land where the Army Reserve Training Center is located was declared surplus by DOE in 1984 and was transferred to the General Services Administration in 1985. Three years later the title was transferred to the U.S. Army Corps of Engineers. Construction of the Army Reserve Training Center was originally scheduled to begin in 1989. However, because of lack of funding, construction was not begun until 1994. The Center has an occupancy of about 20 persons on weekdays and about 200 persons on weekends. It includes a garage where maintenance is performed on heavy vehicles.

Section 4.3.12 in Volume I of the WM PEIS, Safeguards and Security, which has been added to the Final WM PEIS, describes DOE's Safeguards and Security Program to protect DOE interests from theft or diversion of special nuclear material; sabotage, espionage, loss or theft of classified matter or government property; and other hostile acts that could cause unacceptable adverse impacts on national security or on the health and safety of employees, the public, or the environment. Waste management activities are protected from espionage and theft under the DOE Safeguards and Security Program.

Comment (3919)
DOE needs to explain at what nuclear exposure level the public would be notified.

Response
In accordance with DOE's Comprehensive Emergency Management System (DOE Order 151.1), described in Section 1.4.3 in Volume I, each DOE site/facility has the general requirement to notify DOE and offsite officials when operational emergencies occur. Specifically, the Order requires that sites/facilities "promptly notify local, State, Tribal, DOE, and other regional Federal agencies when events categorized as Operational Emergencies occur". (DOE Order 151.1, Section 4.c(1)).

When events occur that represent a specific threat to workers or the public due to the release or potential release of significant quantities of radioactive or hazardous material, an Operational Emergency is declared and classified as either an Alert, Site Area Emergency, or General Emergency, in order of increasing severity. Alert is the lowest classification of an Operational Emergency. As such, the minimum criteria for declaring an Alert represents the threshold level of radioactive release for which notifications of Operational Emergencies are required.

6.1 Emergency Preparedness and Response

An Alert is declared when the radiation dose exceeds either "the applicable Protective Action Guide...at or beyond 30 meters from the point of release to the environment OR a site-specific criterion corresponding to a small fraction of the applicable Protective Action Guide...at or beyond the facility boundary or exclusion area boundary," and "it is not expected that the applicable Protective Action Guide...will be exceeded at or beyond the facility boundary or exclusion zone boundary." (DOE Order 151.1, Chapter V, Section 3.a) These criteria define the Alert and, hence, the threshold level of radioactive release.

Increasing in severity, exceeding the Protective Action Guide at or beyond the facility boundary or exclusion zone boundary will result in the declaration of a Site Area Emergency and corresponding notifications to State and local emergency response organizations. (DOE Order 151.1, Chapter V, Section 3.b) Similar notifications are made when Protective Action Guides are expected to be exceeded at or beyond the site boundary resulting in the declaration of a General Emergency. (DOE Order 151.1, Chapter V, Section 3.c)

Protective Action Guides for releases of radioactive materials are specified in the EPA's *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents* (EPA 400-R-92-001, October 1991). Notifications of Operational Emergencies involving releases of radioactive materials are made to State and local emergency response organizations within 15 minutes of the declaration of the emergency. (DOE Order 151.1, Chapter VIII, Section 4.a) The State and local emergency response organizations notify the public accordingly. DOE does not typically directly notify the public of radioactive releases, but notifies the public indirectly through notifications to State, Tribal, and local organizations. Additional guidance concerning emergency notifications is available in the Emergency Management Guide, *Interim Guidance for Notification* (7/18/92), which is currently being revised to correspond to DOE Order 151.1.

DOE does, however, recognize the need to provide accurate, candid, and timely information to site workers and the public during all emergencies, and requires the establishment of an Emergency Public Information Program. Requirements for this program are described in DOE Order 151.1, Chapter IX. Additional guidance concerning emergency public information is available in the Emergency Management Guide, *Guidance for Public Information* (6/26/92), which is currently being revised to conform to DOE Order 151.1.

6.2 Safeguards and Security

Comment (84)
Commentors are concerned about sabotage or terrorist activities involving radioactive and hazardous waste.

Response
The WM PEIS evaluates the impacts of several types of accidents at treatment and storage facilities (e.g., fires, explosions, earthquakes, aircraft crashes). Table F.2-3 in Volume IV of the WM PEIS contains descriptions of accident initiators. The WM PEIS also includes a detailed assessment of the risks of a complete range of credible transportation accidents for both rail and truck transportation. The potential impacts of these transportation accidents include the kinds of impacts that potentially could result from acts of terrorism or sabotage. DOE has added Section 4.3.12 to Volume I of the WM PEIS to provide a discussion of DOE's Safeguards and Security Program. The procedures and guidelines of the Safeguards and Security Program are applied to waste management activities for radioactive and hazardous waste.

DOE has extensive security systems in place at all its facilities that handle nuclear materials. Security precautions, including emergency response team notification, are routine for all shipments of DOE nuclear material. For more than 40 years, DOE security precautions have been successful in preventing the theft or sabotage of DOE nuclear material.

Comment (534)
DOE needs to ensure that security is adequate for waste shipments, specifically spent nuclear fuel, in light of national security concerns.

Response
DOE has added Section 4.3.12 to Volume I of the WM PEIS to provide a discussion of DOE's Safeguards and Security Program. Section 1.4.4 in Volume I of the WM PEIS describes the hazardous and radioactive waste transportation regulations followed for radioactive and hazardous waste shipments. These regulations include security precautions required for each waste type. Low-level waste, low-level mixed waste, and hazardous waste generally require minimum security requirements. Transuranic waste and high-level waste require more detailed security precautions.

The procedures and guidelines of DOE's Safeguards and Security Program are applied to DOE's waste management activities. For more than 40 years, security precautions have prevented the theft or sabotage of DOE nuclear material and waste.

Management of spent nuclear fuel is outside the scope of the WM PEIS. DOE addressed security for the transportation of spent nuclear fuel in the SNF/INEL EIS (DOE 1995).

Comment (2084)
How many workers are necessary to guard the waste and will more workers be needed for operations or treatment?

Response
DOE's existing Safeguards and Security Program applies to its waste management activities. The five WM PEIS waste types, which are defined in Volume I, Section 1.5, of the WM PEIS contain such small quantities of special nuclear materials or the materials are in such a form, that they do not require

any additional safeguards. DOE does not plan to add security measures beyond those already in place at its sites. DOE added Section 4.3.12 in Volume I of the WM PEIS to provide a discussion of safeguards and safety.

DOE anticipates minimal changes to the operational workforces at the sites after the startup of the proposed waste management facilities. However, some retraining of personnel could be necessary. More detail on the potential socioeconomic impacts associated with various alternatives is provided in Volume I, Sections 6.8, 7.8, 8.8, 9.8, and 10.8 of the WM PEIS.

Comment (3716)
Public safety should be DOE's number one concern.

Response
Indeed, public and worker safety is DOE's number one concern. The WM PEIS considers public safety concerns in numerous ways, ranging from the identification of the affected environment to programmatic analyses of health risks. Further, the minimization of environmental impacts, including risks to public health and safety, is an important decisionmaking criterion.

Comment (4448)
The Draft PEIS Summary document does not fully address high-level waste storage and treatment risks from accidents. Acts of terrorism can have much more severe consequences than accidents. Vulnerability to terrorist attacks is an important consideration concerning even temporary storage of large quantities of radioactive and/or toxic wastes.

Most of the high-level waste has not been vitrified and placed in canisters. Risks from accidents and deliberate sabotage and from such waste in treatment should be considered, along with the preparedness of DOE and other national and local emergency preparedness organizations, for the potential associated consequences.

Response
The WM PEIS evaluates the impacts of several types of accidents at waste management facilities, for example, fires, explosions, earthquakes, and aircraft crashes. The potential impacts of these accidents include the kinds of impacts that potentially could result from acts of deliberate terrorism. The WM PEIS evaluates "generic" or "conceptual" facilities. DOE would describe actual facility designs, which would include specific safety and security measures, in sitewide or project-level NEPA reviews, as described in Section 9.1.1 in Volume I.

The WM PEIS only analyzes the impacts of stored vitrified high-level waste. The environmental impacts of continued storage of liquid high-level waste in tanks and the vitrification of high-level waste have been assessed in previous DOE EISs identified in Section 1.8.1 and Section 9.1.2 in Volume I of the WM PEIS. These previous EISs also consider the environmental impacts of accidents involving the storage of liquid high-level waste. Cumulative impacts of the preferred alternatives in these other environmental analyses, combined with existing conditions and the WM PEIS impacts, are described in Chapter 11 in Volume I of the WM PEIS.

DOE sites have emergency plans and equipment to respond to accidents and other emergencies. DOE requirements for emergency response preparedness are contained in DOE Order 151.1 described in

6.2 Safeguards and Security

Section 1.4.3 in Volume I of the WM PEIS. DOE participates with other Federal agencies, Tribal Nations, and State and local authorities to sponsor and occasionally fund radiological emergency response training throughout the United States. DOE provides Radiological Assistance Program teams of trained experts who are equipped and prepared to respond to an accident involving a shipment of radioactive materials and assist local emergency response personnel, if requested. DOE, the U.S. Department of Transportation, and the Federal Emergency Management Agency assist in review and modification of State and local emergency response plans, if requested.

Section 4.3.12 in Volume I of the WM PEIS, Safeguards and Security, which has been added to the Final WM PEIS, describes DOE's Safeguards and Security Program to protect DOE interests from theft or diversion of special nuclear material; sabotage, espionage, loss or theft of classified matter or government property; and other hostile acts that could cause unacceptable adverse impacts on national security or on the health and safety of employees, the public, or the environment. Waste management activities are protect from espionage and theft under the DOE Safeguards and Security Program.

6.3 Community Stigma

Comment (22)
Many commentors stated that the Final WM PEIS should assess the impacts of stigma or negative perceptions on business, tourism, the gaming industry, property values, and industrial development. Commentors suggested that the analysis include impacts of the distribution of risk on property values and land development patterns in the regions around the sites. Some commentors requested analysis of how negative impacts would be mitigated or compensated for, if they occur. For mitigation, commentors stated that the impact assessment should consider the use of insurance and other compensation programs, such as buying properties of nearby residents, along with such administrative actions as the distribution of compensation to individuals, organizations, or public sectors negatively impacted. Commentors asked that plans to mitigate and minimize cases of stigma be explained in enough detail so that costs and final impact outcomes can be estimated. Commentors expressed concern that property values will decrease near candidate sites, while communities await DOE's WM PEIS decisions. One commentor stated that the influence of greater perceived risk on Indian Reservation communities should be a consideration in the WM PEIS.

Response
The WM PEIS analysis focuses on the assessment of alternatives for addressing national-level strategic issues. The results allow DOE to compare impacts across sites and to make programmatic decisions. To the extent possible, the WM PEIS analysis estimates the potential effects of the proposed actions.

The prosperity or economic development of an area depends on the characteristics or factors that define the particular economic region. Such factors as industrial development, entertainment resort destination, gambling, nuclear complexes, etc., can be perceived to be either positive or negative, depending on the underlying value systems of the individuals forming the perception. DOE recognizes the possibility of negative public perceptions associated with its Waste Management Program. For example, the proximity of a DOE waste management facility may be perceived negatively. It is possible, therefore, that the value of real estate in the vicinity of the facility might decline and land development patterns and tourism might be negatively affected. However, assessing the impact of "stigma" generally is problematic because it does not necessarily depend on the actual physical effects or risks of the proposed action, but on the negative perception of these effects or risks by certain members of the public.

Moreover, the extent of impacts from such perceptions is extremely speculative, and NEPA does not require analysis of potential impacts that are speculative; therefore, analysis of such stigma and the possible mitigation of its impacts is inappropriate for inclusion in NEPA reviews, including this WM PEIS. DOE works with local communities to understand and mitigate potential negative perceptions of DOE operations. DOE also works with Tribal Nations to the same end, in addition to fulfilling its trust and treaty obligations with Native American communities.

Comment (3371)
DOE has an obligation under NEPA to disclose indirect effects. If there is going to be an increase in cancers and other health effects from the handling of this waste during the next 20 years and beyond, what is the impact of this increase going to be on the health care system, and on the economies of the areas around such facilities. How will the location of a nuclear waste facility affect tourism, hunting, fishing, and other qualities of a potentially affected area, such as wilderness areas, research natural areas, wild and scenic rivers, national natural landmarks, and other significant natural features?

6.3 Community Stigma

Response
The WM PEIS analysis focuses on the assessment of alternatives for addressing national-level strategic issues. The results of this study allow DOE to compare impacts across sites and to make programmatic decisions on the selection of waste management sites and appropriate methods for waste treatment and disposal. To the extent possible at the programmatic level, the WM PEIS analysis estimates the potential effects of the proposed actions that are reasonably foreseeable. Therefore, DOE has attempted in this PEIS to analyze reasonably foreseeable, quantifiable environmental impacts that could result from the alternatives, including both operations and accident consequences. The impact parameters include health risks, air quality, water resources, ecological resources, socioeconomics, population, environmental justice, land use, infrastructure, cultural resources, and costs. The methodologies are detailed in Chapter 5 in Volume I of the WM PEIS. The analysis is discussed in the waste-type chapters (6 through 10) in Volume I.

In general, the WM PEIS analysis finds that the increase in health risks (for example, cancer cases) resulting from waste management activities would be small. Therefore, potential impacts on the health care system would be small.

The socioeconomic impact assessment employed three measures of economic activity--change in employment, change in personal income, and change in industry output--as indicators of the relative sensitivity of both regional and national economies to potential changes resulting from the implementation of the alternatives. Changes in demographic shift in regional populations were established as representative indicators of the potential for the alternatives to affect the size, density, stability of local communities, the provision of community services, or the availability of community resources. These indicator values formed the basis for the comparison of the effect of alternatives at each site and are used as representative of the regional economies and social structure for the purposes of estimating impact.

DOE recognizes its obligations under NEPA to disclose indirect, as well as direct and cumulative effects. However, NEPA does not require analysis of indirect impacts that are not reasonably foreseeable. The potential indirect effects of the proximity of a waste management facility on tourism, hunting, and other quality-of-life indicators are speculative and, therefore, not reasonably foreseeable. Moreover, at the programmatic level, the analysis of socioeconomic impacts is both broad and very general. No attempt was made as a part of this assessment to address more specific direct effects at individual sites, such as the potential direct effect on tourism, hunting, fishing, and other recreational or quality-of-life issues, or the provision of health care services, beyond this broad analysis. Sitewide or project-level NEPA reviews would address these issues.

6.4 Regional Equity

Comment (396)
Several commentors encouraged DOE to factor equity into the WM PEIS decision process. Specific suggestions were that waste management activities should be shared, with each State or region having a share; States or regions identified to host waste management activities should be technically capable of handling the waste; western States, such as Washington and Nevada, have been overburdened in the national defense effort and should not be turned into the nation's nuclear waste "dumping grounds." One commentor stated it was unreasonable to ask the citizens of the Northwest to take on more of the burden of the legacy of nuclear weapons production. Commentors also suggested that the decision process provide for negotiations that could mitigate or otherwise offset potential impacts on host States or regions, and that decisions be coordinated with States and regions. One commentor suggested that without considerations of equity in decisionmaking, transportation or environmental justice issues could arise.

Response
The WM PEIS does not analyze "equity," per se, because it is not an environmental effect, but rather a characteristic of the distribution of impacts. However, as one of many factors described in Volume I, Section 1.7.3, equity is a factor to be considered in the decisionmaking process; DOE will favor alternatives that distribute waste management facilities in ways that are equitable. In general, Decentralized Alternatives tend to spread potential impacts across a larger number of geographic areas than Regionalized or Centralized alternatives. As the number of potential host sites decreases from Decentralized to Regionalized to Centralized Alternatives, the number of regions potentially impacted by treatment and disposal activities decreases. On the other hand, risks associated with transportation could increase with Regionalized and Centralized Alternatives.

What is perceived as equitable by one State or region might not be perceived as equitable by another. DOE, nevertheless, considered the distribution of potential impacts across the nation in the selection process for preferred alternatives. DOE also has considered other appropriate factors that have an important bearing on the selection process. These include regulatory compliance, cost, capabilities for mitigating potential impacts, national priorities, environmental justice, consistency with DOE missions, and public concerns.

The cumulative impacts analysis in Volume I, Chapter 11, of the WM PEIS consolidates the potential impacts of waste management activities at each site with past, present, and reasonably foreseeable future activities. This analysis also aided DOE in selecting preferred alternatives identified in the PEIS and will also be useful in gauging site equity considerations in making final decisions.

Facilities or projects needed to implement decisions based on the WM PEIS would be subject to additional review under NEPA. Such reviews would provide another opportunity for public input to DOE's decisionmaking process. DOE will proceed with a reasoned approach to decisionmaking that includes all appropriate factors, including equity. This process would include discussions with affected States and Tribes regarding these projects and facilities.

Comment (4556)
DOE should look at the cumulative impacts of everything associated with all activities at DOE sites and all actions planned or under consideration in the Draft WM PEIS. One consideration when making waste management siting decisions is something called environmental equity. Many people consider it unfair to have their health sacrificed to benefit others, and the possibility of spreading the risk around

6.4 Regional Equity

should be considered, along with whatever such actions might do to total fatalities in the general public and risks to the most exposed member of the general public.

Determining the total number of fatalities would involve determining the total predicted fatalities, for various combinations of alternatives, from existing DOE sites and transportation activities (within perhaps a 50-mile radius from the sites), including the impact of radon from waste material and contaminated soil, impacts of the alternatives analyzed in the WM PEIS, and impacts of actions not analyzed in the WM PEIS (including environmental restoration, spent nuclear fuel, tritium, stockpile stewardship, fissile materials, etc.).

Impacts at locations more than 50 miles from sites from transportation associated with the alternatives, from any DOE transportation, and from transportation in general should also be covered. Special attention should be given to rest stops, refueling facilities, rail switching yards, and other locations that may be at risk, along with potential mitigating measures.

The analysis should cover all routes of exposure (not just air emissions, excluding radon, radiation, and radionuclides from accelerators).

Response
NEPA does not require DOE to look at impacts of everything associated with all activities at DOE sites. NEPA and CEQ implementing regulations recognize that separate NEPA reviews might be warranted for an agency's programs due to timing or the need for specificity or in-depth analyses. To this end, NEPA allows for separate analyses "tiered" from programmatic reviews such as the WM PEIS. By preparing separate environmental impact analyses on a number of extremely complex subjects, DOE has not prevented a comprehensive analysis as suggested in the comment, but rather has developed a more in-depth body of information. Moreover, the cumulative impacts analysis in this WM PEIS (Volume I, Chapter 11) includes the impacts for the preferred alternative described in the NEPA analyses prepared for other DOE programs, enabling an evaluation of impacts from DOE operations as a whole.

The necessity to prepare separate documents on separate but related programs includes a corresponding necessity for coordination among the programs to ensure a consistent presentation of information. DOE, therefore, has made every effort to ensure that the WM PEIS is consistent with other related EISs, including those cited in the comment. Section 1.8 in Volume I of the WM PEIS discusses these related EISs, as well as other DOE programs, and their relationship to the WM PEIS.

DOE reviews every proposal to prepare a NEPA document to determine if the decision is sound and in compliance with CEQ criteria on segmentation and interim actions. Any decision to prepare a NEPA document, including those listed by the commentor, must comply with those criteria. DOE believes that the preparation of one environmental impact statement on all DOE activities (operations, environmental restoration, and waste management) would necessarily be so broad that it would result in an essentially meaningless analysis. DOE has committed, as a matter of policy, to prepare sitewide EISs for large, multi-facility sites. DOE believes that sitewide analyses result in a meaningful assessment of all of DOE activities at a particular location.

The WM PEIS does not analyze "equity," per se, because it is not an environmental effect, but rather, a characteristic of the distribution of impacts. The PEIS analyzes the potential health, environmental, and socioeconomic impacts of a range of waste management alternatives. In general, Decentralized Alternatives tend to spread potential impacts across a larger number of geographic areas than Regionalized or Centralized Alternatives. As the number of potential host sites decreases from Decentralized to Regionalized to Centralized Alternatives, the number of regions potentially impacted by treatment and disposal activities decreases. On the other hand, risks associated with transportation through non-host regions could increase with Regionalized and Centralized Alternatives. Recognizing that what is perceived as equitable by one State or region might not be perceived as equitable by another, DOE, nevertheless, has considered the distribution of potential impacts across the Nation in the selection process for the preferred alternative. Equity concerns are among the decision factors listed in Section 1.7.3 in Volume I of the Final WM PEIS.

The WM PEIS transportation risk analysis considers all possible modes of exposure, including external radiation from passing shipments as well as external radiation, inhalation, and ingestion exposure as the result of potential accidental release. Exposures received by the public at areas such as rest stops and workers at refueling stops and railroad yards are considered in the analysis, as discussed in Section E.5.1 in Volume IV. For each waste type and alternative, Appendix E in Volume IV of the WM PEIS presents cumulative transportation risks to the public, to workers, and to maximally exposed individuals for both truck and rail transportation. In addition, DOE has revised Chapter 11 in Volume I to include consideration of other DOE actions (including those mentioned in the comment) that are considered reasonably foreseeable.

6.5 Waste Management Program Costs and Schedules

Comment (200)
Treatment alternatives for transuranic waste are costly; therefore, DOE needs to consider what assurances exist that funding for these treatment alternatives is available.

Response
NEPA requires that reasonable alternatives be evaluated in an EIS. Therefore, to conduct the analysis for the WM PEIS, DOE had to assume that funding would be available for these treatment alternatives. If funds are not available, implementation could be delayed. DOE is unable to guarantee full funding for any of its projects and programs. The budget for the Waste Management Program, like all Federal programs, is ultimately controlled by the President and Congress.

Comment (505)
DOE should take credit for the cost savings of possible technological advances in treatment, because DOE is considering the added costs of regulatory requirements, such as permitting.

Response
DOE based the costs presented in the WM PEIS on current available technologies so it could analyze alternatives consistently. Factoring potential cost savings related to technology advancements into this analysis would be speculative and would not provide a more credible basis for decisionmaking.

Comment (2032)
In the Final WM PEIS, DOE should provide the breakdown of the cost basis for various low-level mixed waste treatment options.

Response
The WM PEIS does not evaluate treatment options or costs of alternative technologies, and decisions on treatment technologies will not be made as a result of the WM PEIS. The WM PEIS analysis uses a generic treatment process for each site to evaluate the impacts of treating all onsite and offsite low-level mixed waste, as required by the respective alternatives. The resultant costs are broken out by life-cycle component and by treatment unit process in Volume I, Table 6.14-2. The treatment costs are listed under the unit process costs. Using the generic treatment process, the waste streams are routed to each technology as required by the characteristics of the waste, and resultant treatment costs are the sum of costs at each treatment process module, at each site, for the wastes managed in the alternatives. This level of cost presentation is considered appropriate for the programmatic level of the WM PEIS and the objective to make preliminary determinations about where to locate waste management facilities.

The bases for establishing facility costs were obtained by evaluating DOE facilities, primarily at Idaho National Engineering Laboratory (INEL), and commercial facilities costs. These facilities were surveyed to obtain capacity, cost data, and other information needed to support the cost methodology data. Before using these costs, the data were adjusted to account for capacity differences and escalation. To the extent possible, equipment costs for each facility were compared with data from existing facilities to establish a cost confidence level with the boundaries established for programmatic life-cycle cost estimates.

Additional assessment activities included a review of existing DOE facility capital and operating costs for comparison with the cost methodology data. Existing DOE facilities that were evaluated include the Waste Experimental Reduction Facility (incineration, shredding, and compaction) at INEL, the Controlled Air Incinerator at LANL, the Toxic Substances Control Act Incinerator at ORR, the

Supercompactor and Repackaging Facility at RFETS, the Radioactive Waste Management Complex (low-level waste disposal) at INEL, and the Transportable Waste Water Treatment Unit from the Uranium Mill Tailings Remedial Action Project. Planned DOE facility costs at INEL were also evaluated for the Radioactive Waste Storage Facility, the Waste Characterization Facility, the Idaho Waste Processing Facility, and the Mixed Low-Level Waste Treatment Facility. Other facilities evaluated include the Illinois Compact Low-Level Engineered Disposal Facility and the Commonwealth of Massachusetts Low-Level Radioactive Waste Disposal Facility.

Cost estimates for facility components were adapted from commercial sources as follows: Commercial facilities evaluated include conceptual designs and cost estimates for a radiological and hazardous material measurement system provided by Lockheed Martin; size reduction and baler system data from Stock Equipment Company of Chagrin Falls, Ohio; SGS assay system data from Atlan-Tech Corporation, Inc., of Roswell, Georgia; open, dump and sort devices, and robotic arms in consultation with personnel from DOE contractors involved with the Office of Technology Development, Robotic Technology Development Program; incineration package from Joy Energy Systems of Charlotte, North Carolina, and ABB Raymond, Inc., of Lisle, Illinois; dry off-gas filters from Pall Advanced Separation Systems of Cortland, New York; wet scrubbing unit from Croll-Reynold Company of Westfield, New Jersey; concentrator unit from LCI Corporation of Charlotte, North Carolina; air- and area-monitoring unit from Eberline Corporation of Santa Fe, New Mexico; stack monitoring unit from Eberline Corporation of Santa Fe, New Mexico; preparation and feed units from vendor quotes; melter from Ajax Corporation and Retec Corporation; dry and wet off-gas treatment trains from NGK-Locke, Inc., and Callidus Technologies; selected solidification unit from Stock Equipment Company; solidification module assemblies from Stock Equipment Company; drying equipment from Wyssmont Co., Inc., of Fort Lee, New Jersey; blending equipment from Velmac Associates, Inc., of Novato, California; extruder equipment from Sterling Extruders, Davis-Standard Division of Edison, New Jersey; and processing equipment from the U.S. Navy low-level waste processing facility of Lynchburg, Virginia.

See Volume I, Section 5.3.3, for a description of how DOE estimated costs for treatment. The details of the cost estimation methodology as applied to low-level mixed waste are in the Waste Management Facilities Cost Information for Mixed Low-Level Waste Technical Report (INEL-95/0014).

Comment (2338)
The argument concerning economies of scale, which is used throughout the WM PEIS, assumes that larger but fewer facilities will keep costs low; this is not entirely correct. When economies of scale are allowed, a "natural monopoly" occurs, and wastes that are less profitable to manage may be left out of the system. Small competitors cannot survive. This will make it necessary for DOE to maintain its regulatory role.

Response
For the purpose of cost comparison, the WM PEIS analysis assumes that DOE will build and operate its own waste management facilities. Accordingly, economies of scale would apply for these facilities. However, as discussed in Volume I, Section 1.7.4, DOE assumes the impacts of using a privatized facility on a DOE site would be the same as those of using a DOE facility at that site.

In addition, the WM PEIS does project small volumes of waste to be treated by portable treatment units. This treatment is discussed in Volume I, Sections 5.2.3 and 6.2.3, and details are provided in

6.5 Waste Management Program Costs and Schedules

supporting technical reports. Wastes that are less profitable to manage, could be treated by portable treatment units, by small competitors, or large DOE contractors. In either case, DOE will maintain its regulatory role for onsite activities.

Comment (2602)
Labor rates vary significantly among DOE sites and could affect the life-cycle cost of facilities.

Response
There is some regional variation in labor rates [full-time equivalent (FTE) costs]. Sharp changes can occur over time in these rates as economic conditions change or sudden shortages develop, particularly in labor categories, either regionally or nationally. DOE considered these regional variations and potential for change within regions in developing its cost estimates; however, precise predictions of labor rates costs over time are not possible.

DOE has revised Section 5.3.3 in Volume I to state that the indirect and overhead costs (which would include labor) used in the WM PEIS analysis were based on those at INEL, because they fall in the middle range of costs at several DOE sites.

As described in Volume III, Section C.3, DOE estimated labor costs by assuming an annual fixed cost of $140,000 per FTE. Based on previous experience with these cost-estimating techniques, DOE established a confidence level of plus or minus 30% (as noted in Section 5.3.3), which is sufficient for an overall comparison of alternatives and for comparisons of the effects of different alternatives at a single site.

Comment (2821)
The statement in the Draft WM PEIS Summary document that costs decrease as the number of treatment and disposal sites decrease might not apply to all waste streams. Chemical/physical treatment technologies that can be applied on a small scale might be more cost-effective than centralization. Please clarify.

Response
The cited statement correctly summarizes the general trend reflected in Table 4.3-2 of the Summary document. The WM PEIS does evaluate treatment of small volumes of waste by portable treatment units. This treatment is discussed in Volume I, Sections 5.2.3 and 6.2.3, and details are provided in supporting technical reports. The cost savings realized by using portable treatment units are included in the cost calculations presented in Section 4.3.6 of the Summary document. DOE revised Volume I, Sections 6.14, 7.14, and 8.14, to clarify this point.

Comment (2927)
The Final WM PEIS should better address economies of scale in the discussion of alternatives.

Response
Sections 6.14, 7.14, 8.14, 9.14, and 10.14 in Volume I of the WM PEIS discuss economies of scale in the cost analysis. Each cost section begins with a summary that succinctly describes the economies of scale for each waste type. Cost clearly differentiates the economies of scale analysis, specifically for facility size, transportation, and siting alternatives.

6.5 Waste Management Program Costs and Schedules

Section 1.8 in Volume I describes the factors that DOE used to screen, evaluate, and narrow the number of alternatives. Economies of scale are assessed in the cost, transportation, DOE mission, and site mission factors.

Comment (2931)
DOE must make cost estimates of different options available. Otherwise, it is impossible to evaluate the trade-offs between cost and level of risk reduction involved.

Response
Sections 6.14, 7.14, 8.14, 9.14, and 10.14 in Volume I of the WM PEIS compare potential costs by alternative for each waste type. In addition, Volume II contains tables that provide cost information for each site.

Comment (2939)
Is any consideration given to asset reclamation from DOE facilities?

Response
In April 1996, DOE published *Charting the Course: The Future Use Report*, which provides land-use recommendations developed by 16 sites. Identifying future uses for DOE sites and facilities has evolved as a central issue in recent years. First, in addition to directing reconfiguration plans, land-use determinations play a key role in guiding one of DOE's primary efforts--the remediation of contaminated properties and the disposition of Cold War inventory wastes. Second, land-use considerations are essential in helping DOE and affected communities identify and implement beneficial reuse of Federal land, facilities, and equipment that are no longer needed as a result of defense downsizing and changing missions.

In general, reuse of DOE facilities is limited by a number of factors, and evaluation of the potential for asset reclamation would be made on a site by site basis. The WM PEIS accounts for decontamination and decommissioning costs for existing and newly constructed waste management facilities in the cost analysis, but does not identify what asset reclamation will take place. Reclamation of the facilities will be addressed under the environmental restoration programs at the sites.

Comment (3066)
Section 5.3.3 states that only the operations and maintenance costs were estimated for existing facilities. DOE should include decontamination costs for existing facilities.

Response
DOE revised Section 5.3.3 in Volume I of the WM PEIS to clarify that decontamination costs were estimated for existing facilities. A detailed explanation of the cost-estimating methodology for existing facilities is presented in Section C.3.2.1.4 (Volume III). The detailed costing included decontamination and decommissioning (D&D) costs for existing facilities, although these costs were not presented separately in the cost summary data (Volume II Cost Tables) as they were for newly constructed facilities. The existing facility D&D costs were rolled into the Volume II summary "Operations" cost category, which was used to estimate cost impacts.

6.5 Waste Management Program Costs and Schedules

Comment (3139)
Transportation cost estimates in the WM PEIS should include the costs of training and equipment for emergency response planning for State, county, Tribal, and local agencies. The Appendix E analysis of mitigative measures related to transportation fails to identify the costs and other impacts that might be borne by State, local, and Tribal Governments to maintain the levels of emergency planning and preparedness associated with the major shipping campaigns that some alternatives contemplate.

You have not talked about helping to finance transportation and emergency response teams in the localities where you might be depositing these tremendous amounts of waste. This has to be considered.

Response
Emergency planning and preparedness is best done when actual shipping activities are in the planning stages. This includes coordinating notifications to State, Tribal, and local authorities where required. The WM PEIS is a programmatic document that uses representative routes (see Section E.4.2 in Volume IV) and source terms (Section E.6.1) to obtain a nationwide perspective on the risks associated with transporting hazardous waste within the DOE complex. More detailed transportation planning will be performed at the site level when specific actions are decided. Such planning will be able to appropriately address the emergency planning measures required as determined by the specific waste to be shipped and the actual route(s) to be used, as described in Section 4.2 in Volume I. Especially for the large DOE sites, there is already a high level of emergency planning and preparedness in place, as discussed in Section E.9 in Volume IV.

State and local police and fire departments have primary responsibility for responding to events that could endanger the health and welfare of their citizens. Most States maintain specialized teams capable of responding to hazardous materials incidents. Through the capabilities these teams currently possess for dealing with potential accidents involving other hazardous materials (e.g., hazardous chemicals), they should already have the capability to deal with most plausible accidents involving low-level waste and low-level mixed waste. Thus additional training for low-level waste and low-level mixed waste would most likely be minimal. However, some states would require additional training to respond to potential radioactive hazards resulting from transuranic waste or high-level waste transportation accidents. Currently, to assist in planning and preparedness for an unlikely, but theoretically possible, transportation emergency involving transuranic waste or high-level waste radioactive shipments, DOE does offer a variety of radiological emergency response resources and information to complement existing emergency preparedness programs, and will continue to maintain a comprehensive emergency management system, particularly for radiological emergencies. The emergency management system includes training courses, Regional Coordinating Offices, and DOE Radiological Assistance Program teams.

Determinations of training for transuranic waste and high-level waste shipments will be made during the transportation planning process. Any potential training or equipment needs for State, Tribal, or local entities could vary greatly. Additionally, who funds the training could also vary. Thus, analyzing the costs of potential training or emergency equipment was considered too speculative; therefore, those costs are not included in the cost estimates in Section 5.3.3 in Volume I of the WM PEIS. DOE does not believe these costs will affect the programmatic decision process.

6.5 Waste Management Program Costs and Schedules

Comment (3227)
The WM PEIS states that for the low-level waste (LLW) Regionalized Alternatives, alpha low-level waste (LLW) would be treated and disposed of at the closest of five sites: the Hanford Site, INEL, Rocky Flats Environmental Technology Site (RFETS), Los Alamos National Laboratory (LANL), and the Savannah River Site (SRS). Given that approximately 99% of the low-level waste at RFETS is alpha low-level waste, please clarify specifically what this would mean for RFETS.

Response
The WM PEIS LLW Technical Report indicates that, according to the 1992 Integrated Data Base, LLW generated at RFETS would be largely alpha- and uranium/thorium-contaminated. As specified in the footnote to Table 5-10 of the LLW Technical Report, treated alpha LLW would be disposed of at the closest alpha LLW disposal site. This would mean that treated RFETS alpha LLW would be disposed of onsite. The technical report is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final WM PEIS.

Comment (3288)
The Draft PEIS states that costs and risk reductions for the operation of waste treatment, storage, and disposal facilities were calculated based on the assumption that there will be a 50% reduction in the annual generation for each year of the time span considered in the PEIS (Appendix G). However, the costs to achieve such a high reduction have not been factored in.

Response
As stated in Volume IV, Section G.2.2.2, of the WM PEIS cost savings from pollution prevention reductions are estimated for treatment, disposal, and transportation. Because site-specific goals are as yet unavailable, it is assumed that pollution prevention practices reduce new source generation by the same percentage (50%) throughout the DOE complex. There may be additional costs to waste generators to effect such waste generation reductions; however, the costs of making reductions are beyond the scope of this WM PEIS. The savings from waste generation reduction considered here are the waste management cost savings, which may be higher than the net savings.

Comment (3307)
How reliable are the estimates of truck and rail transportation costs?

Response
The cost analysis for truck and rail transportation of wastes between sites provides data that should fall within plus or minus 30% of actual costs. Cost information and assumptions are detailed in Sections C 3.2.2.6 and C.3.2.2.9 in Volume III and described in Volume I, Section 5.3.3, of the WM PEIS.

Comment (3619)
Has or when will repackaging of transuranic waste commence at each applicable site?

Response
Under the No Action Alternative, because there is no disposal of transuranic waste, there would be no reason to retrieve and repackage stored waste. For other alternatives, DOE assumed that retrieval of stored transuranic waste and repackaging after treatment would begin after treatment facilities are constructed.

6.5 Waste Management Program Costs and Schedules

Comment (3699)
Truck transportation is less expensive per load per mile than rail transportation. DOE should not spend taxpayer money on the higher rail transportation costs when such costs are not attributable to any safety or regulatory requirements.

Response
See Volume III, Section C.3.2.2, for a description of the WM PEIS cost-estimating methodology. When selecting transportation modes, DOE will look not only at costs, but at other factors, such as the minimization of impacts to human health and the environment. Transportation planning is described in Section 4.3.10 in Volume I and Appendix E in Volume IV.

Comment (4005)
DOE's insistence that transportation costs are minor in comparison to onsite treatment alternatives has not been documented in the WM PEIS.

Response
DOE believes that the cost estimates presented in the WM PEIS show that transportation costs would be small compared to storage, treatment, and disposal facility life-cycle costs. Volume I, Section 5.3.3, describes the costs evaluated in the PEIS, which included life-cycle costs of facilities plus transportation costs. Sections 6.14, 7.14, 8.14, 9.14, and 10.14 in Volume I of the PEIS describe the costs to manage each waste type. Volume III, Section C.3.2.2, describes the WM PEIS cost-estimating methodology.

6.6 Waste Transportation, General

Comment (344)
Given the City of Tracy's proximity to three freeways, there could be severe consequences to citizens of Tracy if there is a transportation accident. Commentors expressed concern that there are inadequate safeguards for transport of wastes in California.

Response
Actual transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process described in Volume I, Section 4.3.10. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

As shown in Volume I, Section 11.20 of the WM PEIS, shipping waste by truck would result in a combined total of between 12 and 69 potential fatalities from shipping low-level mixed waste, low-level waste, transuranic waste, and hazardous waste over the next 20 years, and for shipping high-level waste over the next 40 years, as shown in Volume IV, Appendix E, and Section 11.20. Shipping low-level mixed waste, low-level waste, transuranic waste, and high-level waste by rail, and hazardous waste by truck would result in a combined total of between 2 and 6 potential fatalities over the same periods.

The results of the transportation analyses conducted in Appendix E show that impacts relating to the transport of waste analyzed in the WM PEIS, which include fatalities from radiation exposure, diesel exhaust emissions, and physical trauma from accidents, are low when compared to nationwide vehicle transportation yearly impacts. Comparatively, from 1971 to 1993, over one million persons were killed by physical trauma in vehicular accidents in the U.S.

DOE is committed to managing its wastes, including transportation of waste, safely and in ways that protect human health and the environment. This includes a commitment to emergency preparedness. DOE participates with other Federal, Tribal, State, and local authorities to sponsor and occasionally fund radiological emergency response training courses throughout the United States. These courses are usually for the benefit of local, State, and Tribal authorities responsible for public safety and emergency responses to accidents or natural disasters.

DOE sites already have emergency plans and equipment to respond to accidents and other emergencies. DOE Order 151.1, provides for Radiological Assistance Program teams consisting of trained experts equipped and prepared to respond to an accident involving a shipment of radioactive materials and assist local emergency response personnel, if requested. State and local authorities require emergency response plans to deal with emergency situations. DOE, the U.S. Department of Transportation, and the Federal Emergency Management Agency can assist in the review and modification of these plans, if necessary.

The WM PEIS Affected Environment Technical Report describes shipping radiological and other hazardous material using interstate highways or rail terminals for each site. In addition, Sections 6.4.2, 7.4.2, 8.4.2, 9.4.2, and 10.4.2 in Volume I, and Appendix E in Volume IV, describe transportation-related impacts.

Comment (1487)
The potential impacts of DOE's proposal to not move waste do not fit with its claims about an excellent transportation record.

6.6 Waste Transportation, General

Response

NEPA requires that DOE evaluate reasonable alternatives, regardless of whether they involve transportation of wastes. The WM PEIS presents alternatives that would minimize waste transportation (Decentralized Alternatives) and that would maximize waste transportation (Centralized Alternatives). DOE also evaluated the option of transporting wastes by rail or truck. In this way, DOE believes that the PEIS analysis includes the impacts of transporting wastes and will permit valid comparisons of potential impacts. DOE is committed to the safe transportation of its waste.

Like other kinds of shipments, radioactive materials in transit have been involved in accidents. In most cases, there was no release of any radioactive material into the environment. When releases have occurred, the material has been cleaned up with no identifiable harm to people or to the environment. No one has ever been killed or seriously injured in an accident involving radioactive materials because of the nature of the cargo.

As shown in Volume I, Section 11.20 of the WM PEIS, shipping waste by truck would result in a combined total of between 12 and 69 potential fatalities from shipping low-level mixed waste, low-level waste, transuranic waste, and hazardous waste over the next 20 years, and for shipping high-level waste over the next 40 years, as shown in Volume IV, Appendix E, and Section 11.20. Shipping low-level mixed waste, low-level waste, transuranic waste, and high-level waste by rail, and hazardous waste by truck would result in a combined total of between 2 and 6 potential fatalities over the same periods.

The results of the transportation analyses conducted in Appendix E show that impacts relating to the transport of waste analyzed in the WM PEIS, which include fatalities from radiation exposure, diesel exhaust emissions, and physical trauma from accidents, are low when compared to nationwide vehicle transportation yearly impacts. Comparatively, from 1971 to 1993, over one million persons were killed by physical trauma in vehicular accidents in the U.S. Estimates of transportation impacts by waste type and alternative are found in Volume I in Tables 6.4-17 and 6.4-18 (low-level mixed waste); Tables 7.4-14 and 7.4-15 (low-level waste); Tables 8.4-8 and 8.4-9 (transuranic waste); Table 9.4-7 (high-level waste); and Tables 10.4-6 and 10.4-7 (hazardous waste).

DOE will consider the impacts of transporting waste, along with many other factors, in the process of making final decisions on the future configuration of the waste management complex.

Comment (1607)

The PEIS should analyze truck transport in relation to the level of service roads in Nevada, and should coordinate with the transportation analysis for NTS now in draft form.

Response

Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. During the transportation planning process the level of service roads and routing is normally addressed. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

6.6 Waste Transportation, General

Section 11.20 in Volume I of the WM PEIS describes combined and cumulative impacts which could occur regionally or Nationally from the transportation of waste. Tables 11.20-1 and 11.20-2 in Volume I summarize the range of combined impacts. The largest number of shipments to or from a single site could occur at NTS, namely a total of 267,000 truck shipments or 100,620 rail shipments (107 and 40 per day, respectively). This number of shipments is well within the capacity of the current transportation network.

The PEIS describes other ongoing DOE NEPA reviews and discusses the relationship of the WM PEIS to those reviews (see Volume I, Section 1.7.4), including the NTS sitewide EIS. The NTS cumulative impacts are described in Chapter 11 (Volume I) of the WM PEIS.

Comment (1618)
The Record of Decision should decide upon the primary use of rail transport (since it is a clear winner and cost factor) and whether intermodal transportation makes sense for all wastes. This is a prime time to address transportation routing, especially to reduce risks, by local consultation on routing.

Response
Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Transportation planning would also include discussion of intermodal transportation if necessary. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

Table 1.5-1 and Section 1.7.3 in Volume I describe the decisions DOE intends to make as a result of the WM PEIS. DOE does not propose to make programmatic decisions on the mode of transport to be used for any wastes. As discussed in Volume IV, Section E.4.2.1, of the WM PEIS, transportation risk analyses used representative routes. These routes are representative because they are consistent with current routing practices. However, these might or might not be the routes actually used. DOE has revised Section 4.3.10 in Volume I to explain how it would select the actual transportation routes for shipping activities. At the time DOE selects a given alternative, it would determine the transportation routes in consultation with the States and other stakeholders.

Although rail shipments appear to result in a lower number of expected fatalities in comparison to truck shipments, in general the risks from both types of transportation would be small. Moreover, even though the estimated risks for rail transportation are lower than those estimated for truck transportation, there is no significant difference in the calculated radiological risks between the two transport modes because of the uncertainties involved in the calculations. "Roadside residents" are not expected to receive a higher exposure from truck shipments than from rail shipments because most truck transportation is expected to occur over the interstate highway system where large setbacks from the roadside exist. On the other hand, the motoring public might receive a higher exposure from truck shipments than members of the public sharing the rail transportation routes. The risks of physical trauma fatalities directly related to traffic accidents suggest rail transport might be less hazardous than truck transport. These differences between impacts of truck and rail transportation become significant only when there are a large numbers of shipments, such as for low-level waste in the Centralized Alternative. Section 7.4.2 in Volume I was revised to incorporate this discussion.

6.6 Waste Transportation, General

Furthermore, a number of factors have been specifically addressed in the transportation assessment conducted for the WM PEIS. First, waste to be shipped by rail could require an additional intermodal transfer (truck/rail) for sites without rail access, which would contribute to the overall risk. (A review of the transportation facilities at 35 DOE sites indicated that 15 have direct rail access on the site, 12 have access within 10 miles, and 8 have access between 10 and 100 miles.) Second, a number of other factors could make rail shipments less desirable than truck shipments. For example, to be cost-effective, rail shipments probably would require the shipment of a large amount of waste at one time. Moreover, rail operations are less flexible or responsive to individual site needs than truck operations. Volume IV, Section E.8.5, describes uncertainties in the comparison of truck and rail transportation modes.

As shown in Volume I, Section 11.20 of the WM PEIS, shipping waste by truck would result in a combined total of between 12 and 69 potential fatalities from shipping low-level mixed waste, low-level waste, transuranic waste, and hazardous waste over the next 20 years, and for shipping high-level waste over the next 40 years, as shown in Volume IV, Appendix E, and Section 11.20. Shipping low-level mixed waste, low-level waste, transuranic waste, and high-level waste by rail, and hazardous waste by truck would result in a combined total of between 2 and 6 potential fatalities over the same periods.

The results of the transportation analyses conducted in Appendix E show that impacts relating to the transport of waste analyzed in the WM PEIS, which include fatalities from radiation exposure, diesel exhaust emissions, and physical trauma from accidents, are low when compared to nationwide vehicle transportation yearly impacts. Comparatively, from 1971 to 1993, over one million persons were killed by physical trauma in vehicular accidents in the U.S.

DOE has used trains in the past including during shipments of foreign research reactor spent nuclear fuel from Charleston, South Carolina, to the SRS in 1994 and 1996, and when shipping low-level waste from FEMP to the Envirocare Site in Utah. The decision to use truck or trains would be addressed during the transportation planning process at each site. Section 4.3.10 in Volume I describes DOE's transportation elements. Tables 4.3-6 and 4.3-7 provide the number of current rail and truck shipments to and from the major DOE sites based on the 1993 Shipment Mobility/Accountability Collection and the Waste Manifest System FY 1993.

Comment (1624)
DOE should explain how truck transport of wastes will have markers and identification symbols.

Response
The characteristics of a material determines how it is to be packaged and labeled for shipping. As discussed in Volume IV, Sections E.3.1 and E.13, DOE will ship all its radioactive and hazardous material according to U.S. Department of Transportation (DOT) and/or NRC regulations identified in Section 1.4.4 in Volume 1 of the WM PEIS. Title 49 of the Code of Federal Regulations, Part 173, delineates DOT shipping requirements that include the proper labeling of a radioactive or hazardous material shipment. The NRC regulations can be found in 10 CFR 71. In addition, any State-specific or Tribal-specific requirements would be addressed at the time of shipment.

6.6 Waste Transportation, General

Comment (1629)
The WM PEIS is not clear about how transportation routing issues are addressed. What is needed in the WM PEIS is a sensitivity to local traffic conditions (e.g., Las Vegas) as opposed to just a highway model.

Response
The WM PEIS transportation analysis is generic and based on programmatic models to enable decisionmakers to compare programmatic management options. Actual transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. The implementation of programmatic waste management decisions at the sites will consider such factors as historical transport modes at waste management sites, existing infrastructures, emergency response training programs and practices, and management skills of local and regional officials.

In conducting transportation activities, DOE will adhere to applicable Federal regulations to ensure that the waste is transported safely and will minimize the potential for impacts to the public and the environment. The U.S. Department of Transportation (DOT) is responsible for national routing regulations, and DOE complies with those regulations. DOT has no railroad regulations. Railroads are private corporations and are not as regulated as the Federal highway system.

DOE used the routing model HIGHWAY 3.1 to determine the representative truck routes and INTERLINE 5.0 to determine the representative rail routes. More information on representative transportation routes is contained in Volume IV, Appendix E, and detailed route characteristics are provided in the technical reports prepared for each waste type. These technical reports are available in the DOE public reading rooms listed in Section 1.9 in Volume 1 of the WM PEIS.

In the WM PEIS analysis, the highest traffic volumes would be generated by a Centralized Alternative for low-level waste. Approximately 125 shipments per day would be expected under this alternative. This number of shipments is well within the capacity of the current transportation network. However, in addition to its commitment to the safe transportation of its radioactive waste, DOE is also concerned with the minimization of impacts to local communities around the sites and along transportation corridors. DOE will be proactive in working with regional entities, States, and carriers in ensuring that the safest routing alternatives are utilized. Transportation planning is described in Volume I, Section 4.3.10, and in Volume IV, Appendix E.

Comment (1645)
DOE should ensure that its process for transporting wastes includes redundant systems to address any potential risks that might occur.

Response
Regulations that govern the transportation of radioactive and hazardous materials are designed to protect the public from the potential loss or dispersal of radioactive and hazardous materials, as well as from routine doses of radiation during transport. The primary regulatory approach for ensuring safety is by specifying standards for the packaging of radioactive and hazardous materials.

6.6 Waste Transportation, General

Although several Federal and State organizations are involved in regulating the transportation of radioactive waste, the U.S. Department of Transportation (DOT) and NRC have primary regulatory responsibility. In addition, DOE has formalized agreements with the NRC and DOT to delineate responsibilities of each agency. All transportation-related activities must be in accordance with applicable regulations of these agencies identified in Section 1.4.4 in Volume I of the WM PEIS.

DOT and EPA regulations have been established to ensure that shipping hazardous waste is accomplished safely and with minimum risk to transportation workers and the public. These regulations, which DOE has adopted as part of DOE Order 1450.1C, cover the packaging, handling, and transporting of hazardous material.

See Section E.3 in Volume IV of the WM PEIS for more information on packaging and transporting radioactive and hazardous wastes.

Comment (1647)
DOE should favor transporting wastes the minimum distance, pending complete elimination.

Response
Transportation requirements will be a factor in comparing different WM PEIS alternatives (see Volume I, Section 1.7.3). DOE is required to analyze reasonable alternatives in the WM PEIS, the following would have the lowest number of shipments: the No Action Alternative for low-level mixed waste (none for truck and rail); the Decentralized Alternative for low-level waste (24,420 for truck and 9,210 for rail); the No Action Alternative for transuranic waste (none for truck and rail); the No Action Alternative for high-level waste (19,872 for truck and 3,975 for rail) and the No Action Alternative for hazardous waste (34,000 for truck as the predominant transportation mode).

As shown in Volume I, Section 11.20 of the WM PEIS, shipping waste by truck would result in a combined total of between 12 and 69 potential fatalities from shipping low-level mixed waste, low-level waste, transuranic waste, and hazardous waste over the next 20 years, and for shipping high-level waste over the next 40 years, as shown in Volume IV, Appendix E, and Section 11.20. Shipping low-level mixed waste, low-level waste, transuranic waste, and high-level waste by rail, and hazardous waste by truck would result in a combined total of between 2 and 6 potential fatalities over the same periods.

The results of the transportation analyses conducted in Appendix E show that impacts relating to the transport of waste analyzed in the WM PEIS, which include fatalities from radiation exposure, diesel exhaust emissions, and physical trauma from accidents, are low when compared to nationwide vehicle transportation yearly impacts. Comparatively, from 1971 to 1993, over one million persons were killed by physical trauma in vehicular accidents in the U.S. Thus, while the PEIS does not consider eliminating transportation, the analysis finds that the potential transportation impacts would be low when compared to yearly vehicular accidents.

DOE is strongly committed to pollution prevention, which is achieved through (1) reducing the amount of waste generated and (2) recycling wastes. Source reduction by waste generators in Defense Programs, Energy Research, and other DOE programs will reduce the amount and radioactivity level of waste sent to the Waste Management Program, the cost of constructing and operating these waste management facilities, the amount of transportation, and the health risks to the public and workers. Each DOE site has

6.6 Waste Transportation, General

Waste Minimization and Pollution Prevention Programs and plans in place. Appendix G (Volume IV) of the WM PEIS addresses pollution prevention at a programmatic level.

Comment (1651)
For low-level mixed waste, the Regionalized Alternative involves too much transportation, although it is common knowledge that transportation puts the most people at risk. It would be better to wait until treatment technologies are available that reduce health risks.

Response
Deciding what role various DOE sites will have in waste management activities will involve trade-offs of many factors, including transportation risk and cost of facility construction. In general, minimizing transportation risks maximizes the number (and cost) of treatment facilities.

It takes time to develop new technologies and waiting for new technologies would result in untreated wastes being stored for a longer period. This might not be acceptable to residents near the sites or to regulators. RCRA, the Federal Facility Compliance Act, and the Site Treatment Plans encourage DOE to treat mixed waste rather than indefinitely storing them until new technologies would make treatment less problematic.

Comment (1670)
Increased use of rail transportation could significantly reduce both risk and cost for all alternatives except in the case where there is no offsite transportation; therefore, the risks of all alternatives for low-level waste disposal would be comparable with regard to health risks. Cases show cost reductions ranging from $30 million to $2 billion. Risks reductions range from 8% to 80%. In the current analysis, the motoring public and roadside residents would experience the greatest portion of total risk in order to achieve relatively modest reductions in future risks to communities that are near DOE facilities. Alternatives using rail transportation more than they are used at present should be considered, including maximum use of train transportation reasonably possible.

Regarding NTS, rail transportation could reduce concerns about the environmental management activities in Nevada. Currently, truck shipments travel primarily through the largest cities in Nevada and then to NTS, due to routing restrictions imposed by U.S. Department of Transportation regulations. Rail shipments could allow greater DOE discretion in the development of alternative routes that could avoid these areas, because currently there are no rail routing regulations.

There should be a rail system for transporting low-level waste and high-level waste to Nevada, and the WM PEIS should consider transporting waste to the NTS only by rail.

Response
Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

Although rail shipments appear to result in a lower number of estimated potential fatalities in comparison to truck shipments, in general the risks from both types of transportation are small.

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Moreover, even though the estimated risks for rail transportation are lower than those estimated for truck transportation, there is no significant difference in the estimated radiological risks between the two shipping modes because of the uncertainties involved in the calculations. "Roadside residents" are not expected to receive a higher exposure from truck shipments than from rail shipments because most truck shipping are expected to travel over the interstate highway system where large setbacks from the roadside exist. On the other hand, the motoring public might receive a higher exposure from truck shipments than members of the public sharing the rail transportation routes. The risks from injury directly related to traffic accidents suggest rail transportation might be less hazardous than truck transportation. Section 7.4.2, Volume I, of the Final WM PEIS was revised to incorporate this information.

Furthermore, a number of factors have been specifically addressed in the transportation assessment conducted for the WM PEIS. First, waste to be shipped by rail could require an additional intermodal transfer (truck/rail) for sites without rail access, which would contribute to the overall risk. (A review of the transportation facilities at 35 DOE sites indicated that 15 have direct rail access onsite, an additional 12 have access within 10 miles, and 8 more have access between 10 and 100 miles.) Second, a number of other factors could make rail transportation less desirable than truck transportation. For example, to be cost-effective, rail transportation probably would require the shipment of a large amount of waste. Moreover, rail operations are not very flexible or responsive to individual site needs. A discussion of uncertainties involved when comparing the truck and rail transportation impacts is presented in Appendix E, Section E.8.5, in Volume IV of the WM PEIS.

Regarding NTS, because rail lines do not currently extend onto that site, a rail line would have to be built. The construction and operation of this rail line could result in significant environmental impacts. Therefore, appropriate NEPA review would be needed before construction of a rail line could begin.

Comment (1783)
A commentor was "disheartened that a systematic consideration of the potential dangers of transporting materials to" WIPP and Yucca Mountain was not included in the WM PEIS. The commentor lives in Colorado and is also concerned that Interstate 70 and Interstate 25 will become major routes for the transportation of nuclear wastes.

Response
Radioactive materials are shipped every day on U.S. interstate highways. Most shipments involve small quantities of material with low levels of radioactivity. A small percentage of shipments involve materials with higher levels of radioactivity, such as commercial radioactive spent fuel from nuclear power plants. Safety is built into the transportation system for radioactive material shipments to protect the public, transportation workers, and the environment. DOE has an excellent record of safely transporting waste and nuclear materials over the last 40 years.

Chapters 6 through 10 in Volume I of the PEIS provide information and results of potential transportation-related impacts. Appendix E in Volume IV contains transportation analyses, including an evaluation of the impacts of all transuranic waste that would go to WIPP and all high-level waste that would go to Yucca Mountain. However, DOE will not make the decisions whether to use WIPP or Yucca Mountain on the basis of the WM PEIS. DOE has prepared the WIPP SEIS-II to evaluate disposal at WIPP. The Yucca Mountain EIS is currently being prepared.

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Transport of spent nuclear fuel to a geologic repository is outside the scope of the WM PEIS, although these shipments were considered in Section 11 (Volume I) on cumulative impacts. Shipment of spent nuclear fuel to Yucca Mountain is being evaluated in the Yucca Mountain Repository EIS.

Comment (1954)
A commentor advised against transporting high-level radioactive wastes through population centers and suggested establishing repositories close to sources until a final system of transportation and disposal, avoiding population centers, is agreed upon.

Response
Transportation mode and routing decisions for high-level waste will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

DOE must comply with U.S. Department of Transportation (DOT) and NRC regulations identified in Section 1.4.4, Volume I of the WM PEIS, to transport high-level radioactive waste. A high-level waste shipment requires advance approval from DOT-designated State agencies for alternative routes that would be used for highway shipments. If approved by NRC and DOT, high-level waste could be transported through population centers if an alternative route is not available.

Comment (2054)
Moving wastes between sites is problematic.

Response
NEPA requires that DOE evaluate reasonable alternatives when preparing an EIS. In this PEIS, four categories of alternatives are analyzed for each waste type including No Action, Decentralized, Regionalized, and Centralized. The number of transportation shipments were evaluated for each alternative. A Centralized Alternative requires the most shipments and a No Action Alternative requires the least. The cost sections in each waste-type chapter, Sections 6.14, 7.14, 8.14, 9.14, and 10.14 in Volume I of the WM PEIS, show the costs associated with siting and transportation decisions. In many alternatives it is more cost-effective to transport waste to another site, rather than to build a facility.

Transportation is an integral component of the alternatives being considered for each type of waste considered in the WM PEIS. For some alternatives, radioactive waste would be shipped between the DOE sites at various stages of the treatment, storage, and disposal process. The magnitude of transportation-related activities range from minimal for decentralized approaches to significant for some centralized approaches.

The WM PEIS includes a detailed assessment of the risks of a complete range of credible transportation accidents for both rail and truck transportation, including low-probability/high-consequence and high-probability/low-consequence accidents. Both radiological and nonradiological causes contribute to the overall transportation risk. In general, the radiological risks from waste shipments (i.e., risks associated with the radioactive nature of the waste) tend to be less than or equal to the nonradiological risks (i.e., risks from traffic accidents unrelated to the radioactive cargo). For high-level waste, the radiological and

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nonradiological risks are roughly equal. For the other waste types, radiological risks are less than the nonradiological risks. Thus, the greatest risk tends to be from physical trauma.

With respect to the radiological risk, by far the dominant component would be exposure to external radiation during routine conditions. The accident component of the radiological risk (which takes into account probability and consequence) would generally be very small. Accident risks would be small because accidents are rare in general, most accidents would not involve significant releases of radioactive material, and the consequences of most accidents would not be severe.

Even though the overall accident risks would be small, the PEIS presents the consequences of the most severe credible transportation accidents (assuming they occurred)--which are of very low probability--for each waste type to indicate the maximum foreseeable accident. Finally, all risks would be directly proportional to the total shipment mileage.

Appendix E in Volume IV of the PEIS contains a detailed the transportation risk assessment.

Comment (2309)
A major problem not evaluated in the WM PEIS is transportation of the waste. DOE's strategy should (1) involve site-specific advisory boards, local communities, and the public to ensure minimal transportation impacts when routes are selected; (2) stop total reliance on DOE regulations, and (3) review the New Mexico Supreme Court decision *Komis v. The City of Santa Fe*. Otherwise, there is a potential for considerable litigation and delay of final decisions.

Response
The transportation of each waste type for treatment and disposal is an integral component of the alternatives considered in the WM PEIS, including both truck and rail transportation. To support programmatic decisions, the analysis of transportation routing is generic. Before new waste management facilities are sited, sitewide or project-level NEPA reviews would analyze transportation issues in greater detail.

Both the programmatic and site-specific NEPA analyses provide opportunities for the public to provide input. Scoping meetings, workshops, and public hearings on the Draft WM PEIS involved the public and interested stakeholders. DOE is developing a "National Dialogue" initiative, which includes the waste management programs as well as other DOE programs concerning intersite management of nuclear materials. The objective is to enhance integrated decisionmaking, exchange information, and provide a forum for discussion of public concerns. This initiative is discussed in Section 1.8.2 in Volume I of the Final WM PEIS.

DOE complies with U.S. Department of Transportation and NRC transportation regulations, which contain safety standards that have been very effective in the past. Like other kinds of shipments, radioactive materials in transit have been involved in accidents. In most cases, there was no release of any radioactive material into the environment. When releases have occurred, the material has been cleaned up with no identifiable harm to people or to the environment. No one has ever been killed or seriously injured in an accident involving radioactive materials because of the nature of the cargo. Section 4.3.10.1 has been revised to better describe the process DOE uses in planning transportation activities.

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Sections 4.3.10, 6.2.4, 7.2.4, 8.2.4, 9.2.4, and 11.20 in Volume I, and Appendix E in Volume IV provide more detail on transportation issues.

The decision of New Mexico's Supreme Court in *Santa Fe v. Komis*, 845 P.2d 753 (N.M. 1992), addressed the issue of damages due landowners whose property had been condemned for a highway to the Waste Isolation Pilot Project. The decision does not implicate the analysis of potential impacts of transporting wastes under NEPA, and is unlikely to apply in situations that do not involve a government's use of its power of eminent domain to condemn private property.

Comment (2653)

Does Table 8.4-8 in Volume I include the effects of transportation to WIPP for disposal, which might help to discriminate between alternatives? If so, why aren't the impacts of regionalization alternatives (which would include shipment of some material between sites and then to WIPP) greater than those of centralization at WIPP (which would only include shipping everything to WIPP one time)?

Response

The estimated number of traffic-accident fatalities presented in Table 8.4-8 are a function of the total number of miles traveled by the trucks. Table E-21 in Volume IV, provides a summary of mileage and shipment information for TRUW truck shipments. The total mileage traveled under the Regionalized Alternatives would be: Regionalized Alternative 1, 38.3 million; Regionalized Alternative 2, 34 million; and Regionalized Alternative 3, 37.2 million. DOE estimates 38.7 million miles for the Centralized Alternative. Therefore, the potential traffic-accident fatality estimates for the Regionalized and Centralized Alternatives are similar.

The transportation mileage estimates include shipments to WIPP for disposal. One reason the risks are so high for the Centralized Alternative versus the Regionalized Alternatives is that, under the Centralized Alternative, the remote-handled TRUW would still be shipped to Hanford or ORR for treatment before it is shipped to WIPP; shipments of remote-handled TRUW account for more than half of the total shipments. Of the contact-handled TRUW shipments, all sites would ship untreated waste to WIPP under the Centralized Alternative. Under the Regionalized Alternatives, the sites with the majority of the contact-handled TRUW would not ship waste for treatment. As a result of treatment, these sites would ship a smaller volume of treated waste to WIPP, thereby reducing the number of shipments necessary. This would then result in an overall decrease in the number of shipments under Regionalized Alternatives 2 and 3.

Comment (2659)

Is waste from PGDP representative of the waste that could possibly be involved in the other accident scenarios? See Volume IV, Section E.7.4.4.

Response

As stated in Section E.7.4.4, Volume IV, of the WM PEIS the low-level mixed waste from PGDP would result in the highest transportation accident doses for the most severe accidents. This is due to the higher level of alpha-emitting radionuclide contamination in the organic liquid low-level mixed waste, and the characteristics of the shipping route. Therefore, results using low-level mixed waste from PGDP would be an upper limit on the impacts from accidents involving low-level mixed waste from other sites. That is, low-level mixed waste from the other sites would be expected to result in lower doses for the same type of accident. Details of the low-level mixed waste accident analysis are

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presented in supporting technical reports that are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the WM PEIS.

Comment (3123)
It is not clear why DOE says the analysis done for the PEIS is *not* to replace results of previous transportation analyses, given that the PEIS includes both new International Commission on Radiological Protection factors and new data on waste inventories.

Response
Appendix E, Volume IV, of the WM PEIS contains the radioactive and hazardous waste transportation risk assessment for the WM PEIS. Section 1.8, Volume I, describes the WM PEIS relationship to other DOE actions and programs. The reason for not replacing results of previous transportation analyses with the transportation analyses in Appendix E is because: some decisions have already been made and actions are underway or completed; site-specific EIS documents could contain actual transportation routes rather than the generic routes analyzed in the WM PEIS; or the radiological profiles used for site transportation analyses are more specific than the maximum allowable external dose rates for exclusive-use shipments identified in Section E.3.1 (Volume IV). The results of the transportation analyses conducted in Appendix E show that impacts relating to the transport of wastes analyzed in the WM PEIS are low when compared to nationwide vehicle transportation yearly impacts.

The results of the transportation analyses conducted in Appendix E show that impacts relating to the transport of waste analyzed in the WM PEIS, which include fatalities from radiation exposure, diesel exhaust emissions, and physical trauma from accidents, are low when compared to nationwide vehicle transportation yearly impacts. Comparatively, from 1971 to 1993, over one million persons were killed by physical trauma in vehicular accidents in the U.S.

Actual transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

Comment (3124)
The transportation risk assessment should examine traffic and infrastructure impacts, given that there could be a total of 295,000 truck shipments or 106,000 rail shipments (56 and 21 per day, respectively) to Yucca Mountain or NTS. This level of shipments could create additional risks due to traffic increases or infrastructure deterioration.

Response
Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

Section 11.20 in Volume I of the WM PEIS describes combined and cumulative impacts which could occur regionally or Nationally from the transportation of waste. Tables 11.20-1 and 11.20-2 in Volume I summarize the range of combined impacts. The largest number of shipments to or from a single site could occur at NTS as a result of shipments of low-level mixed waste (Regionalized Alternative 3) and low-level waste (Centralized Alternative 2), and the shipments of high-level waste if Yucca Mountain is found to be suitable for the disposal of defense high-level waste (all alternatives).

Traffic and infrastructure impacts would be expected to be minimal at NTS. NTS has a well-established transportation network. Compared to the existing traffic volumes, the impacts from potentially added shipments resulting from waste management operations appear to be minimal. The average *hourly* traffic volumes on the major access roads to the site are well above the *daily* estimates of 56 and 21 truck and rail shipments expected for the waste management alternatives considered.

Comment (3127)
The discussion of the single-canister truck cask does not refer to DOE's development of spent fuel casks or to the Multi-Purpose Canister EIS. Is there any linkage between the Office of Environmental Management high-level waste program and these other efforts?

Response
Several casks for shipment of civilian spent nuclear fuel have been licensed by NRC. The Final Evaluating Container Systems for the Management of Naval Spent Nuclear Fuel EIS (formerly, Multi-Purpose Canister EIS) was published in November 1996. The EIS was prepared by the Navy, with DOE as a cooperating agency. That EIS addresses only naval spent nuclear fuel. Storage and disposition of spent nuclear fuel are outside the scope of the WM PEIS. There is no linkage between the Navy's evaluation of the multi-purpose canister and DOE's evaluation of its High-Level Waste Program.

Comment (3209)
The Draft WM PEIS states that the transportation risk assessment does not address how increased levels of transportation might affect *local* traffic flow, noise levels, logistics, or infrastructure. However, given that many of the proposed alternatives result in a tremendous volume of shipments, the increased traffic and potential infrastructure degradation does need to be addressed in some manner.

Response
As a national and programmatic study, the WM PEIS assumes representative transportation routes by rail and truck. The WM PEIS explores ranges of alternatives and is intended to assist decisionmakers and the public in comparing the transportation risks associated with the alternatives considered. The representative routes were selected to be consistent with existing routing practices and all applicable routing regulations and guidelines.

Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

Section 11.20 in Volume I of the WM PEIS describes combined and cumulative impacts, which could occur regionally or nationally from the transportation of waste. Tables 11.20-1 and 11.20-2 in Volume I summarize the range of combined impacts. The largest number of shipments to or from a single site could occur at NTS, namely a total of 267,000 truck shipments or 100,620 rail shipments

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(107 and 40 per day, respectively). This number of shipments is well within the capacity of the current transportation network.

Comment (3217)
A commentor expressed satisfaction with DOE's acknowledgment in Appendix E that WIPP protocols are "representative" of those likely to be adopted for future DOE shipping campaigns. In addition, in Section E.9, the Draft WM PEIS states that the transportation plan developed for the WIPP campaign "can be representative of those for future major DOE programs for waste transportation." Some commentors strongly agree with this statement. However, the WIPP transportation plan includes more than the features listed. One very important component of the WIPP transportation safety program is the fact that DOE pre-designated routes from each generator site to the WIPP facility several years prior to the beginning of shipments. This allows the States and Native American Tribes along the transport corridor to focus their training and other emergency preparedness activities along those routes, instead of having to divide their time and resources among all the potential routes that would qualify using Federal routing criteria. This must be done both for highway and rail routing to allow a focus on emergency preparedness efforts.

Response
Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized. Training and emergency preparedness are addressed during the transportation planning process.

As discussed in Section E.4.2.1 in Appendix E (Volume IV) of the WM PEIS, transportation risk analyses used representative routes. These routes are deemed representative because they are consistent with current routing practices but may or may not be the routes actually used if the shipping campaign were to occur in the future. Section 4.3.10 in Volume I has been updated to explain how DOE would select the actual transportation routes for shipping activities. Most transportation routes for radioactive waste shipments occur over interstate highways and are consistently used regardless of the waste type being shipped.

Comment (3221)
Many of DOE's wastes do not have approved transport packaging licensed to meet regulatory standards.

Response
Any waste shipped by DOE will meet existing packaging requirements as set forth by the U.S. Department of Transportation, EPA, and NRC, as applicable. The radioactive wastes considered in the WM PEIS already have approved packaging or have designs ready for approval. A discussion of the types of packaging considered for each waste type can be found in Volume IV, Section E.3.

Comment (3239)
DOE should (1) directly involve corridor States and Tribes in preparing for large-scale nuclear waste/material shipments; this would include developing rail and truck transportation plans, preferred routes, and procedures prior to shipment (similar to that developed by DOE and the Western States

Governors' Association for transuranic waste shipments to WIPP); (2) use only shipping containers that can be manufactured to meet current Federal transportation safety requirements; and (3) provide accurate projected shipment information (quantities, schedules, etc.), as well as necessary assistance and lead time for State/Tribe emergency response preparation. These recommendations are based on the following concerns:

- Transuranic shipment routes in California traverse densely populated urban regions, such as the Los Angeles Basin, that are subject to long traffic delays and congestion.

- DOE has used outdated packaging (Polypanther) for transuranic waste shipments in California that provide far less protection than the double-contained TRUPACT II planned for transuranic waste shipments to WIPP in New Mexico.

- Emergency response capability to handle a potential accident involving transuranic materials needs improving.

- DOE needs to provide the State with accurate, reliable information on planned transuranic waste shipments and provide adequate lead time for emergency response preparation.

Response

Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process described in Section 4.3.10, in Volume I of the WM PEIS. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

Due to its programmatic nature, the WM PEIS uses representative routing for purposes of analysis and comparison of siting options. For the WM PEIS, representative truck and rail routes were determined for all possible pairs of origin and destination sites. The routes were selected to be consistent with existing routing practices and all applicable routing regulations and guidelines; however, because the routes were determined for the purposes of risk assessment, they do not necessarily represent actual routes that would be used to transport waste in the future. Transportation planning is described in Section 4.3.10 in Volume I.

Specific transportation issues, including the determination transportation mode(s), will be addressed when actual waste management facilities are sited after sitewide or project-level NEPA review. The implementation of programmatic waste management decisions regarding actual transportation routes, modes, etc., will consider within its analysis of risks to human health and the environment such factors as historical transport modes at waste management sites, existing infrastructures, emergency response training programs and practices, and management skills of local and regional officials.

The route characteristics most important to risk assessment include the total shipping distance between each origin-and-destination pair and the fractions of travel in rural, suburban, and urban zones of population density. The route selected determines the total potentially exposed population along a route and the expected frequency of transportation-related accidents. U.S. Department of Transportation (DOT) routing regulations for public highways are contained in 49 CFR 177 (also known as HM-164). DOT has no rail routing regulations. A vehicle transporting a shipment of a "highway route controlled quantity" of

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radioactive materials is required by HM-164 to use the interstate highway system except under defined circumstances. Carriers are required to use interstate circumferential or bypass routes, if available, to avoid populous areas. Any State or Native American tribe may designate other "preferred highways" in place of or to supplement the interstate system. However, DOT can prohibit State and local restrictions. Further information on representative transportation routes is contained in Volume IV, Appendix E, and detailed route characteristics are provided in the technical reports prepared for each waste type.

Section E.3.1 describes packaging requirements. All transportation-related activities must be in accordance with applicable regulations of DOT and NRC specified in 49 CFR 173 and 10 CFR 71. Section E.3.2 identifies representative packing and shipment/configurations by waste type.

DOE is concerned the need for emergency preparedness in an around its sites. Emergency response plans are required on sites and in the surrounding communities by Federal, State, and local authorities that deal with emergency situations such as floods, tornadoes, and other natural or man-made disasters. These plans are continually updated. DOE, DOT, and the Federal Emergency Management Agency are available to assist with review of State and local authorities with their emergency plans.

Emergency planning and preparedness is best done when actual shipping activities are in the planning stages. This includes coordinating notifications to State, Tribal, and local authorities where required. The WM PEIS is a programmatic document that uses representative routes (see Section E.4.2 in Volume IV) and source terms (Section E.6.1) to obtain a nationwide perspective on the risks associated with transporting hazardous waste within the DOE complex. More detailed transportation planning will be performed at the site level when specific actions are decided. Such planning will be able to appropriately address the emergency planning measures required as determined by the specific waste to be shipped and the actual route(s) to be used, as described in Section 4.2 in Volume I. Especially for the large DOE sites, there is already a high level of emergency planning and preparedness in place, as discussed in Section E.9 in Volume IV.

State and local police and fire departments have primary responsibility for responding to events that could endanger the health and welfare of their citizens. Most States maintain specialized teams capable of responding to hazardous materials incidents. Through the capabilities these teams currently possess for dealing with potential accidents involving other hazardous materials (e.g., hazardous chemicals), they should already have the capability to deal with most plausible accidents involving low-level waste and low-level mixed waste. Thus additional training for low-level waste and low-level mixed waste would most likely be minimal. However, some states would require additional training to respond to potential radioactive hazards resulting from transuranic waste or high-level waste transportation accidents. Currently, to assist in planning and preparedness for an unlikely, but theoretically possible, transportation emergency involving transuranic waste or high-level waste radioactive shipments, DOE does offer a variety of radiological emergency response resources and information to complement existing emergency preparedness programs, and will continue to maintain a comprehensive emergency management system, particularly for radiological emergencies. The emergency management system includes training courses, Regional Coordinating Offices, and DOE Radiological Assistance Program teams.

DOE sites have plans and equipment to respond to accidents and other emergencies. DOE requirements for emergency response preparedness are contained in DOE Order 151.1.

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Comment (3272)
The WM PEIS should fully address the economic and environmental impacts of routing waste shipments through the Las Vegas urban area and smaller communities in Clark County. DOE should obtain significant input by local government and Tribal stakeholders and should address a number of transportation-related issues including the cumulative impacts of rail or truck shipment of wastes from different DOE programs through Clark County; the health and safety risks associated with routing waste shipments along interstate highways that come close to or through densely populated urban areas; the need for local development of institutional controls and preparation for transportation emergencies, which could drain public funds; the potential for land along designated transportation routes to be devalued and changed from more to less desirable uses, and for tourism to decline; and the additive impacts on air quality due to traffic increases, congestion, and travel time.

Response
The health and safety risks associated with routing waste shipments along interstate highways and through urban areas is small, as identified in Appendix E. Section E.2.4 of the WM PEIS states that the impacts of transporting radioactive materials were evaluated for both routine transportation and for transportation accidents. The estimated health risk associated with routine transportation results from the potential exposure of individuals to low-levels of external radiation near the surface of shipments. The risk from transportation accidents involves the potential release and dispersal of radioactive material into the environment, with individuals exposed through a number of pathways, including inhalation and ingestion of contaminated food.

Chapter 11 of the WM PEIS provides the cumulative impacts from other programs. The impacts from transportation are among those considered. More information on cumulative impacts for NTS can be found in Section 11.10. Other sources of risk include the shipments of DOE and commercial spent nuclear fuel, other DOE nuclear materials, radioisotopes used in medicine and other activities, and commercial waste. Table 11.20-3 summarizes existing and reasonably foreseeable shipments of radioactive materials that have been included in the assessment of cumulative transportation impacts, but are not a part of the alternatives. A discussion of these other shipments is contained in DOE, 1995d.

Emergency preparedness for transportation of radioactive wastes is a vital part of the transportation planning process. State and local police and fire departments have primary responsibility for responding to events that could endanger the health and welfare of their citizens, including transportation accidents. Most States maintain specialized hazardous materials response teams that could be activated to provide technical assistance and mitigation during emergencies. State teams are activated at the request of an Incident Commander or other appropriate State or local authority. The carrier also would provide technical response assistance to emergency responders as required by event scene conditions.

DOE sites already have emergency plans and equipment to respond to accidents and other emergencies. DOE requirements for emergency response preparedness are contained in DOE Order 151.1. DOE also participates with other Federal agencies and State and local authorities to sponsor and occasionally fund radiological emergency response training throughout the United States. Training is usually provided for those responsible for public safety and emergency response to natural disasters or accidents. DOE provides Radiological Assistance Program teams of trained experts who are equipped and prepared to respond to an accident involving a shipment of radioactive materials, and to assist

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State, local, and Tribal emergency response personnel, if necessary. DOE, the U.S. Department of Transportation, and the Federal Emergency Management Agency assist in review and modification of State and local emergency response plans, if requested.

Emergency planning and preparedness is best done when actual shipping activities are in the planning stages. The WM PEIS is a high-level programmatic document that uses representative routes (see Section E.4.2) and source terms (see Section E.6.1) to obtain a nationwide perspective on the risks associated with transporting hazardous waste within the DOE complex. More detailed transportation planning will be performed at the site level when specific actions are decided. Such planning will appropriately address the emergency planning measures required as determined by the specific waste to be shipped and the actual route(s) to be used, as described in Section E.4.2. Especially for the large DOE sites, there is already a high level of emergency planning and preparedness in place, as discussed in Section E.9.

DOE believes it has fully analyzed at the programmatic level, the human health, environmental, and socioeconomic impacts of the waste management alternatives. DOE recognizes that siting of waste management facilities might be perceived negatively by some persons; however, DOE believes that analysis of economic impacts of such negative perceptions would be too speculative. DOE is committed to managing its wastes to protect human health and the environment and will work with local communities to help ensure that negative perceptions and potential negative impacts are minimized.

Sections C.4.2.1.2.1.3 and C.4.2.1.2.2.2 in Volume III of the WM PEIS identify the transportation sources assumptions that were used in the air quality impacts analysis. DOE believes the additive impacts on air quality due to traffic increases, congestion, and travel time are generally small to moderate, as shown in the Volume II Site Data Tables for NTS.

Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process described in Section 4.3.10, in Volume I of the WM PEIS. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

Comment (3309)
The WM PEIS estimate that rail transport would save \$1.7 to \$1.8 billion in 1994 dollars does not reconcile with DOE Nevada's judgment that rail provides no benefit for the types of low-level wastes currently disposed of at the Nevada Test Site (NTS). What costs per ton-mile are assumed in estimates of rail transport costs, and how do these compare with the industry average for freight shipment (2.5 cents per ton-mile in 1993)? A \$1.7 to \$1.8 billion savings in operations costs (present value of about \$1 billion over 20 years) would probably build a rail spur to NTS. The total costs of Centralized Alternatives 2 and 4 (which include the \$1.7 to \$1.8 billion additional costs of truck transport) could cover the capital costs of a rail spur. Is this an option that is available for consideration?

Truck transport costs for low-level wastes are estimated at about \$1,520 per cubic meter (\$2.25 billion under Centralized Alternative 2, divided by 1,480,000 cubic meters), but at only \$265 per cubic meter for low-level mixed waste disposal (\$0.06 billion under Regionalized Alternative 3, divided by

226,000 cubic meters). What accounts for the difference? Is the source reduction in mixed waste treatment greater than that in low-level waste treatment?

Response

The WM PEIS is a programmatic analysis of alternatives for treating, storing, and disposing of DOE waste. It does not compare specific transportation routes because decisions on routes will not be made based on the WM PEIS analysis. Therefore, it is beyond the scope of the WM PEIS to consider a possible rail spur to NTS. The routes in the PEIS were used for comparison of impacts across sites, and are intended to be representative of possible routes.

The transportation cost analyses described in Volume I, Section 5.3.3, of the WM PEIS show that costs are identified on a national level by DOE waste types. Cost savings shown in Sections 6.10, 7.10, 8.10, 9.10, and 10.10 in Volume I, for example, when truck is compared to rail, are based on a variety of assumptions identified in Appendix E in Volume IV. Therefore, transferring national savings to one site in order to make a construction decision is not appropriate.

Centralized Alternative 2 for low-level waste identifies a cost difference of $1.82 billion between truck and rail transport. The commentor suggests utilizing this savings to build a rail spur at NTS. The $1.82 billion dollar cost savings is based on all sites using rail transport from Centralized Alternative 2 for low-level waste. Thus, the savings cannot be transferred just to NTS.

Other factors also affect the rail transport cost estimates. First, Volume I, Section 5.3.3, describes that the cost analysis provides data that should fall plus or minus 30% of actual costs using the waste volumes quantified in the alternatives. Second, waste to be shipped by rail could require an additional intermodal transfer (truck/rail) for sites without rail access, which would contribute to the overall cost. Third, a review of the transportation facilities at 35 DOE sites indicated that 15 have direct rail access on the site, 12 have access within 10 miles, and 8 have access between 10 and 100 miles. Other factors could also make rail shipments less desirable than truck shipments. For example, to be cost-effective, rail shipments probably would require the shipment of a large amount of waste at one time. Moreover, rail operations are less flexible or responsive to individual site needs than truck operations.

Although Centralized Alternative 2 for low-level waste results in a cost savings using rail over truck, rail transport is more expensive than truck transport for high-level waste. Therefore, a rail spur at NTS cannot be justified on a national savings cost comparison.

Actual transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

Transportation costs were calculated based on the number of shipments, the mass quantities requiring shipment, and the mileage between generator sites and treatment sites, generator sites and disposal sites, and treatment sites and disposal sites. Thus, the transportation costs also vary between the Regionalized and Centralized Alternatives based on the number of facilities to be used. Regionalized Alternative 3 for low-level mixed waste would require approximately 11,000 truck shipments.

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Centralized Alternative 2 for low-level waste would require approximately 257,000 truck shipments. This information is contained in Volume I, Tables 6.16-2 and 7.16-2, respectively.

The commentor's comparison of costs between Centralized Alternative 2 for low-level waste and Regionalized Alternative 3 for low-level mixed waste cannot be made using just summary table transportation cost information. Volume I, Section 5.3.3, describes that trip price and cost-per-mile prices were established by reviewing transportation industry tariffs and practices. In order to compare transportation costs, information contained in Appendix E (Volume IV) is required. For the comparison cited by the commentor, the Centralized Alternative 2 for low-level waste (Volume IV, Table E-15) will include approximately 257,270 shipments covering 505 million miles. Volume IV, Table E-28, identifies that Regionalized Alternative 3 will include approximately 10,990 shipments over 14.9 million miles. By dividing the total costs by mileage, the cost of transporting for Centralized Alternative 2 low-level waste is $4.95 per mile and the cost of transporting Regionalized Alternative 3 low-level mixed waste is $4.03 per mile. The number of shipments also factors into the cost. Thus, the comparison identified by the commentor is not valid. The cost evaluations should rather be based on information contained in Appendix E.

The cost methodology is summarized in Volume III, Section C.3.2.2.6, and is explained in greater detail in a technical report cited in Appendix C.

Comment (3397)
Volume I, Table 10.16-1: Mileage figures for Regionalized Alternative 2 seem wrong. Waste would be shipped the greatest distance for treatment at DOE sites, yet the total mileage figure is among the lowest.

Response
The mileage for Regionalized Alternative 2 is less than the mileage for Regionalized Alternative 1. It might appear at first glance in comparing the hazardous waste alternatives presented in Figures 10.3-1 through 10.3-4 in Volume I of the WM PEIS that waste would be shipped the greatest distance under Regionalized Alternative 2. Because only 10% of nonwastewater hazardous waste is shipped to commercial treatment centers under Regionalized Alternative 2, the number of shipments is 34,000 rather than 50,000 under Regionalized Alternative 1 (see Table 10.4-7); therefore, the number of miles shipped under this alternative is actually less than under Regionalized Alternative 1. Fewer shipments equate to fewer miles. The additional 16,000 shipments under Regionalized Alternative 1 accounts for the vast mileage difference between Regionalized Alternatives 1 and 2.

Comment (3402)
Commentors are concerned about the condition of the rail system in and out of PGDP. There are several crossings that do not have crossing lights. The rails are in questionable condition in some places. There have been accidents with radioactive materials on these rail lines.

Response
If transportation of waste is required, DOE will consult with State and local officials prior to shipment. Any unique transportation concerns for a site will be considered during these consultations. Any measures necessary to mitigate potential transportation risks will be implemented after these consultations. The comments regarding the condition of the rail system in and out of PGDP have been forwarded to the DOE PGDP site office.

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Comment (3613)
There are no transportation maps found within the entire WM PEIS in regards to transportation of any type of waste. These maps/routes must be included along with a full analysis of the potential impacts from exposure, unregulated releases, and accidents in order for the WM PEIS to approach meeting NEPA requirements. Analysis must also include alternative routes in the case of a major accident irreparably damaging a route, particularly in cases where only one direct route might be available."

Response
Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process described in Section 4.3.10, in Volume I of the WM PEIS. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

As discussed in Volume IV, Section E.4.2.1 of the WM PEIS, transportation risk analyses used representative routes that are consistent with current routing practices. However, these will not necessarily be the actual routes used. DOE has revised Volume I, Section 4.3.10, to explain how DOE would select the actual transportation routes for waste shipments. Since actual routes are not known, no maps were provided in the WM PEIS. However, a full analysis of the transportation impacts is provided in the WM PEIS in Appendix E. The analysis covers routine exposures to maximally exposed individuals and the collective population, accident risks to the collective populations along the shipping routes, and consequences to maximally exposed individuals and generic local population groups from the postulated most severe accident for each waste type

NEPA requires DOE to evaluate reasonable alternatives when preparing an EIS. NEPA does not require DOE to look at all possible transportation alternative routes. The transportation planning process, described in Section 4.3.10 in Volume I of the PEIS, will identify alternative routes where necessary. Since the transportation activities for the WM PEIS could occur over the 20-year period of analysis, new highways will be constructed and highways currently in use could close. Thus, DOE will continue to be proactive in the transportation planning process to ensure safe transportation throughout.

Comment (3615)
Historically, there have been problems with the TRUPACT Type B container for contact-handled transuranic waste. Are the problems still the same? If not, how exactly have the past problems been resolved? What tests have been conducted to assure that the changes are adequate, and to what degree is safety certain?

Response
The original TRUPACT-I project was abandoned due to potential licensing issues. The TRUPACT-II project has replaced the TRUPACT-I project. The TRUPACT-II canister would be used to transport contact-handled transuranic waste. These containers have been certified by NRC. To achieve NRC approval, these containers must endure fire, water, immersion, and free drops without leakage. Each container has the capacity to hold fourteen 55-gallon drums, two standard (0.9-meter x 1.4-meter x 1.8-meter [3.1-foot x 4.5-foot x 5.9-foot]) waste boxes, or a 10-drum overpack, which fits one standard waste box or ten 55-gallon drums. Each TRUPACT-II has a total payload capacity of 2,835 kilograms (6,250 pounds). Up to three TRUPACT-IIs could be transported on a specially designed trailer, and up to six containers could be carried on a specially-adapted rail car.

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Additionally, during the manufacture of some TRUPACT-IIs, an inspection identified that the welds were inadequate. The TRUPACT-IIs with inadequate welds were rejected for use.

Comment (3616)
Historically, there have been problems with the NUPAC 72B cask. Has the NRC approved this cask for remote-handled (RH) transuranic waste?"

Response
The cask, which was referred to as the NUPAC-72B in the Draft WM PEIS, has been renamed to RH-72B. The original NUPAC-72B cask had not yet received NRC certification. Therefore any "problems" with the NUPAC-72B cask would have occurred while the cask was being developed. DOE currently is awaiting NRC certification of the RH-72B cask. The RH-72B cask must comply with all applicable safety and operational requirements in order to receive certification.

Comment (3667)
What happened to the plan for "parking areas" along the WIPP routes for offsite transportation to reduce the public's exposure?

Response
The WIPP transportation system still incorporates designated parking areas along all routes for use in bad weather. All DOE transportation carriers would be made aware of the WIPP designated parking areas for use in bad weather.

Comment (3672)
How will DOE dispose the absorbent overpacking when hazardous chemicals spill or seep into the packing during routine transportation?

Response
The absorbent overpacking is only needed for shipments of liquid waste, of which there would be very few between sites. If hazardous chemicals were to spill or seep into this packing during routine transportation, the packing itself would then be considered a hazardous material and would be handled according to the type of material it absorbed, and according to applicable regulations.

Comment (3676)
The WM PEIS scope does not include a number of public concerns that have been submitted to DOE in comments to various transportation-related PEIS, SEIS, and DEIS documents--such as safety concerns for the testing of the TRUPACT container, including the fact that the burn test is not done until last. While we understand that NRC regulations state the order of the testing series and burning is last, a worst-case scenario accident in the southwestern portion of the country would be an accident with a gas or propane transport truck where temperatures could reach 1400°F. Yet the burn test only rises to 1275°F.

Response
The burn test is done last because any transportation-related fire would occur after impact. The burn test specified by the NRC in 10 CFR 71.73 requires "an average flame temperature of at least 800°C (1475°F)," which is higher than 1400°F.

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Comment (3696)
The WM PEIS lacks any discussion of the historical transport modes that have been employed by DOE's various proposed sites. Historical modes are significant, since local and regional emergency response officials tend to be trained and familiar with, and have often already committed substantial resources to, managing shipments within such historical modes and routes. Thus, it might not make sense for DOE to suggest that a transport mode be shifted at a particular location based on small variations in modeled accident consequence probabilities if local and regional officials are much more prepared for and skilled in managing the existing transport mode.

Response
Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. Historical transport modes will be a major factor in determining a site's transportation mode. In the transportation planning process, DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

Historical transportation emergency response capabilities of a region affect routing and safe-haven decisions. DOE will consult with local and regional officials prior to large shipping activities. Section 4.3.10 in Volume I of the WM PEIS describes DOE's transportation activities including the transportation planning process.

Comment (3872)
The hazardous waste is dangerous enough. What safety precautions will DOE take during transport of waste in and out of the facilities?

Response
U.S. Department of Transportation and EPA regulations have been established to ensure that shipping hazardous waste is accomplished safely with minimum risk to transportation workers and the public. These regulations, which DOE has adopted as part of DOE Order 1450.1C, cover the packaging, handling, and transporting of hazardous material.

Regulations that govern the transportation of hazardous materials are designed to protect the public from the potential dispersal of hazardous materials. The specification of standards for packaging hazardous materials is the primary regulatory approach for ensuring the public's safety.

As stated in Section E.13 in Volume IV of the WM PEIS, the packaging requirements for a specific hazardous material are determined by the level of hazard the material would present as a result of an accidental release. In the *Hazardous Materials Table* (49 CFR 172.01), which lists more than 4,000 chemicals in alphabetical order by proper shipping name, column eight supplies a reference number to a part of 49 CFR 173. The part specified describes shipping requirements for a particular chemical.

Container acceptability is determined by performance-based tests (e.g., drop strength, leak resistance, hydrostatic pressure, stacking, and vibration) (49 CFR 173). A wide range of performance levels is required because of the broad spectrum of hazard levels presented by different hazardous materials. Hazardous wastes in the DOE complex are shipped mainly by 55-gallon drum or smaller containers,

6.6 Waste Transportation, General

and single-unit trucks will likely be the predominant truck type used. Hazardous waste is shipped in accordance with U.S. Department of Transportation regulations.

Part II of Appendix E of the WM PEIS provides more detail on the hazardous waste transportation risk assessment.

Comment (3948)
DOE has arbitrarily omitted barge and air transportation of nuclear materials from its WM PEIS.

Response
DOE did not arbitrarily omit barge and air transportation of nuclear materials. Section E.2.6 in Volume IV states that although radioactive waste can be transported by various modes, all shipments have been assumed to take place either by truck or rail. Shipments by barge, though feasible for some sites, have not been explicitly considered because this mode of transportation is somewhat limited and is not a reasonable programmatic alternative for the PEIS assessment. Similarly, shipment by aircraft was not considered a reasonable alternative due to cost, safety, and logistics.

Comment (3981)
Both the Portsmouth Plant and PGDP have major rail transport infrastructures already in place, obviously between the two facilities. Risk to the public along this rail route, residents within the region of the sites, and workers onsite from accidents and long-term low-dose exposure should be calculated by DOE as a transportation risk for both of these sites. By eliminating accidents onsite during loading and unloading activities, the agency has eliminated a major source of risk from transportation with low probability, but high impact. Historically, loading and unloading of hot canisters of highly enriched uranium has been a major source of accidents with severe consequences at the Portsmouth Plant.

Response
The transportation of non-waste materials is outside the scope of the WM PEIS. "Hot canisters" of highly enriched uranium are not considered waste and, therefore, were not analyzed in the WM PEIS. The Portsmouth Plant and PGDP have procedures in place to safely load and unload fresh highly enriched uranium canisters.

Loading and unloading of waste onsite was analyzed. DOE has not eliminated accidents onsite during loading and unloading activities. Loading and unloading accidents are evaluated in the WM PEIS as facility accidents. Facility accidents are described in detail in Volume IV, Appendix F. Section F.2.4.1 in Volume IV, Selection and Categorization of Accident Initiators, describes that handling accidents were considered a subset of operational events initiated from within the facility that would initiate an accident. These accident sequences were then classified by frequency categories, as shown in Table F.2-2 in Volume IV.

Transportation of waste between PGDP and the Portsmouth Plant was analyzed for Regionalized Alternatives for low-level mixed waste and low-level waste. The risk associated with the transport of low-level mixed waste and low-level waste between PGDP and the Portsmouth Plant was small. Volume IV, Appendix E, of the WM PEIS contains a detailed transportation risk assessment.

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Comment (4148)
Radiation exposure to the public from high-level nuclear waste shipment trucks and to dock workers unloading the waste at public ports should not be self-regulated by DOE. DOE should be required to keep public radiation exposure lower than the standards set by EPA and NRC.

Response
DOE will manage its waste handling and transportation activities in compliance with all applicable laws and regulations. Moreover, it is DOE's policy to maintain exposures at a level that is as low as reasonably achievable.

Under the Atomic Energy Act, DOE has responsibility for developing its own standards for health and environmental protection for radiological materials. These standards are established in DOE Orders and regulations (e.g., 5400.5 and 10 CFR Part 835) that address the maximum allowable radiation doses for members of the general public and for workers, respectively. These levels are generally at least as low as those established by EPA and NRC for similar exposure situations. For hazardous chemical exposures, DOE complies with exposure levels established by EPA and the Occupational Safety and Health Administration.

The U.S. Department of Transportation (DOT) and NRC have primary regulatory responsibility for the transportation of radioactive waste. In addition, DOE has formalized agreements with the NRC and DOT to delineate the responsibilities of each agency. All transportation-related activities must be in accordance with the applicable regulations of these agencies, as specified in 49 CFR 173 and 10 CFR 71. Section 1.4.4 in Volume I of the WM PEIS describes the DOT and NRC transportation regulations.

Comment (4324)
A commentor asked DOE to contact the national Nuclear Waste Transportation Task Force of Citizens' Alert of Reno, Nevada, (702) 827-4200, to see what they have to say about trucking accidents generally and how devastating they are to the general public.

Response
DOE spoke to a representative of Citizens Alert in October 1996 regarding transportation issues and the overall WM PEIS. The representative stated that Citizens Alert agreed with the State of Nevada's comments, which can be located in the Response to Public Comments Index in Volume V of the WM PEIS.

Transportation is an integral component of the analysis of alternatives considered for the WM PEIS. The magnitude of the transportation-related activities increase with each alternative, ranging from minimal transportation for the decentralized approaches, to more significant levels under the regionalized and some centralized approaches. Both radiological and nonradiological causes contribute to the overall transportation risk. The PEIS includes a detailed assessment of these risks for a complete range of credible transportation accidents for both rail and truck transportation, including low probability/high consequence and high probability/low consequence accidents. The results of the transportation analyses conducted in Appendix E show that impacts relating to the transport of waste analyzed in the WM PEIS, which include fatalities from radiation exposure, diesel exhaust emissions, and physical trauma from accidents, are low when compared to nationwide vehicle transportation yearly impacts. Comparatively, from 1971 to 1993 over one million persons were killed by physical

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trauma in vehicular accidents in the U.S. The WM PEIS allows a site to choose either the truck or rail transport mode.

Actual transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE proactively works with States, regional entities, and carriers during large shipping activities to ensure that safe routing alternatives and safe havens are utilized.

Comment (4453)
DOE should include in its evaluation of transportation costs the costs and risks of loading and unloading waste and associated materials into suitable containers and loading and unloading the containers from vehicles; the cost of planning; and the costs and risks to persons involved in escort services required during shipping. The impacts of alternatives to such escort services should also be evaluated.

Response
The costs of loading and unloading waste are facility operation costs that DOE has included in the support facility costs. No escort services are included for the shipments analyzed in the WM PEIS because the waste materials do not currently require escorts. In addition, information from other programs shows that for the programs that require escort services (i.e., spent nuclear fuel), these services constitute only 20% of transportation costs. Because transportation costs would not be large enough to affect WM PEIS decisions, there is no compelling reason to include the costs of escort vehicles.

The risks of loading and unloading waste are facility operations risks that DOE has included in the description of facility risks. Such risks could be estimated from the scenarios evaluated for maximally exposed individuals. The risk for escort services would be much less than the risks for operators of the transportation vehicles.

Comment (4475)
The reference in Section 9.1 of the Draft WM PEIS Summary document refers to 295,000 truck shipments or more than 106,000 rail shipments of waste that occur at NTS. This seems like an unrealistic ratio, since a single rail shipment can have many cars of waste, while trucks typically have only one trailer (or three at most).

Response
The ratio of 295,000 truck shipments to 106,000 rail shipments is reasonable based on the discussion in Section E.3.2.1 in Volume IV. The number reported for rail transportation is the number of railcars, not the number of trains. The shipment capacity ratio of a single railcar and a single tractor-truck trailer is roughly 3 to 1. Transportation impacts were calculated on a per-railcar basis. DOE considered only regular freight train service with one waste railcar per train, not special or dedicated train service, so that rail impacts would not be underestimated.

6.7 Waste Minimization

Comment (25)
Many commentors urged DOE to stop producing nuclear waste; to consider recycling nuclear waste as part of treatment, and, in general, to focus on reducing waste volumes and waste generation; and to consider waste management alternatives that include the positive impacts of an aggressive pollution prevention program. Some suggested that DOE curtail its proposed Stockpile Stewardship and Management Program and other nuclear weapons research programs to prevent generation of wastes in the future. Some asked why so much more waste will be generated, when DOE facilities are required to set goals under the Hazardous Waste Minimization Plan to reduce the most persistent, bioaccumulative, and toxic constituents by 25% by 2000 and 50% by 2005. Others asked if the DOE site nearest them has a waste minimization or pollution prevention program, and expressed a desire to be kept informed of the status and risks of such programs.

Response
The largest waste generation associated with the production of nuclear weapons resulted from the production of weapons-grade plutonium and highly enriched uranium used in the weapons. Both of these activities used large quantities of hazardous substances and generated a large volume of wastewater. With the end of the Cold War and subsequent reduction of nuclear weapons stockpiles, DOE foresees diminished short-term needs to produce weapons-grade plutonium and highly enriched uranium.

DOE anticipates a continued reduction in the size of the nuclear weapons stockpile and plans to adapt its aging facilities to this new mission. Accordingly, DOE has proposed to consolidate the facilities associated with maintaining nuclear weapons. The alternatives for achieving a downsized nuclear weapons complex are analyzed in the Stockpile Stewardship and Management PEIS. However, nuclear weapons remain the cornerstone of the nation's security policy. Thus, DOE's responsibilities for ensuring the safety and reliability of the nuclear weapons stockpile will continue for the foreseeable future. In other words, DOE does not consider a shutdown of its nuclear weapons programs to be a reasonable alternative at this time. Based on the best available information at the time of the analysis on future waste generation, DOE assumed in the WM PEIS that current waste generation rates would continue for the next 20 years. Volume I, Section 1.8.1, describes DOE programs and actions that generates the waste analyzed in the WM PEIS. Curtailing the weapons program will not prevent production of waste by DOE in the future because waste is produced by other programs, such as energy research.

DOE is strongly committed to pollution prevention and has a very aggressive pollution prevention program in place for several years. DOE strongly endorses pollution prevention, including recycling, where practical. Materials that cannot be recycled are considered waste and would be treated and disposed of, as appropriate.

Appendix G in Volume IV of the PEIS describes the DOE Pollution Prevention Program, estimates source reductions for specific types of waste, and examines the effects on the Waste Management Program of a 50% reduction in future waste generation. Section 1.8.2 in Volume I of the PEIS has been revised to contain a discussion of DOE's Pollution Prevention Program Plan. This program applies to all DOE activities and all types of waste that these activities generate. Source reduction by generators in Defense Programs, Energy Research, and other DOE programs will reduce the amount and radioactivity level of waste coming into the waste management complex, reduce the cost of constructing waste management facilities, and reduce health risks to the public and workers. All DOE

6.7 Waste Minimization

sites have site-specific waste minimization and pollution prevention programs and plans that have resulted in many source-reduction successes, and the sites make these plans available to the public.

DOE is committed to a policy of open dialogue with a broad range of stakeholders who have a wide variety of interests and concerns. In the process of making decisions, DOE views NEPA as a major vehicle for public information and dialogue on the analysis of environmental impacts.

Comment (904)
DOE should adopt an aggressive LLMW minimization program by examining the efforts of academic, medical, and industrial institutions, and by accessing and incorporating databases and resources from the EPA (e.g., Office of Pollution Prevention and Toxics, Office of Research and Development, Office of Environmental Engineering and Technology Development) provided for generators of hazardous wastes. DOE should take into account waste minimization techniques including separation of waste streams, store-to-decay, etc., in its LLW management strategies in light of the positive experiences in academia, industry, and medical institutions, and in light of the rapid escalation of LLW disposal costs.

Response
DOE has adopted an aggressive pollution prevention program, as required by Executive Order 12856. DOE's pollution prevention program applies to all Department activities and all types of waste that these activities generate. In general, waste reduction is achieved through either source reduction or recycling.

Appendix G in Volume IV of the WM PEIS describes the DOE pollution prevention program in some detail. Among other things, the program has a goal of reducing the generation of all waste types by 50%. DOE has waste minimization and pollution prevention programs and plans in place at all of its sites, and uses the information and experiences of others, including EPA, to achieve waste reduction goals.

Comment (1608)
The PEIS should use more conservative assumptions for the volume reduction treatment of LLW because the 50% reduction assumption appears to be too high.

Response
Volume reduction waste treatment technologies for low-level waste are capable of achieving far greater than 50% reductions in volume. Thus, a 50% volume reduction from treatment would be a conservative assumption. However, DOE assumes that the comment is directed, not toward volume reduction waste treatment, but toward the assumption in Appendix G that there is a 50% decrease in annual generation of waste from pollution prevention efforts, i.e. source reduction.

On August 3, 1993, President Clinton issued Executive Order 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*. To help ensure that Federal agencies manage their facilities to meet the objectives of the Pollution Prevention Act, a Federal statute, to the maximum extent possible, this Executive Order requires Federal agencies to develop voluntary goals to reduce pollutants by 50%. DOE is committed to complying with this Executive Order; thus, the WM PEIS assumes a 50% reduction in annual generation of waste. DOE understands that reductions in annual generation will vary from waste stream to waste stream. However, an average reduction of 50% is not necessarily optimistic. For example, Appendix G cites a reduction in the use of naphtha-based solvents of 90% at the Pantex Plant.

Comment (2045)
BNL should be commended for and should continue its waste minimization efforts.

Response
Thank you for your comment.

Comment (2390)
Review and discuss resource and energy recovery plans in the treatment options for all non-radioactive and radioactive chemicals and materials.

Response
DOE's policy is to first reduce generation of potential waste, then recycle (i.e., resource recovery) or reuse the remaining material, where possible. Material that remains after recycling is waste, and is transferred to waste management facilities. The WM PEIS is concerned with waste management--the treatment, storage, and disposal of material for which there is no further use. As recycling allows material to be put to a beneficial use rather than becoming waste, it is not considered a waste management technique, per se, and is not evaluated in the WM PEIS.

However, DOE is strongly committed to pollution prevention, which is achieved through (1) source reduction by reducing the quantity of waste that is transferred to DOE facilities and (2) recycling. Appendix G in Volume IV describes DOE's pollution prevention plans and initiatives. Appendix G also contains estimates of reductions in waste volumes that would go to treatment, storage, and disposal facilities, the cost of constructing and operating these facilities, and the human health risks from a 50% reduction in the annual generation of waste.

Comment (2568)
While it is encouraging to see DOE devote an entire appendix to waste minimization, it is time to go beyond talk and begin serious implementation of this very simple and extremely powerful idea complex-wide. This concept has the potential to save enormous sums of money by ensuring waste is never generated in the first place. Waste not created is waste that doesn't need to be managed and so cannot be mismanaged with all the attendant cost and publicity. DOE needs to tell the public what is being done to minimize generation of radioactive and chemical waste and should take steps to oppose lobbies and to be socially and environmentally responsible.

Additionally, lessons learned and technology developed in implementing waste minimization can be transferred to private industry, enhancing their competitiveness and helping fulfill DOE's technology transfer mission. In addition to the action described in Appendix G, DOE should also (1) develop accounting systems to determine the cost savings associated with waste minimization and, conversely, the costs of continued waste generation, (2) track and publicize the progress or lack of it in achieving challenging waste minimization goals, and (3) develop charge-back systems so that generators "pay" for the storage, treatment, and disposal of the wastes they generate.

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Response

The purpose of Appendix G of the WM PEIS is to discuss how DOE's waste minimization and pollution prevention programs and practices could affect the volumes of waste that waste management facilities receive, and consequently, the need for the facilities. The appendix contains estimates of reductions in waste volumes, risks associated with waste management activities, and waste management costs resulting from pollution prevention. Due to the programmatic nature of the WM PEIS, the approach used reflects one method of estimating waste minimization impacts in the absence of site-specific goals for the reduction of wastes and pollution. The WM PEIS assumes a 50% reduction in the future generation of waste to be handled by the waste management complex. DOE appreciates the suggestion to develop accounting systems to determine the cost savings associated with pollution prevention and the cost of continued waste generation. Costs in this context, however, involve uncertainties. In some instances, such as revamping operations to meet the waste reduction goal, the costs could be substantial and the net dollar gain through pollution prevention would be lower than projected. These latter costs cannot yet be calculated and are considered beyond the scope of the WM PEIS.

Tracking progress in pollution prevention is key to a successful program. The DOE Office of Waste Management is responsible for coordinating and consolidating DOE's Waste Reduction Policy, in accordance with Executive Order 12856. Accordingly, DOE has published the *Annual Report on Waste Generation and Waste Minimization and Pollution Prevention Cross-Cut Plan.* Issues concerning charge-back systems and related incentives for reducing wastes are beyond the scope of WM PEIS, which analyzes programmatic siting options for waste management activities.

Comment (3249)

DOE must do everything feasible to reduce the production of radioactive and hazardous waste in its operations, including substituting less hazardous materials, reclaiming all heavy metals for reuse, using more labor-intensive practices, etc.

Response

On August 3, 1993, President Clinton issued Executive Order 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*. To help ensure that Federal agencies manage their facilities so that the objectives of the Pollution Prevention Act, a Federal statute, are met to the maximum extent possible, this Executive Order requires Federal agencies to develop voluntary goals to reduce pollutants by 50%. DOE is firmly committed to complying with this Executive Order and has developed the Pollution Prevention Program Plan, which serves as the principal guidance on the program. In addition, DOE sites have developed site-specific pollution prevention plans. This topic is discussed in Section 1.8 of the Summary document and in Volume IV, Appendix G.

Comment (3291)

According to Appendix G of the Draft WM PEIS, in the absence of approved installation-specific waste minimization plans, 'a simple assumption is made that source reduction will result in a 50% reduction in the annual generation of each waste stream for each year of the time spans considered in the WM PEIS." While the statement notes that this is an arbitrary assumption, it also seems like an impossibly optimistic assumption, perhaps resulting in an underestimation of annual waste generation.

Response

On August 3, 1993, President Clinton issued Executive Order 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*. To help ensure that Federal agencies manage their facilities so that the objective of the Pollution Prevention Act, a Federal statute, are met to the maximum extent possible, this Executive Order requires Federal agencies to develop voluntary goals to reduce pollutants by 50%. DOE is committed to complying with this Executive Order. The 50% reduction in the annual generation of waste is the goal of the DOE Pollution Prevention Program Plan. It is understood that reduction in annual generation will vary from waste stream to waste stream, and recent DOE experience has shown that a greater-than-50% source reduction is achievable for some waste streams. Therefore, a 50% source reduction assumption for the pollution prevention analysis presented in Appendix G of the WM PEIS is reasonable. For example, Section G.2 in Volume IV cites a reduction in the use of naphtha-based solvents of 90% at the Pantex Plant.

Comment (4354)

If it costs more to treat the waste before burial, it's not worth the extra cost.

Response

A number of factors will contribute to the waste management decisions. Among these are environmental and social impacts, human health risk, and other considerations such as environmental justice. These factors must be weighed in addition to cost, and in many cases, factors such as human health risk must take precedence over cost in making a final determination.

Comment (4569)

Recycling radioactive waste by-products should be a priority for radioactive waste management.

Response

DOE's waste minimization/pollution prevention program, discussed in Appendix G, Section G.1. and briefly in Section 1.8.2, calls first for reducing the waste at its source, then for recycling of material not eliminated through this source reduction. Material that is left after source reduction and recycling is waste. The waste management process begins after source reduction and recycling, where possible, have occurred; therefore, these activities are not discussed as waste management practices in the WM PEIS.

Comment (4572)

National policy should focus on reducing or eliminating the production of radioactive and hazardous wastes.

Response

DOE has established a Pollution Prevention Program pursuant to Executive Order 12856. Appendix G (Volume IV) of the WM PEIS contains a description of this program. It is DOE's policy to prevent or reduce the production of waste to the extent possible. Materials that remain after this waste minimization process are considered waste; certain of these wastes are the subject of the WM PEIS. Pollution prevention is considered as a mitigation measure in Chapter 12 in Volume I of the WM PEIS.

6.8 Privatization

Comment (45)
An alternative should be considered under which DOE would provide seed money in the private sector to help startup companies build LLMW treatment facilities.

Response
Section 1.7.4, which DOE added to Volume I of the WM PEIS, describes the use of commercial or privatized facilities. DOE expects treatment and disposal capacity at commercial facilities to increase in response to demand. DOE's Office of Waste Management has a program to investigate the potential for privatization to result in economic efficiencies. Specific privatization initiatives will be considered at the site level.

Comment (189)
Several commentors oppose the use of private contractors or commercial facilities for conducting waste management activities, particularly at LLNL.

Response
Section 1.7.4, which DOE added to Volume I of the WM PEIS, describes the use of commercial or privatized facilities.

Only DOE sites were analyzed in the WM PEIS as potential locations for waste management facilities. However, the Final WM PEIS does consider, at a conceptual level, the use of commercial waste management facilities. A new section (1.7.4) was added to Volume I to discuss use of commercial facilities. As stated in Section 1.7.4, the impacts associated with DOE waste management facilities are expected to be representative of the impacts associated with private facilities on DOE sites. The impacts at offsite commercial facilities are generally not analyzed. DOE assumes that offsite facilities meet all applicable regulations and are permitted by the appropriate agencies. The regulator is likely to be a State agency or the NRC. The regulator will ensure that commercial facilities comply with all laws and regulations, including those related to safety.

DOE believes that use of commercial contractors for waste management is reasonable, and should be evaluated at a site-specific level. Commercial waste management facilities must comply with all applicable laws and regulations. As discussed in Section 1.7.4 in Volume I of the WM PEIS, impacts of privatized facilities on DOE sites would be the same as those of DOE facilities.

Comment (191)
Several commentors asked DOE to analyze alternatives for privatization and commercialization of waste management for waste types other than hazardous waste. One commentor stated that DOE should identify private-market capacities, comparative costs, and availability; and evaluate the impacts of privatization on environmental health and safety.

Another commentor pointed out that disposal and treatment of low level mixed and low level wastes at privately owned waste management sites are already underway and considered to be more viable than onsite treatment or disposal for many waste streams. In this context, the many alternatives that include significant treatment and disposal at ORR seem unrealistic, especially since the offsite waste streams slated for treatment and disposal at ORR are based on geographic proximity of the generation site to the disposal site, rather than on waste stream characteristics. Another commentor stated that future success using the commercial sector for waste management is anticipated and, therefore, the amounts of waste that DOE might have to manage from the Portsmouth Plant are likely to be significantly lower than the estimates in Table 4-2.

Response

Decisions on privatization are site-specific in nature, and therefore privatization would be addressed in sitewide or project-specific NEPA documents. However, although only DOE sites were analyzed as potential locations for waste management functions in the WM PEIS, the study did consider the use of commercial and privatized waste management facilities. DOE has revised Section 1.5 in Volume I and has added Section 1.7.4 to discuss the issue of waste management privatization at DOE sites. DOE assumed that these facilities meet all applicable regulations and are permitted by the appropriate agencies. The impacts of private facilities on DOE sites are expected to be similar to impacts associated with DOE-owned waste management facilities, and DOE would maintain the flexibility to use private facilities.

There are many offsite waste management facilities that are operated by private companies. It would be difficult to determine which facilities DOE would use, how much waste they would receive, and what types of waste they would receive. Therefore, the impacts at offsite commercial facilities are generally not analyzed. Again, these impacts would be considered in sitewide or project-specific NEPA documents.

Comment (918)

A commentor supports the DOE preference to not develop additional hazardous waste capacity and continue the use of commercial hazardous waste treatment.

Response

Thank you for your comment.

Comment (2171)

DOE received several comments regarding the authority and responsibility for the Portsmouth and Paducah Plants. One commentor asked DOE to explain who is in charge of the Portsmouth Plant; another commentor wanted DOE to clarify the regulatory relationship between DOE, NRC, and the United States Enrichment Corporation (USEC), and the jurisdiction over the radionuclides. The commentor stated that the permit issued to DOE would be coming up for a hearing in Kentucky and that under the permit, DOE would be solely responsible for waste generated by USEC and managed by DOE. The public would need to understand why USEC-generated wastes are not USEC's responsibility. Another commentor stated that if the low-level waste is generated by ongoing enrichment operations at PGDP, it is USEC's responsibility. Another commentor inquired about a statement by a DOE representative that DOE has been directed by Congress to take USEC wastes. The commentor asked if this was part of a Congressional appropriation and, if so, when was it done.

Response

From startup until July 1 1993, DOE and its predecessor agencies operated the Portsmouth Gaseous Diffusion Plant and the Paducah Gaseous Diffusion Plant. On July 1, 1993, USEC assumed responsibility for operating the Portsmouth Plant. USEC was established as an independent government corporation by the Energy Policy Act of 1992 (P.L. 102-486) as a transitional step toward the goal of fully privatizing uranium enrichment operations. Enrichment activities at the Portsmouth and Paducah Plants, and the wastes generated from these activities, have been managed by USEC since

6.8 Privatization

July 1, 1993. Environmental restoration activities are managed by DOE. Regarding LLW management, as of July 1, 1993, USEC is responsible for LLW that is generated by USEC's ongoing enrichment operations. However, the USEC Privatization Act (P.L. 104-134) provides that, upon request, DOE would accept this waste for disposal and would be reimbursed for its costs. LLW generated prior to July 1, 1993, remains DOE's responsibility and is included in the waste volume estimates for Portsmouth used in the PEIS. DOE is also responsible for the disposal of depleted uranium generated by USEC prior to privatization, as provided in the USEC Privatization Act. Until USEC receives its certificate of compliance from NRC, DOE is responsible for safety oversight with regard to radioactive materials at the Portsmouth and Paducah Plants, and with regard to USEC's operations.

USEC plans to obtain a certificate of compliance from NRC, which would make it subject to NRC nuclear safety requirements. Should USEC become privatized, pursuant to the recently enacted USEC Privatization Act, it still would be subject to NRC safety requirements.

Comment (2195)
Does the WM PEIS address the issue of safety and compliance at commercial waste treatment sites where DOE wastes might be sent?

Response
Only DOE sites were analyzed in the WM PEIS as potential locations for waste management facilities. However, the Final WM PEIS does consider, at a conceptual level, the use of commercial waste management facilities. A new section (1.7.4) was added to Volume I to discuss use of commercial facilities. As stated in Section 1.7.4, the impacts associated with DOE waste management facilities are expected to be representative of the impacts associated with private facilities on DOE sites. The impacts at offsite commercial facilities are generally not analyzed. DOE assumes that offsite facilities will meet all applicable regulations and will be permitted by the appropriate agencies prior to receiving DOE waste. The regulator is likely to be a State agency or the NRC. The regulator will ensure that commercial facilities comply with all laws and regulations, including those related to safety. DOE will not send waste to a facility for treatment that does not have the proper permits.

Comment (3063)
Another way to approach design and output would be to use "building fixed facilities" and "privatization" as paths forward in parallel. Then, compare the two approaches and select the WM activities most suitable to each option.

Response
DOE's policy is to use existing DOE facilities, where possible, to treat waste management wastes. New facilities would be constructed only when the capacities of the existing facilities were exceeded. There are many offsite waste management facilities that are operated by private companies. It would be difficult to determine which facilities DOE would use, how much waste they would receive, and what types of waste they would receive.

Section 1.7.4 has been added to Volume I of the WM PEIS to discuss the issue of waste management privatization at DOE sites. As stated in Section 1.7.4, the impacts associated with DOE waste management facilities are expected to be representative of the impacts of private facilities on DOE sites.

6.8 Privatization

Although DOE identified preferred alternatives in the PEIS, decisions on privatization are site-specific, in nature, and would be addressed in site-specific documents. Under either the Regionalized, Centralized, or Decentralized Alternative categories, DOE would maintain the flexibility to use private facilities.

Comment (3955)
DOE is not fulfilling its responsibility to the public and workers at PGDP and the Portsmouth Plant by allowing privatization with little or no public involvement in the process and no EIS preparation other than considering both sites as major waste management sites. It seems that DOE is responsible for future land-use decisions for waste treatment and disposal, but has no responsibility in current site production operations. The interests of the workers and the public are not being adequately protected by this policy.

Response
As described in Section 2.5 of the WM PEIS Affected Environment Technical Report, on July 1, 1993, the United States Enrichment Corporation (USEC) assumed responsibility for operating PGDP and the Portsmouth Plant, pursuant to legislation passed by Congress (the USEC Privatization Act), not by a policy decision by DOE. USEC became responsible for wastes generated from enrichment activities at these facilities after July 1, 1993. Environmental restoration activities are managed by DOE. DOE is also responsible for managing waste management wastes generated prior to July 1, 1993, the date on which USEC assumed responsibility for operating PGDP and the Portsmouth Plant. DOE is also responsible for safety oversight with regard to radioactive materials at those sites and with regard to USEC's operations.

Given this situation, PGDP and Portsmouth continue to be among the 54 sites for which DOE has some waste management responsibility and that are within the scope of the WM PEIS. See Volume I, Section 1.6.1, for a description of how DOE identified the major sites for evaluation.

While the WM PEIS addresses programmatic waste management (i.e., storage, treatment, disposal, or a combination thereof), issues pertaining to decisions on the privatization of USEC, and the operation of USEC, are not within the scope of the WM PEIS. However, these issues are the subject of other NEPA reviews.

6.8 Privatization

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7. Impacts Mitigation

Comment (2270)
DOE should make a firm commitment or give programmatic direction for subsidiary EISs to commit to mitigate ecological impacts and to use native seed and plant stock for restoration whenever siting or building waste management facilities. In particular, the high shrub habitat at the Hanford Site should not be used because it is a critical habitat.

Response
As discussed in Section 5.4.4 in Volume I, the WM PEIS evaluated the potential for waste management actions to eliminate or disturb portions of existing nonsensitive terrestrial habitats as a result of the site clearing and excavation activities required to build waste treatment, storage, and disposal facilities. However, the WM PEIS does not identify or analyze specific locations for waste management facilities onsite. Therefore, site-specific impacts such as those on terrestrial habitats will be addressed in sitewide or project-level NEPA reviews.

The WM PEIS analysis did assume that the severity of these impacts would generally be related to the amount of land disturbed in building waste management facilities compared to the overall extent of the range of the plant and animal species that constitute these habitats. The WM PEIS discusses the degree to which sites with sensitive habitats could be affected by noise or vibration disturbances, human presence, vehicle or equipment emissions, runoff, or encroachment by nearby waste management construction activities by estimating the percentage of available land required at a site for facility construction under any alternative. Available acreage was estimated from site development plans either by using land designated for waste management operations or subtracting the acreage of existing structures and sensitive habitats, such as wetlands and wildlife management areas, from the total site acreage. See Volume I, Sections 6.7.2, 7.7.2, 8.7.2, 9.7.2, and 10.7.2.

DOE would have a great degree of flexibility in locating facilities on sites and can employ a range of mitigative measures so that site clearing to implement an alternative generally would not affect adjacent sensitive habitats. DOE has modified Section 12.2 in Volume I to include a recommendation that ecological mitigation by the use of native species for restoration be considered. However, selection of appropriate site-specific mitigation actions will be based on site-specific studies and plans.

The high shrub (shrub-steppe) habitat at Hanford is not listed by the U.S. Fish and Wildlife Service as critical habitat; that is, habitat critical to the survival of a Federally listed endangered or threatened species. However, the habitat is considered priority habitat by the State of Washington, which has designated large and small blocks of shrub-steppe as priority habitat, because it possesses unique or significant value to many species. The State makes this classification determination based on the quality of the following attributes: comparatively high fish and wildlife density, comparatively high fish and wildlife species diversity, important fish and wildlife breeding habitat, important fish and wildlife seasonal ranges, important fish and wildlife movement corridors, limited availability, high vulnerability to habitat alteration, and unique or dependent species.

Almost the entire Hanford Site is classified as shrub-steppe and is, therefore, priority habitat. However, much of the site's habitat, including the habitat of the Central Plateau, the site of nearly all of Hanford's waste management operations, is previously disturbed. The site is criss-crossed with dirt roads; old concrete water tanks are scattered throughout the site; an abandoned gravel pit is centrally located on the site; and an old laydown yard (used during construction of the REDOX plant) is on the western end of the site.

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Unlike the U.S. Fish and Wildlife Service's designations of critical habitat, Washington State's priority habitat designations have no associated legal requirements for habitat protection. However, DOE Order 430.1 requires that DOE consider ecosystem management and preservation values during all phases of Hanford Site operations. DOE intends to limit disturbances to priority habitats through the designation of future Hanford Site land uses. The Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan (DOE/EIS-0222D), which is currently undergoing public review and comment, takes into account the preservation of valuable natural resources when developing broad classes of future land uses. When the ROD for this EIS is issued and land uses are designated, a Hanford Biological Resources Management Plan will be finalized (it is currently in draft form) to provide direction regarding the protection and enhancement of the natural environment.

Comment (2423)
Volume I, Section 1.7.3, states that, in most cases, impacts found significant can be mitigated or eliminated. Chapter 12, Mitigation Measures, covers only seven pages. For a document that covers waste management across the entire DOE complex for the next 20 years, this is a very large assumption and these seven pages are woefully inadequate. A greatly expanded discussion of mitigation measures is needed.

Response
Chapter 12 in Volume I provides general information on measures that are available to mitigate the impacts of alternatives considered in the WM PEIS. Sitewide or project-level NEPA reviews would consider mitigation measures in greater detail. The extent to which risks and impacts can be reduced or eliminated would depend on the facility designs and conditions at individual DOE sites. Chapter 12 in the Final PEIS was revised to incorporate additional mitigation measures.

Comment (3094)
Table 12-1 should include "compensatory" mitigation in case DOE cannot avoid or minimize impacts.

Response
DOE added additional compensatory mitigation measures to Chapter 12 in Volume I of the WM PEIS.

Comment (3203)
Much of the 14,496 acres identified in Section 4.3.8 for waste management at the Hanford Site is located in areas of essential habitat. Reservation of space in the 200 West area for a potential national low-level and mixed-waste repository precluded consideration of that land for siting of the Environmental Restoration and Disposal Facility (ERDF). As a result, that facility was sited in pristine habitat. The ERDF Record of Decision (ROD) commits only to revegetation, not to remediation of the damage or to the use of native plant and seed stock. Many species that are listed or under consideration for listing as rare, threatened, or endangered rely on this precious habitat.

Response
The land area considered for waste management facility construction at the Hanford Site has been revised to include only the 6,000 acre Central Plateau area designated by the site for waste management activities. If new waste management facilities are proposed for Hanford in the WM PEIS Records of Decision, sitewide or project-level NEPA reviews (incorporating site-specific environmental data) will help determine whether a facility can be constructed and operated at a specific location on the site. In

addition, site-specific mitigation of potential adverse environmental impacts would be addressed in such reviews.

The ERDF is on the 6,000 acre Central Plateau area. The CERCLA ROD for ERDF states that mitigation measures to reduce ecological impacts have been incorporated to satisfy the Remedial Action Objectives identified in Section 7(4)(l) through 7(4)(v). In addition, to comply with stipulations in the CERCLA ROD, DOE developed a Mitigation Action Plan in coordination with the Natural Resource Trustees for additional mitigation measures.

A large portion of the site *is* high quality shrub-steppe habitat, but it is criss-crossed with dirt roads; old concrete water tanks are scattered throughout the site; an abandoned gravel pit is centrally located on the site; and an old laydown yard (used during construction of the REDOX plant) is on the western end of the site.

It should be understood that almost the entire Hanford Site is classified as shrub-steppe and is, therefore, priority habitat. In general, the habitat of the Central Plateau previously disturbed and is the site of nearly all of Hanford's waste management operations.

The State of Washington has designated large and small blocks of shrub-steppe as priority habitat, because it possesses unique or significant value to many species. The State makes this classification determination based on the quality of the following attributes: comparatively high fish and wildlife density, comparatively high fish and wildlife species diversity, important fish and wildlife breeding habitat, important fish and wildlife seasonal ranges, important fish and wildlife movement corridors, limited availability, high vulnerability to habitat alteration, and unique or dependent species.

Although Washington State priority habitat designations have no associated legal requirements for habitat protection, DOE Order 430.1 requires that DOE consider ecosystem management and preservation values during all phases of Hanford Site operations. DOE intends to limit disturbances to priority habitats through the designation of future Hanford Site land uses. The Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan (DOE/EIS-0222D), which is currently undergoing public review and comment, takes into account the preservation of valuable natural resources when developing broad classes of future land uses. When the ROD for this EIS is issued and land uses are designated, a Hanford Biological Resources Management Plan will be finalized (it is currently in draft form) to provide direction regarding the protection and enhancement of the natural environment.

Comment (3293)
Job training and retraining should specifically address the use of workers from the host local community. Also, preference should be given to contracting with businesses in the host local community.

Response
As required by NEPA and CEQ implementing regulations, Chapter 12 in Volume I of the WM PEIS provides general information about measures that are available to mitigate the impacts of alternatives considered in the PEIS. Site-specific mitigation measures could include job training and retraining (to help reduce demand for new employees who would inmigrate to regions and place additional demands

7. Impacts Mitigation

on local infrastructures) and cooperation and communication with existing industries to identify and take advantage of opportunities for diversification. See Table 12-1.

The WM PEIS analysis of socioeconomic effects does consider both the availability of required labor in the region of influence (local hiring) and the potential for DOE-sponsored training and retraining programs to encourage local hiring. See Volume III, Section C.4.6.1.2. The analysis assumes that from 40 to 70% of construction jobs, and from 40 to 60% of operations and maintenance jobs would be filled from the local region. Several factors are assumed to influence the actual level of local hiring, including the current level of regional unemployment, local economic conditions, other local demand for labor skills, and the ability of the local labor force to provide the needed skills. As stated in Section C.4.6.1.2, the analysis also considers job training and retraining programs as a potential mitigation measure where population and demographic pressure due to inmigration might exist. The WM PEIS analysis assumed that at least 40% of available operations and maintenance jobs will go to re-trainees, 30% will go to local workers, and 30% will go to inmigrants.

DOE recognizes the influence that its site operations can have on the economies of the local regions of influence. Wherever possible, DOE will cooperate and communicate with existing business and industry to identify and take advantage of emerging opportunities for local development or diversification of the local economy. However, the establishment of a procurement policy favoring preferential consideration for industries in the local region is outside the scope of the WM PEIS. DOE procurement policy and contracting procedures, like all government contracting, are subject to the provisions of the Federal Acquisition Regulations. A policy to give preference to local business in the host communities would be more appropriate to the implementation phase of the waste management process after the WM PEIS Records of Decision are issued. Such a policy, if implemented, would be expected to conform to the Federal Acquisition Regulations.

Comment (3658)
We hope that DOE will install additional control measures to reduce the radionuclide emissions into the air to acceptable levels (meaning zero) if there are exceedances at LANL and WIPP.

Response
Releases from DOE facilities would comply with all applicable air quality regulations. Air quality analyses in the WM PEIS used generic technologies and scenarios that in some alternatives predicted exceedances of air quality standards at some sites. These predictions indicate that additional control measures would be needed at these sites if these alternatives are chosen. Such control measures might include facility designs and operational procedures to ensure that no air quality standards would be exceeded.

Comment (4435)
The WM PEIS should include a more detailed analysis of mitigation measures and of the extent to which such measures, associated uncertainties, and timing considerations could affect the relative impacts of alternatives. Alternative programs should be included to develop the necessary information, and this information should be reevaluated, in detail, at least every 5 years to determine if a supplemental PEIS or a new PEIS is warranted.

Response

Chapter 12 in Volume I of the WM PEIS provides general information about measures that are available to mitigate the impacts of alternatives considered in the PEIS. DOE added additional compensatory mitigation measures to Chapter 12 in the WM PEIS. These include programmatic and site-specific actions. However, the PEIS does not describe the effectiveness of these mitigation measures because effectiveness can be determined only from the specific design and application of the measure at a particular site. Sitewide or project-level NEPA reviews would evaluate mitigation measures in greater detail. The extent to which risks and impacts can be reduced or eliminated would depend on conditions at each DOE site.

Disposal facilities are not expected to result in releases that exceed on drinking water standards, given the requirement that these facilities must satisfy performance standards in DOE Order 5820.2A. The mitigation measures and other steps required to meet these performance standards will vary by site, depending on the type and location of the facility. Mitigation measures, such as the design of the disposal unit, and specification of the waste form and other acceptance criteria are developed during the performance assessment process.

DOE recognizes that certain management decisions could preclude other options in the future. However, DOE intends to make reasoned decisions regarding waste management only after consideration of a broad spectrum of information, including the availability of promising new technology and the efficacy of mitigation measures. Research in these areas is ongoing.

Even though an impact statement adequately discusses the environmental impacts of a proposed action, situations can arise in which a supplemental impact statement is necessary. CEQ regulations require supplemental EISs when:

- The agency makes substantial changes in the proposed action that are relevant to environmental concerns;

- There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts (40 CFR 1502.9(c)(1)).

An agency might also prepare a supplemental statement if it decides that it will further the purposes of the Act (40 CFR 1502.9(c)(1)(iii)).

In the notice entitled "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," the CEQ indicates that, as a rule of thumb, if the proposal has not yet been implemented or if the EIS concerns an ongoing program, an EIS that is more than 5 years old should be carefully reexamined to determine if the criteria in Section 1502.9 compels preparation of an EIS supplement (46 Fed. Reg. 18026 (1981)).

In accordance with the CEQ regulations and DOE's NEPA regulations, DOE would prepare a supplemental NEPA analysis for the WM PEIS if significant new circumstances or information relevant to the environment and the proposed action or its impacts arose. If DOE prepared a supplemental analysis, that document would discuss the circumstances that are pertinent to deciding whether to prepare a supplemental EIS. DOE cannot determine at this time whether a supplemental analysis would be required. Although the DOE NEPA regulations suggest that a supplemental NEPA analysis be

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prepared every 5 years for sitewide NEPA documents, they do not contain guidelines for preparing supplemental NEPA analyses for programmatic NEPA documents.

Comment (4456)
What mitigation measures and alternative technologies were considered for the treatment of tritium-containing wastes to reduce the release of the tritium to the environment?

Given the high concentrations of radionuclides in groundwater, treatment of groundwater to correct the radionuclide problem should be considered, in addition to the waste acceptance criteria and the environmental impacts of plausible actions that might be needed to meet potential criteria.

Response
In addition to reducing tritium release to the environment, the WM PEIS considered two approaches to testing with tritium contamination: isotopic separation techniques and separation of tritium-containing wastes for storage until the tritium decays to harmless levels of radioactivity. The first approach was judged prohibitively expensive for bulk treatment. The second approach, however, was considered feasible, given the approximately 12-year half-life of tritium. DOE added this information regarding the tritium problem to Volume IV, Section H.4.1.1, of the WM PEIS.

Comment (4560)
Criteria should be developed for issuing a supplemental WM PEIS (preferably an Environmental Restoration and Waste Management PEIS) to reevaluate the alternatives when enough information becomes available to evaluate the impacts of locating activities at optimized locations on sites. Programmatic alternatives that would develop the data needed for this purpose on different schedules should also be considered.

Response
The CEQ regulations (40 CFR 1500-1508) and DOE NEPA regulations (10 CFR 1021) contain criteria to help DOE determine when it must prepare an EIS. These criteria also apply to preparing a supplement to a NEPA document. Specifically, a supplemental EIS might be needed if there are significant new circumstances or information relevant to environmental concerns. DOE has a policy to reconsider site-specific EIS studies every 5 years, if necessary, but there is no guidance on when to supplement a programmatic EIS.

Comment (4561)
DOE should evaluate programmatic alternatives for development of better methods (and parameters) for risk assessment that could provide better information for programmatic decisionmaking, along with improved methods of displaying risk assessment results.

Uncertainties in the modeling and in the data used for modeling should be quantified, when possible, and used to identify areas where adequate information is currently unavailable to make final programmatic decisions. This information should be used to analyze the role of further monitoring and research in refining DOE's decisionmaking process, and to evaluate alternatives to current programs.

A detailed review of available information should be performed at least every 5 years to determine if enough new information is available to warrant a new or supplemental PEIS.

Response
The purpose of the WM PEIS is to evaluate the environmental impacts associated with alternatives that address DOE's need to better manage its waste. This management has been defined as treating, storing, or disposing of five types of waste. The environmental impacts to be assessed are those physical impacts that may occur when facilities are constructed or operated. This is further discussed in Chapter 2, Volume I, of the PEIS.

The assessment of these alternatives includes many different methods detailed in Chapter 5 in Volume I, some of which include health risk assessments. The commentor's recommendation that DOE should develop better methods for risk assessment is being considered, but not in the context of alternatives which might cause physical impacts to the environment, and thus require an environmental impact assessment. Rather, better assessment methods are associated with the methodology that could be used to assess impacts. The assessment methods, themselves, will not cause impacts to the environment and do not fall within the definition of major actions requiring National Environmental Policy Act review.

The WM PEIS health risk impacts analysis used conceptual waste management facilities, the best available data at the time of the analysis, state-of-the-art models, and conservative assumptions to develop screening-level estimates of the potential health risks associated with waste treatment, storage, disposal, and transportation. These estimates were used to provide relative comparisons of impacts among the proposed waste management alternatives.

Human health risk assessment results are conditional estimates that are influenced to a large extent by the many assumptions that must be made to account for an insufficient understanding of biological processes or a lack of information on contaminant or receptor behavior. Therefore, in evaluating risk estimate results, it is important to recognize that uncertainties are involved in analysis in order to place the risk estimates in proper perspective. Uncertainties associated with the risk assessment methodology used in the PEIS analyses are discussed in Volume I, Section 5.4, and Volume III, Appendix D.

Sitewide or project-level NEPA reviews will be better able to utilize additional site-specific information on the exact siting of waste management facilities, hydrogeological, meteorological and population demographic parameters, and specific mitigation methods, to provide more refined estimates of potential impacts.

Even though an impact statement adequately discusses the environmental impacts of a proposed action, situations can arise in which a supplemental impact statement is necessary. CEQ regulations require supplemental EISs when:

- The agency makes substantial changes in the proposed action that are relevant to environmental concerns;

- There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts (40 CFR 1502.9(c)(1)).

An agency might also prepare a supplemental statement if it decides that it will further the purposes of the Act (40 CFR 1502.9(c)(1)(iii)).

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In the notice entitled "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," the CEQ indicates that, as a rule of thumb, if the proposal has not yet been implemented or if the EIS concerns an ongoing program, an EIS that is more than 5 years old should be carefully reexamined to determine if the criteria in Section 1502.9 compels preparation of an EIS supplement (46 Fed. Reg. 18026 (1981)).

In accordance with the CEQ regulations and DOE's NEPA regulations, DOE would prepare a supplemental NEPA analysis for the WM PEIS if significant new circumstances or information relevant to the environment and the proposed action or its impacts arose. If DOE prepared a supplemental analysis, that document would discuss the circumstances that are pertinent to deciding whether to prepare a supplemental EIS. DOE cannot determine at this time whether a supplemental analysis would be required. Although the DOE NEPA regulations suggest that a supplemental NEPA analysis be prepared every 5 years for sitewide NEPA documents, they do not contain guidelines for preparing supplemental NEPA analyses for programmatic NEPA documents.

Comment (4562)
Trade-offs between more shielding (resulting in less radiation impacts) and additional volumes of waste with their associated increases in conventional pollution and safety impacts should be analyzed as part of the WM PEIS.

Response
Because of the conservative assumptions in the WM PEIS analysis, potential shielding between the shipment and the receptor is not factored into the estimate of potential health risks from radiation exposure during transportation.

Comment (4563)
Regarding mitigation measures, the WM PEIS should consider new, more restrictive, worker protection and environmental standards, along with the use of robots to do work that would otherwise exceed the new worker-protection standards.

Response
DOE complies with all applicable laws and to protect human health and the environment in undertaking its waste management responsibilities. Moreover, DOE believes that existing standards adequately protect human health (both workers and the public) and the environment. Although worker protection and environmental laws and standards might change over time, DOE cannot predict such changes or their applicability to the mitigation measures discussed in the WM PEIS.

8. Technical Issues

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(No comments were received for this section)

8.1 Waste Types Analyzed, Volumes and Characteristics

Comment (27)
If the WM PEIS contains information different from the 1993 Integrated Data Base Report, the difference needs to be thoroughly explained.

Response
The Draft WM PEIS identified the sources of volume data for each type of waste. Those sources represented the best available data at the time of the analysis on how much waste there was, and where it was at the time DOE prepared the Draft WM PEIS. Many of those sources have since been updated. Therefore, the Final WM PEIS provides an update of all of the site-specific waste volumes for low-level waste, low-level mixed waste, and transuranic waste, and has performed a reanalysis of impacts at selected sites (see Volume IV, Appendix I). Appendix I discusses why these waste volumes have changed and how they qualitatively affect the WM PEIS impacts analysis.

Comment (164)
Waste volumes could shrink drastically if the criteria for classification, for example 100 nanocuries per gram for transuranic waste, were relaxed. This should apply to low-level waste and low-level mixed waste as well.

Response
As is DOE policy, the WM PEIS applies current waste classification criteria, which is consistent with existing statutory definitions of waste types, to the existing and projected waste volumes. Current waste classification criteria would not be relaxed unless the statutory definitions were amended.

While it is true that relaxing the criteria for transuranic waste would reduce the amount of that waste type, it would increase the amount of low-level waste and low-level mixed waste. The definitions of low-level waste and low-level mixed waste do not set radioactivity thresholds below which the waste is not considered to be radioactive.

Comment (195)
A commentor believes that DOE should be dealing with low-level mixed, low-level, transuranic, and high-level wastes in similar ways.

Response
Similarities between waste types were considered in the WM PEIS; however, each waste type has unique physical and regulatory requirements and must be managed separately. See WM PEIS Volume I, Section 1.5.

Comment (476)
The WM PEIS needs to clarify whether wastewater volumes are included in waste totals, and where the wastewater from the sludges goes.

Response
The Draft WM PEIS included wastewaters in the volume totals for low-level mixed waste, low-level waste, and transuranic waste. DOE would continue to manage this wastewater at each site. Other wastewaters that are the subject of the WM PEIS analysis do not constitute large volumes and DOE is likely to recycle them to minimize treatment requirements; however, the waste volume totals do include wastewaters.

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Since the Draft WM PEIS was published, DOE has released updated waste-volume data (see Appendix I in Volume IV of the Final PEIS). These data include wastewater in the volumes for low-level mixed waste and transuranic waste, but not in the volumes for low-level waste. DOE used the revised data to reanalyze impacts of selected sites that might be significantly affected by the new data.

The WM PEIS high-level waste analysis addressed only the impacts of the storage and transportation of vitrified high-level waste in canisters. The hazardous waste analysis did not include wastewater in the total volume of hazardous waste because of the DOE policy to manage existing wastewater on the generator sites due to the difficulty and expense of transporting it.

The total sludge volume includes the water in sludge wastes. The wastewater that is derived from sludge processing is not included in the primary waste streams because it is already included in the sludge volume.

Comment (1087)
DOE should explain why the waste volumes in the Draft WM PEIS for Fernald Environmental Management Project (FEMP), including those in Table 4-2, are so much lower than the actual waste volumes at FEMP. The numbers are confusing and should be revised in the Final PEIS to include the actual waste volumes at FEMP. DOE should explain the source of the waste-volume data used in the PEIS for FEMP, especially for low-level waste.

Response
The Draft WM PEIS identified the sources of volume data for each type of waste. Those sources represented the best available information at the time of the analysis on how much waste there was, and where it was at the time DOE prepared the Draft PEIS.

Sites continually characterize their wastes, and implement pollution prevention practices; these activities can change estimates of waste volumes. DOE has released updated waste-volume data, which is incorporated in the Final WM PEIS analysis (see Appendix I in Volume IV). The sources for these updated data are provided, along with a discussion of how the new data affected the WM PEIS analysis.

DOE considers FEMP low-level waste to be environmental restoration waste, not waste management waste. The 1995 Integrated Data Base (the source of new low-level waste data) reported no waste management wastes generated or stored at FEMP, and projected no waste management waste generation for the future. The WM PEIS Low-Level Waste Inventory Technical Report provides details on the amounts and characteristics of low-level waste that would be treated at FEMP under some alternatives. This technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

The WM PEIS does not evaluate environmental restoration alternatives and, therefore, does not quantitatively evaluate environmental restoration wastes at FEMP or other sites. The impacts of environmental restoration activities at FEMP are evaluated in site-specific CERCLA documents including:

- *Feasibility Study/Proposed Plan for Operable Unit 1, Final, Fernald Environmental Management Project* (DOE/EA-0938);

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- *Feasibility Study Report for Operable Unit 4, Final, Fernald Environmental Management Project* (DOE/EIS-0195);
- *Feasibility Study Report/Environmental Assessment for Operable Unit 2, Final, Fernald Environmental Management Project* (DOE/EA-0953);
- *Feasibility Study Report for Operable Unit 5, Final, Fernald Environmental Management Project*; and
- *Operable Unit 3 Final Remedial Investigation/Feasibility Study Report, Final, Fernald Environmental Management Project.*

Comment (1105)
DOE should provide more information about the amounts and types of wastes potentially coming to FEMP for treatment.

Response
In relation to the treatment of waste from other sites, DOE considered FEMP as a potential treatment site for low-level mixed waste and low-level waste. Under Regionalized Alternative 1 for low-level mixed waste, FEMP would receive low-level mixed waste for treatment from Argonne National Laboratory-East (ANL-E,) Ames Laboratory, and the Mound Plant, which would increase FEMP treatment volume requirements such that 76% of its total treatment volumes would come from other sites. (See Volume I, Table 6.3-3.) Under Regionalized Alternative 2, FEMP would receive low-level waste for treatment from ANL-E, Ames, Mound, and Fermi National Accelerator Laboratory. Since all FEMP onsite low-level waste is categorized as environmental restoration waste, 100% of FEMP's treatment volume would come from other sites (see Table 7.3-4). No other low-level mixed waste or low-level waste management alternatives would require FEMP to treat wastes from other sites. Table 6.1-1 lists the estimated total volume of low-level mixed waste from waste management activities at each of the 37 low-level mixed wastes sites. Table 7.1-1 lists the total estimated low-level waste volumes at those sites.

Details on the amounts and characteristics of low-level mixed waste and low-level waste that would come to FEMP from these sites are provided in the Low-Level Mixed Waste Technical Report prepared for the WM PEIS (ANL/EAD/TM-32, Draft-April 1995) and the Low-Level Waste Technical Report prepared for the WM PEIS (ANL/EAD/TM-20, Draft-April 1995). These reports are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (1530)
WM PEIS authors must not have read the Baseline Environmental Management Report (BEMR), because there are vast discrepancies between the waste numbers in the PEIS and the waste.

Response
The 1996 BEMR identifies all activities and projects in the DOE Environmental Management Program. The WM PEIS focuses only on the waste management portion of that program. Furthermore, the WM PEIS considers only current waste management waste inventories plus 20 years of generation, while BEMR considers wastes in inventory plus generation over each site's life cycle, which might extend over 75 years. Section 1.8.2 describes BEMR and its relationship to the PEIS.

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The PEIS uses BEMR as a source only for estimates of environmental restoration waste volumes. Volume I, Chapters 6 through 10 of the PEIS, identify other sources of PEIS waste volumes. The Final PEIS considers the 1996 BEMR environmental restoration waste volumes (see Appendix B in Volume III and Chapters 6, 7, and 8 in Volume I).

Comment (1584)

Given the existing problems with plutonium at the Rocky Flats Environmental Technology Site (RFETS), the Hanford Site, and the Savannah River Site (SRS), the WM PEIS ignores the dangers associated with plutonium, which will still be undecayed after 10,000 years and, contrary to some DOE statements, can move through the soil.

Response

Depending on the isotopes and level of radioactivity, there can be plutonium in four of the waste types (transuranic, high-level, low-level mixed, or low-level) considered in the WM PEIS. Moreover, the different plutonium isotopes have different half-lives; some decay faster than others. DOE analyzed the waste streams that contain plutonium isotopes for potential environmental impacts.

As described in the WM PEIS, DOE proposes to dispose of transuranic waste, including that containing plutonium, at WIPP. DOE is addressing the potential impacts of transuranic waste disposal at WIPP in the WIPP SEIS-II. The WM PEIS evaluates the impacts of disposing of low-level and low-level mixed wastes at several facilities. It assumes breaches at disposal facilities and provides models of wastes containing plutonium moving through the environment. It estimates little or no plutonium in groundwater (see Site Data Tables, Volume II). The WM PEIS also describes impacts to workers and offsite populations from exposure to plutonium. DOE is in the process of stabilizing and repackaging weapons-usable fissile materials such as plutonium and placing them in safe, secure storage. For plutonium, these corrective actions were developed in response to DOE's *Plutonium Vulnerability Management Plan* (DOE/EM-0199), the assessment by DOE's *Plutonium Working Group Report* (DOE/EH-0415), and recommendations made by the Defense Nuclear Facilities Safety Board to improve the remediation of the sites where plutonium is currently stored.

A number of NEPA documents are currently available that address plutonium at RFETS, the Hanford Site, and SRS. The Storage and Disposition of Weapons-Usable Fissile Materials PEIS considers surplus plutonium materials Department-wide. The stabilization, concentration, and storage of plutonium residues, as well as non-weapons-usable waste, is covered in the RFETS Environmental Assessment on Solid Residues Treatment, Repackaging, and Storage, the SRS F-Canyon Plutonium Solutions EIS, and the Hanford Plutonium Finishing Plant Complex EIS. These documents are available to the public. Additional NEPA documents (such as the Rocky Flats Plutonium Residues and Scrub Alloy EIS) will be prepared to further address plutonium within the DOE complex.

The 1995 Baseline Environmental Management Report provides information on possible plutonium problems at DOE sites. At RFETS, soil contamination is highest east and southeast of the temporary storage area (903 Pad) where DOE used steel drums to store plutonium-contaminated industrial oils from 1958 to 1968. DOE used TRX facilities at SRS for experimental work and the development and demonstration of new processes. The old TRX seepage basin was the main contributor to SRS groundwater contamination, with concentrations of plutonium exceeding the primary drinking water standard. There are also concentrations of plutonium in soil or groundwater above established limits at the Hanford Site.

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Most plutonium compounds are only slightly soluble in water and, therefore, have a low-mobility in most soils. DOE recently completed the *Performance Evaluation of the Technical Capabilities of DOE Sites for Disposal of Mixed Low-Level Waste* (DOE/ID-10521/2). This report classifies the mobility of plutonium as high, medium, or low. Of the 15 sites considered in the report, only the Oak Ridge Reservation (ORR) was in the medium mobility class.

Comment (1652)
Commentors suggested that DOE change the classifications and definitions of waste because they either lack sufficient waste characterization or are classified by production source or management risks rather than by health risks.

Response
The commentors correctly point out that the definition of wastes have different bases--some are defined by source, some by physical characteristics, and some by exception. Although a waste type may be broadly defined to encompass wastes that potentially pose a wide range of health risks, DOE's management in effect classifies the waste according to health risk. One example is waste acceptance criteria for disposal of low-level waste. These waste acceptance criteria require that wastes that would pose higher risks to groundwater because of physical, chemical, or radiological characteristics be stabilized.

In the WM PEIS, low-level waste and low-level mixed waste are divided into "alpha" and "non-alpha." Low-level waste, low-level mixed waste, and transuranic waste are divided into "contact-handled" and "remote-handled." These divisions are made in recognition of what is required to protect the health of waste management workers. Thus, it is not necessary to change the definitions of waste types for DOE to manage waste according to the health risks they pose.

Comment (1830)
Commentors expressed concerns that the projected waste volumes used for the WM PEIS analysis are based on 1994 and earlier data. The designation of ANL-E as a major site and the WM PEIS impact analysis for ANL-E are based on inflated radioactive waste projections and alternatives that do not fit. For low-level mixed waste, a projected volume of 8,410 cubic meters was listed in the data tables. The PEIS acknowledges that this figure is 60 times higher than is currently estimated by ANL-E. The document cites similarly inflated estimates for BNL. It is ominous that DOE should consider a factor of 60 applied in this circumstance to be realistically conservative. This approach renders the evaluation of alternatives meaningless. Based on the approach taken for these two sites, the credibility of any of the data in the report is questionable. DOE should work with the DOE Operations Offices to obtain correct data, recalculate the numbers, and conduct a more accurate, meaningful analysis.

Response
The Draft WM PEIS used low-level mixed waste information from DOE's 1994 Mixed Waste Inventory Report. The Final WM PEIS contains mixed waste information for ANL-E from the 1995 Mixed Waste Inventory Report which estimates the volume of mixed waste (inventory plus 20 years of generation) at ANL-E to be 159 cubic meters. DOE did not reanalyze waste management at BNL using new waste-volume data. The previous analysis, although likely to be conservative, was considered sufficiently accurate for programmatic decisions. See Section 3.7 in Volume I for DOE's preferred alternatives, and the reasons they are preferred, for all waste types, including low-level mixed waste.

Appendix I in Volume IV provides detailed information on 1995 data for low-level waste, low-level mixed waste, and transuranic waste. DOE examined these data for each site to determine whether a reevaluation of impacts was required. The criteria applied and sites chosen for reanalysis are also identified in Appendix I.

Identification as a "major site" does not mean the site will be selected as a site for waste management activities. The major site concept, which is explained in Section 1.6.1 in Volume I of the WM PEIS, is intended to facilitate the analysis in terms of alternatives considered and to allow for meaningful comparison of programmatic waste management options. ANL-E fits the WM PEIS definition of a major site.

Comment (2079)
In Volume I, Chapter 1, the box titled, "Types of Radioactivity" states that dense materials are the best shield for neutrons. This is incorrect; hydrogenous materials (water or wax) are the best shield.

Response
DOE corrected the Summary document and Chapter 1 in Volume I of the WM PEIS to indicate that hydrogenous materials, like water, are more effective than dense materials for shielding neutrons.

Comment (2140)
DOE should explain what type and quantity of waste will be generated by the particle accelerator scheduled to be at BNL in 1999.

Response
The Relativistic Heavy Ion Collider (RHIC) is currently scheduled to be completed in 1999. DOE prepared an environmental assessment in 1991 to evaluate potential environmental impacts associated with the construction and operation of RHIC. Based on 1989 waste generation data for BNL, it was estimated that RHIC would increase BNL's generation of solid waste by 5%, hazardous non-radioactive waste by 2%, and low-level radioactive waste by 4%. The radioactive low-level waste would be mainly in the form of activated target material. Based on the most recent data, less than 1% of the low-level radioactive waste generated in the DOE complex is generated at BNL.

The Final WM PEIS uses more recent waste-volume data that were not available when the Draft WM PEIS was prepared. A discussion of the new waste volumes is provided in Volume IV, Appendix I, of the Final PEIS.

Comment (2142)
DOE should explain what wastes would be produced from transmuting and partitioning wastes at BNL.

Response
DOE assumes that this comment refers to using nuclear reactions to transmute long-lived radionuclides to short-lived or stable nuclides. Such transmutation could take place in accelerators or nuclear reactors. One transmutation reaction that has been considered concerns technetium-99, a troublesome radionuclide with a half-life of 225,000 years. In this process, technetium-99 would be bombarded with neutrons to form technetium-100, which decays quickly (16-second half-life) to ruthenium-100, which is stable. Transmutation also applies to waste containing fissionable fertile nuclides (nuclides will be transmuted to fissionable nuclides upon neutron absorption), such as those in uranium, thorium,

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and transuranic waste. The effect would be to convert long-lived fertile radionuclides into shorter-lived fission products through the fission process. These fission products would be disposed of as low-level radioactive waste. Also, useful heat would be produced.

The following caveats apply to transmutation: (1) demonstration of the process has not been applied to transuranic waste and (2) it is a technology that has not yet been proven acceptable for production-size facilities.

The low-level waste data used in the Draft WM PEIS were taken from the 1992 Integrated Data Base. For the Final PEIS, the waste estimates have been updated using the 1995 Integrated Data Base. Approximately 1% of the curie content of the low-level mixed waste at BNL is either technetium-99 or a fissionable fertile nuclide and potentially suitable for transmutation.

Comment (2154)
Commentors asked whether classified waste is considered in the WM PEIS, and stated that DOE should declassify all waste volumes at all sites. The public cannot decide what to do until all the wastes have been openly identified.

Response
A classified waste, which requires protection against unauthorized information or material disclosure for reasons of national security, is a special-case waste when there is no management plan for it. Such waste would be managed as a special-case. As further discussed in Volume I, Section 1.5.6, of the Final WM PEIS, special-case waste is not considered in the WM PEIS. Special-case wastes account for less than 4% of low-level waste, low-level mixed waste, and transuranic waste inventories.

Comment (2155)
Does DOE classify platinum as a waste? There is platinum onsite at Portsmouth.

Response
DOE waste could contain traces of platinum and, therefore, could be considered waste. For the WM PEIS analysis, DOE used standard radiological profiles for each site and made assumptions about the concentration of each waste type in each treatability group based on available data on the origins of the waste. None of these profiles contained platinum. Most of the radioactive isotopes of platinum have short half-lives (days or hours) and it is a fairly inert metal.

Comment (2172)
Ninety-nine percent of all wastes are liquids, but were left out of the WM PEIS. DOE admits that under a number of alternatives, Hanford exceeds its total wastewater treatment capacity. Hanford exceeds it even under current proposals without sending more waste here to be treated.

Response
Contaminated wastewater generated at a DOE site is treated at that site. The process residues from this treatment are included in the waste volumes considered in the WM PEIS, as were the volumes of low-level waste, low-level mixed waste, and transuranic waste wastewater as available from the data sources identified in the Draft PEIS. The Final WM PEIS does not evaluate low-level waste wastewater.

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At the Hanford Site, a large volume of secondary low-level mixed waste and low-level waste wastewater is projected from management of high-level waste. (More detail could be obtained from the Tank Waste Remediation System EIS.) This wastewater is also excluded from WM PEIS evaluations of low-level mixed waste and low-level waste. It is considered to be part of high-level waste treatment, which is not within the scope of the WM PEIS.

Under no alternative in the PEIS is there liquid waste that will be shipped to Hanford for treatment at a wastewater treatment facility. However, some alternatives evaluated in the WM PEIS could require additional wastewater treatment capacity at the Hanford Site. This is shown in Tables 11.6-1 and 11.6-2 in Volume I, which displays the range of combined waste management alternative impacts and the range of cumulative impacts respectively at the Hanford Site.

Comment (2269)
A review of the 200 Area West Study shows that the plutonium numbers are invalid for that area. The data show all the same isotopic mix, which was done for reasons of national security. For this reason, DOE should be careful about using the Hanford Environmental Information System database numbers in the PEIS.

Response
Special nuclear materials are not usually classified as wastes and, therefore, are outside the scope of the WM PEIS. The storage and disposition of weapons-usable fissile materials is analyzed in a separate PEIS.

The Draft WM PEIS identified the sources of the waste-volume data used. These sources represented the best available data at the time of the analysis on how much waste there was, and where it was at the time the Draft WM PEIS was prepared. Appendix I in Volume IV of the Final WM PEIS uses the most recent databases to update the site-specific waste volumes.

Some nuclides of plutonium are fissile. Therefore, plutonium can be used to sustain a nuclear chain reaction in a nuclear reactor or a weapon. Plutonium in a material of sufficient purity could be used in weapons. Management of such material is addressed in the Storage and Disposition of Weapons-Usable Fissile Materials PEIS.

Waste generated in the DOE complex that is contaminated with plutonium would be either low-level waste, low-level mixed waste, or transuranic waste. The WM PEIS does not use the Hanford Environmental Information System database. The data bases that are used for these waste types are referenced in Chapters 6 through 8 in Volume I and in Appendix I in Volume IV.

Comment (2329)
It is not clear what categories and volumes of wastes are to be treated by the Toxic Substances Control Act (TSCA) incinerator, the Scientific Ecology Group (SEG) unit, and other planned installations at Oak Ridge National Laboratory (ORNL).

Response
The WM PEIS analyzes siting options for treatment, storage, and disposal of waste on a programmatic scale. The categories and volumes of waste to be treated at the Oak Ridge Reservation (ORR) depend on waste type and siting option, or alternative. For each waste type, the PEIS shows the treatment

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sequence by physical and chemical characteristics. For example, Figure 7.2-1 in Volume I shows that combustibles and organic liquids would undergo thermal treatment, such as incineration.

The TSCA incinerator, located at the K-25 Site, is a facility for destroying mixed waste, hazardous waste, and certain chemical substances covered by the TSCA. The 1994 low-level mixed waste incineration capacity for ORR was 13,500 cubic meters per year.

SEG is a private company that provides low-level waste processing services. According to a recent NRC report (NUREG/CR-6147), there is an SEG supercompactor near ORR that handled more than 1 million cubic feet of low-level waste during 1989. The WM PEIS considered supercompaction as a technology for treating compactible low-level waste. SEG also operates an incinerator at the ORR.

The WM PEIS does not provide determinations of which facilities to use at a site, although it provides credit for existing capacities in the evaluation of impacts. Thus, the existing treatment capacity at the TSCA facility is considered and construction impacts are not listed for wastes that could be treated in the TSCA facility. The WM PEIS also does not make determinations of whether to treat waste onsite or use a commercial facility such as SEG. These determinations will be made after site-level evaluations.

The technical reports available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS contain more information on categories and volumes of waste.

Comment (2332)
It is not clear what becomes of the solid residue and what weight is given to issues related to transportation of contaminated feeds and residues at ORR.

Response
The WM PEIS evaluated the impacts of routing wastes requiring treatment and or disposal through a series of facilities, referred to as a treatment train. This analysis accounted for 100% of the entering material (feeds) and exiting material (residues) as they were routed from each facility to the next appropriate facility for treatment. At the conclusion of treatment, residues were routed to disposal. Any waste shipped offsite was appropriately packaged and certified before shipment. Figure 6.2-1 in Volume I, as an example, shows the PEIS flow diagram for low-level mixed waste.

DOE analyzed transportation impacts associated with each waste management alternative as wastes were routed to other sites for treatment and/or disposal. Both truck and rail transportation were considered using computerized routing models following the general principle of minimizing distance and transportation time. Transportation routes were selected to be consistent with DOE's current routing practices and all applicable U.S. Department of Transportation regulations. Sections 6.2.4, 7.2.4, 8.2.4, and 9.2.4 in Volume I and Appendix E in Volume IV contain more detail on transportation.

Therefore, contaminated feeds and residues are included in wastes routed to disposal following treatment, and are considered in the evaluation of transportation and disposal impacts.

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Comment (2336)
The WM PEIS deals in only a cursory fashion with liquid wastes, although the possibility of expensive and embarrassing events from this category seem more likely than from many on which the WM PEIS focused.

Response
While the WM PEIS covers five waste types, those wastes are not homogenous and are derived from thousands of different waste streams. Therefore, the wastes were combined into treatment groups for purposes of developing treatment system designs (see Volume I, Section 5.2.1). Each treatment group is identified with one of the five waste types considered in the WM PEIS and a treatment method, where appropriate, that EPA recognizes as meeting the requirements of RCRA. For the WM PEIS analysis, the physical structure of the waste was used for the initial sort for treatment grouping.

At the most basic level of analysis, all waste can be grouped into six physical categories using common engineering criteria design parameters, which also served as the initial set of treatment categories. Wastes could be subjected to more than one treatment process before being suitable for disposal. These physical categories considered in the WM PEIS include aqueous liquids and organic liquids. Aqueous liquids are primarily water with organic content less than 1% (such as wastewater) and organic liquids are liquids and slurries with organic content greater than 1% (such as solvents).

Liquids are included in the generic treatment plan for the different physical waste forms. For example, Figure 6.2-1 in Volume I shows the WM PEIS flow diagram for low-level mixed waste.

Comment (2392)
Volume I, Table 1.6-2, gives volumes and percent of wastes at major sites. The WM PEIS should present species by volumes and curies for all wastes. By describing relative size in volumes rather than providing the information in curies, the reader can readily be misled. For example, the graph would lead one to believe that both Hanford and INEL have more transuranic waste issues to address than does SRS and LANL, whereas if one were to look at curies (what one cares about when it comes to exposure) the SRS transuranic waste issues are by far the largest of any of the DOE sites. In addition, presenting transuranic wastes by only physical volume favors sites with plutonium-239 versus sites with mostly plutonium-238, which could place SRS and LANL at a funding disadvantage relative to Hanford and INEL. The use of volumes as the measure of waste obscures rather than clarifies the nature and extent of waste management problems elsewhere as well, and places some sites at a funding disadvantage.

Response
Both volumes and curies are important for the evaluation of impacts for each alternative. Waste volume is a primary criterion for identifying sites as potential locations for waste management activities under the various alternatives. Waste volume is a readily understandable measure of wastes at each site, and is presented in Volume I. Information on total radioactivity cannot be accurately presented without detailed information on the radiological profiles--as noted in the comment. However, the radiological profile data are voluminous. Consequently, this information is contained in the technical reports referenced in Volume I, Section 15.2, and available in the DOE public reading rooms listed in Section 1.9 in Volume I.

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Broad radioactive categories (contact- versus remote-handled, alpha versus non-alpha) are also important in the development of alternatives. They are also important in estimating costs and impacts associated with resource use. The source terms for risk contain detailed radiological profiles for each site and are presented in the technical reports. However, risk is one of the major impact categories analyzed for all alternatives. The results of the risk analyses are summarized in Volume I.

As discussed in the technical reports, the source terms were developed by assigning profiles to waste streams groupings, then by routing those waste steams through the treatment trains--keeping an account of the radiologic content of each part of the waste flow. For transuranic wastes, for example, the curies of plutonium-238 versus plutonium-239 are tracked throughout the streams and specific radionuclides such as plutonium-238 and americium-241 drive the risks. Appendix D identifies for each waste type those radionuclides that are risk drivers.

The WM PEIS is not intended to be a mechanism for controlling funding at various DOE sites. However, DOE believes that the WM PEIS accurately portrays the importance of the radiological characteristics, as well as the volumes of wastes to decisionmakers who allocate resources.

Comment (2431)
Data presented in Volume I, Table 4-2, for INEL list values that are inconsistent with other DOE documents, including the sources listed in Section 5.2.1. The listed inventories for mixed waste are less than inventories listed in the INEL Site Treatment Plan. Programmatic decisions (i.e., assumptions made during the analysis of risk, impacts, and costs) based on this data are a concern that should be addressed.

Response
As stated in Volume I, Section 5.2.1, DOE revises the databases used for the WM PEIS as new data become available. The Draft WM PEIS used the latest data available for low-level mixed waste, which was the 1994 Mixed Waste Inventory Report. Changes in waste inventories at INEL or at other sites could affect the size of proposed facilities, but are not likely to affect basic conclusions based on the PEIS. Appendix I in Volume IV of the Final PEIS addresses how more recent waste-volume data, including data from the 1995 Mixed Waste Inventory Report, could affect the analysis of WM PEIS alternatives.

Comment (2434)
It would be helpful if the tables defining the alternatives showed amounts of offsite waste (of each type) to be treated or disposed of at each site under each alternative and/or the percentage of total DOE complex waste (of each type) to be treated or disposed of at each site under each alternative (not just the percentage of waste to be treated or disposed of at each site that came from offsite).

Response
The amount of waste that would be treated and disposed of at treatment and disposal sites under each alternative is in the supporting technical reports for waste types. The technical reports are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. The amount of offsite waste each site would treat and dispose of can be determined using the volumes identified in the technical reports and the percentages identified in Volume I of the PEIS.

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Comment (2439)
In Volume I, Table 7.1-1, the total for INEL is wrong. It should be 104,000.

Response
The inventory of 3,500 cubic meters and 20-year projected generation of 101,000 cubic meters has been rounded up to 105,000 cubic meters in Table 7.1-1 in Volume I.

Comment (2807)
Volume I, Section 1.5.6, of the Draft WM PEIS refers to some low-level waste (LLW) that, "because of its high radioactivity levels, cannot currently be disposed of at existing DOE LLW disposal facilities..." If some LLW is so radioactive, it is a misnomer to characterize it with the term "low-level." This misleads the public into thinking that all of this waste is relatively innocuous. Therefore, LLW of this nature should be given a new and distinct term and should be handled separately and with greater care than LLW that fits the implied definition of the term.

Response
Section 1.5.6 in Volume I of the WM PEIS describes wastes that are not considered in this document. Such wastes include special-case waste and commercial greater-than-Class-C (GTCC) LLW. Special-case waste is defined as radioactive waste owned or generated by DOE that does not fit into typical management plans developed for the major radioactive waste types such as high-level waste, low-level waste, and transuranic waste. Examples of special-case waste are (1) LLW that, because of its high radioactivity levels, cannot currently be disposed of at existing DOE LLW disposal facilities without exceeding their performance standards and (2) transuranic waste that cannot meet geologic disposal acceptance criteria.

Under the Low-Level Radioactive Waste Policy Amendments Act of 1985 (42 USC 2021), DOE is also responsible for commercially generated GTCC LLW. GTCC exceeds NRC concentration limits for Class C LLW specified in 10 CFR 61 and, thus, exceeds limits for shallow land burial. Commercial GTCC LLW includes activated metals, process wastes, other contaminated solids generated from the operation of commercial nuclear power plants, and radioactive materials that are used in minerals exploration and as part of medical treatments. Because of their high radioactivity levels and long half-lives, special-case wastes and GTCC LLW must be isolated for hundreds or, in many cases, thousands of years. Unlike transuranic waste and high-level waste, however, neither of these waste types is authorized under the Nuclear Waste Policy Act (42 USC 10101-10270) for disposal in a geologic repository. Further, both special-case wastes and GTCC LLW vary considerably in their nature. DOE is currently developing strategies for both GTCC LLW and special-case waste that include disposal. On March 13, 1995, DOE published a notice in the *Federal Register* inviting interested parties to provide input into the development of strategies. Subsequently, two workshops were held to discuss preliminary strategies. Based on the input received, alternative strategies will be evaluated in a NEPA review once a proposal is developed.

Comment (2823)
In Volume I, Section 1.1, provide a reference, citation, or basis for classifying test specimens as low-level waste.

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Response
DOE revised Section 1.1 to indicate that DOE Order 5820.2A is the source for the statement about the classification of test specimens.

Comment (2905)
The WM PEIS does not characterize the waste streams at the sites well enough to enable the public to make constructive suggestions regarding the proposals. Additional information that would be useful for each waste classification at each site includes:

- Weight and volume of each waste stream;
- Level of radioactivity for each waste stream;
- Volume of waste by radioactivity level ranges and half-lives;
- Post-treatment volume for permanent disposal;
- Nature of non-hazardous substrate(s): State, carbonaceous, mineral, metal, etc.;
- Nature of contaminants: organic/inorganic, species, amount, concentration, half-life, if applicable;
- Potentially applicable processing and storage technologies, including required means of handling, e.g., contact or remote;
- Feasibility of transporting waste across sites for treatment and permanent disposal; mode of transportation available at each site, e.g., truck, rail;
- Suitability of treatment methods (e.g., compaction, combustion, vitrification, etc.);
- Relative cost of treatment;
- Future manpower availability and requirements at each site;
- Permanent disposal requirements and existing suitable site disposal facilities.

Response
The WM PEIS analyzes the potential impacts of managing wastes containing hazardous chemicals and radioactive isotopes. The chemicals/isotopes represented in DOE waste are numerous and diverse and reflect the spectrum of activities that DOE conducts. DOE manages these chemicals and isotopes according to broad waste types: high-level waste, low-level waste, low-level mixed waste, transuranic waste, and hazardous waste. The WM PEIS is organized according to these waste types. It is important to note, however, that risk analyses were based on individual chemicals and radionuclides.

A detailed discussion of waste characterization data used for the analysis of impacts in the WM PEIS is contained in the technical reports listed at the back of Volume I. These technical reports are available in the DOE public reading rooms listed in Section 1.9 in Volume I. For example, the reports authored by Argonne National Laboratory (ANL) show weight and mass of the waste stream groups (aggregates of the more than 2,000 streams in DOE) analyzed at each site, radioactivity levels and radiological profile (curies by radionuclide and percentage in the waste stream of each of the waste stream groups), disposal volumes, chemical-physical structure of the waste stream groups, and concentrations of contaminants in the waste groups. The ANL reports also give technical specifications for the technologies assumed for the analysis and the assumed existing facilities at each site. Other reports authored by the Idaho National Engineering Laboratory (INEL) detail costs and resources.

A more general discussion of these elements of the analytic methods employed by the WM PEIS is contained in Volume I, Chapter 5, and in Appendices C and D in Volume III. The WM PEIS does not contain a discussion of onsite transportation capabilities. The PEIS analysis assumed adequate transportation onsite and conducted a representative assessment of impacts using one site as its model. More detailed analyses of onsite transportation options will be included in site-level analyses, as appropriate.

The WM PEIS is not intended to provide the detail necessary to make all waste management decisions. Rather, it provides a broad, programmatic analysis of waste management across the DOE complex upon which strategic and programmatic decisions can be based. To address the issue of safe and efficient management of such wastes, DOE first needed to develop an overall picture. For purposes of this programmatic analysis, DOE made broad assumptions about waste characteristics and management practices. Before implementing Department-wide waste management strategies, additional NEPA reviews will likely be necessary to identify the precise location, capacity, and design of facilities at the individual DOE sites. Implications of specific waste characteristics would also be addressed in such reviews.

Comment (2910)
The wastes are generally characterized by volume. The Final WM PEIS should explain whether these are before or after treatment.

Response
The WM PEIS analyzes waste volumes for hazardous waste, low-level waste, low-level mixed waste, and transuranic waste before treatment (with the exception of certain wastes in storage that might have been treated, and evaporated wastewater) and high-level waste volumes after treatment. The PEIS analyzes the treatment activity and makes assumptions on final waste forms (volumes) to evaluate disposal alternatives. The PEIS limits its evaluation of high-level waste to alternatives for storing waste that has been treated. DOE considers the treatment of high-level waste a site-specific activity, since this waste will not be shipped for treatment and is, therefore, beyond the scope of the WM PEIS.

Comment (2937)
It should be made clear whether wastes generated from weapons dismantlement and processing surplus enriched uranium are included.

Response
The WM PEIS does not specifically address wastes from the processing of surplus highly enriched uranium (HEU). When DOE estimated volumes of low-level waste and low-level mixed waste volumes for the PEIS analysis, it did not consider the disposition of surplus highly enriched uranium. DOE will estimate volumes of waste from processing surplus HEU in the Disposition of Surplus Highly Enriched Uranium EIS and nuclear weapons assembly/disassembly in the Stockpile Stewardship and Management PEIS. The waste volume estimates in the WM PEIS are conservative and would cover the minor volumes of wastes DOE expects to generate from processing surplus HEU and weapons dismantlement. Appendix I in Volume IV of the Final PEIS provides the latest available information on waste inventories.

Comment (3032)
DOE should use current data in Table 1.6-2 and state if the data are limited to waste management waste.

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Response

Tables 1.6-2 and 1.6-3 in Volume I of the WM PEIS presents the waste management waste volumes used in the document. The sources for these waste-volume data are described in Section 5.2.1 in Volume I of the PEIS.

Since environmental restoration wastes are outside the scope of the WM PEIS, DOE has changed the title of Table 1.6-3 in the Final PEIS to indicate that the data are for waste management wastes only.

Comment (3079)

Table 7.3-2 and others show the percentage of offsite waste compared to locally generated wastes. However, this method of delineating the effect of adding offsite wastes is biased against large sites, such as Hanford, that have large quantities of locally generated waste.

Response

In choosing sites for the alternatives, DOE considered waste volumes, transportation requirements, character of waste, specialized treatment requirements, and existing facilities (see Section 3.5 in Volume I). Table 7.3-2 in Volume I was generated after sites had already been selected using the above set of criteria, and was therefore, not used to choose sites for analyses. The objective of this table and others showing the alternatives is to provide more information on the alternatives.

DOE believes the waste volume and shipping tables, such as Table 7.3-2, contained in each waste-type chapter for each alternative provide valuable information to the public regarding the relative effect of adding offsite waste that would be shipped to their site under each alternative. Although these tables do not compare the size of waste volumes at the sites, the percentages given help the reader understand the potential increase in the volume of waste each site would be required to manage, and gives some indication of the potential impact at the site.

Comment (3262)

Throughout the WM PEIS, various amounts of waste are cited as being the subject of the WM PEIS. The figures listed are not consistent. For instance:

- Table 6.1-1 lists a 20-year projected inventory of low-level mixed waste of 22,000 cubic meters for RFETS;
- Table 6.15-1 predicts low-level mixed waste from environmental restoration at RFETS to be 116,000 cubic feet;
- The RFETS contractor has estimated that 194,000 cubic meters of low-level mixed waste will be generated, as well as 12,300 cubic meters of low-level waste (Rocky Flats Accelerated Site Action Project - October 9, 1995). These numbers add significantly to the 20-year projection in the WM PEIS.

Response

The 21,000 cubic meters of low-level mixed waste in Volume I, Table 6.1-1, represents waste management inventory at RFETS, plus the anticipated 20-year generation. The environmental restoration waste volumes have been updated for the Final WM PEIS, based on the 1996 Environmental Restoration Core Database. The total volume of environmental restoration low-level waste, low-level mixed waste, and transuranic waste at RFETS is now estimated to be 96,000, 380,000, and 4,900 cubic meters, respectively. Since 1992, the mission of RFETS has been decontamination and decommissioning and cleanup, as well as special nuclear material stabilization and storage.

Comment (3328)
The classification of the five types of waste in this document is an incredible piece of mathematical genius meant to convince us all of something. The WM PEIS Summary document states that DOE developed and applied specific assumptions to evaluate the potential environmental impacts of the alternatives, and that DOE first identified the type, characteristics, quantity, and special requirements (e.g., handling requirements) of each waste type to frame the analysis within reasonable bounds and to make the analytical process more manageable. Wouldn't the application of specific facts produce a better evaluation?

Response
The classification of the five waste types in the WM PEIS was not made based on DOE policy, but rather, was based on the existing definitions of those waste types set forth in Federal statutes passed by Congress. These statutes also specify many requirements, such as handling requirements, for these wastes, with which DOE must comply.

The WM PEIS is a programmatic document that evaluates the potential environmental consequences of implementing various forms of an entire DOE program. Such documents typically consider impacts that will occur in the future under conditions that often are not precisely set. The WM PEIS evaluation is based on facts to the extent that they are available. For example, waste volumes and characteristics were obtained from the latest data available. However, various waste forms would be transported along routes that have yet to be specified, and much of the waste would be treated and disposed of in facilities that have not been built. Therefore, it was necessary to make reasonable assumptions about routes, facilities, and other issues in order to estimate and evaluate the potential consequences of the various alternatives.

Comment (3342)
The categorization of waste into a handful of types may be convenient, but there is much contamination below the low-level criteria which, in time, will be proven hazardous, and should not be excluded.

Response
The categorization of wastes into waste types is based on statutory definitions. Therefore, DOE is required to apply these definitions in its management of waste. Radioactive waste that does not meet the definition of high-level waste, spent nuclear fuel, or transuranic waste is low-level waste. If low-level waste is also contaminated with constituents that are hazardous under RCRA, then it is low-level mixed waste. There is no statutory lower limit on the amount of radioactivity in low-level waste and low-level mixed waste. However, in practice, any radioactivity above background levels would result in a waste being classified as either low-level waste or low-level mixed waste.

Comment (3424)
Plutonium residues and scraps at Hanford should be declared waste (rather than special nuclear material exempt from regulation) and its disposal considered in the WM PEIS.

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Response
Plutonium scraps (materials discarded from manufacturing processes) and residues currently stored in the Plutonium Finishing Plant at Hanford have been declared excess to defense program needs. Plans for treatment of such plutonium-bearing material to render it more stable are discussed in the Plutonium Finishing Plant Stabilization EIS. The Record of Decision for that EIS, published in the *Federal Register* on July 10, 1996, selected the alternative to stabilize the material and then place it in interim storage on the Hanford Site. However, these scraps and residues have not yet been declared waste. Before the designation of "special nuclear material" can be removed and the material declared to be waste, certain processing must take place so that safeguards and security requirements are met.

Comment (3528)
The WM PEIS should provide more details about the types of waste categorized as special-case waste [e.g., explain whether classified transuranic waste (see Implementation Plan for NTS - DOE/NV-390, Rev. 0) is a special-case waste]. The WM PEIS should further identify wastes excluded from the PEIS based on the laws/regulations providing for such exclusions (as, for example, materials emitted as a result of nuclear explosions are considered a "Federally permitted release" not reported to EPA).

Response
As described in Volume I, Section 1.5.6 of the WM PEIS, at some sites there are kinds of low-level waste or transuranic waste that are designated as "special-case" wastes by the generating site. Although it may be categorized as low-level waste or transuranic waste, such waste would be managed as a special-case. DOE did not undertake a detailed waste-stream and site-specific analysis in the WM PEIS to develop options for each of these exceptions. As detailed analyses are conducted, management plans for each waste stream will be established.

DOE is currently developing strategies for special-case wastes that include disposal. On March 13, 1995, DOE published a notice in the *Federal Register* inviting interested parties to provide input into the development of strategies. Subsequently, two workshops were held to discuss preliminary strategies. Based on the input received, alternative strategies will be evaluated in a NEPA review.

Classified waste is addressed in the NTS Sitewide EIS. It is defined as weapons components and assemblies designated by the U.S. Government, pursuant to Executive Order, statute, or regulation, that require protection against unauthorized information or material disclosure for reasons of national security. Additional security and safeguards management activities are required in the handling of these materials. These classified wastes can be, but are not necessarily special-case waste. The databases from which waste volume information was obtained do not include classified waste.

The WM PEIS addresses five waste types (i.e., low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste) that have resulted from DOE's past energy and weapons research and production. If a waste resulting from a nuclear weapons testing activity falls into one of the five categories and is not classified waste, it is addressed in the WM PEIS. Note that contaminated media such as soils and groundwater are being addressed by DOE's Environmental Restoration Program and, therefore, are outside the scope of the WM PEIS.

Comment (3530)
The waste volumes at NTS (i.e., 0.3 cubic meters of low-level mixed waste and 610 cubic meters of transuranic waste) are seriously under-reported. For example, there are about a dozen sites with

kilogram quantities of plutonium-239 disposed over hundreds of acres, and at Area 13, approximately 600,000 cubic yards of surface soil were removed and hauled to a desert crater at the Nevada Test Site (NTS).

Response
The Draft WM PEIS identified the sources of waste-volume data. Those sources represented the best data available at the time the Draft PEIS was developed. Since then, new information from updated databases has become available for low-level mixed waste, low-level waste, and transuranic waste. The updated data are discussed in Volume IV, Appendix I, of the Final PEIS to determine if the update waste-volume data affect any of the impacts described in the PEIS.

While the 1994 Mixed Waste Inventory Report reported a current inventory of 0.3 cubic meters of low-level mixed waste at NTS, the 1995 Mixed Waste Inventory Report shows 300. For transuranic waste, the newer data show 620 cubic meters in inventory at NTS, compared to 610 cubic meters reported in the earlier sources. Environmental restoration waste volumes are presented for each site in Volume III, Appendix B, of the WM PEIS. However, environmental restoration alternatives are not addressed in the WM PEIS analysis. The wastes referred to in the comment are primarily soils contaminated with plutonium. These wastes have been removed, packaged, and disposed of at NTS. Therefore, no further action is contemplated, and consequently, these volumes are not included in the Waste Management Program inventory for NTS.

Comment (3685)
The WM PEIS does not incorporate historical data for waste volumes for the five waste types. Why? We never have had a U.S. Nuclear Policy Management Plan inclusive of addressing the waste.

Response
The waste volumes considered in the WM PEIS have two components: (1) an inventory of waste that was generated in the past and is now in storage awaiting treatment and disposal and (2) projections of wastes to be generated in the 20-year period of analysis. The inventory waste is based on historical data. The databases that contain these historical data are referenced in the respective waste-type chapters in Volume I of the PEIS. The waste volumes do not include waste that has already been disposed of or wastes that will remain within the Environmental Restoration Program. As explained in Volume I, Section 1.7.1, environmental restoration wastes were originally within the scope of the WM PEIS. After completion of the Implementation Plan, it became clear that it would not be appropriate to make programmatic decisions regarding cleanup strategies that would be applicable to all of DOE's sites. DOE announced its proposal to shift the focus of the WM PEIS on January 24, 1995 (60 FR 4606).

Comment (3740)
The public needs to have questions answered (1) What are the isotopes of the materials? (2) What are the half-lives of the isotopes? (3) Is plutonium involved in the material to be disposed of at ANL-E? (4) Will the waste be in a fixed or liquid state?

Response
While the WM PEIS covers five waste types, those wastes are not homogenous and are derived from thousands of different waste streams that contain a wide variety of isotopes. Details of the radiological composition assumed for each waste type are found in the technical reports published for the waste

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types (see Volume I, Section 15.2). For example, low-level waste is divided into six categories, each of which contains an assumed mix of isotopes. Each of these isotopes has a unique half-life, which could range from a few years to thousands of years.

Plutonium is listed in the ANL-E low-level waste management feedstock radiological profiles for fission products. It accounts for less than 1% of the total activity of ANL-E's low-level waste. (See the WM PEIS Low-Level Waste Technical Report, which is available in the DOE reading rooms listed in Volume I, Section 1.9, of the Final PEIS.)

Comment (3746)
The WM PEIS fails to disclose quantities and plans for the very hottest "low-level" radioactive waste, e.g., greater-than-Class-C (GTCC) waste and special-case waste.

Response
Low-level radioactive waste (LLW) includes all radioactive waste that is not classified as high-level waste (HLW), spent nuclear fuel, transuranic waste (TRUW), or uranium and thorium mill tailings or waste from processed ore. As described in Section 1.5.6 in Volume I of the WM PEIS, under the Low-Level Radioactive Waste Policy Amendments Act of 1985, DOE is responsible for managing commercially generated GTCC LLW. GTCC exceeds NRC concentration limits for Class C LLW specified in 10 CFR Part 61, and is, therefore, generally not suitable for near-surface disposal. However, unlike TRUW and HLW, this waste is not included for disposal in a geological repository authorized by the Nuclear Waste Policy Act. DOE has identified certain waste as special-case waste that does not fit into typical management plans. Special-case LLW includes highly radioactive LLW that cannot comply with the waste acceptance criteria of near-surface disposal facilities.

DOE is currently developing strategies for managing GTCC and special-case LLW that include disposal. On March 13, 1995, DOE published a notice in the *Federal Register* inviting interested parties to provide input into the development of strategies. Subsequently, two workshops were held to discuss preliminary strategies. Based on the input received, alternative strategies will be evaluated in a NEPA review once a proposal is developed.

Comment (3934)
The volumes and types of wastes considered in the WM PEIS omit major predictable, known categories and sources within the current DOE inventory, as well as categories and sources that DOE can reasonably expect to be created within the next 20 years.

Response
The volumes and types of wastes included in the Draft WM PEIS were based on the best information available at the time the Draft PEIS was prepared. The Final PEIS includes updated data (see Appendix I in Volume IV). The databases containing waste volumes and types are available to the public.

The WM PEIS includes only categories of waste that are appropriate for a programmatic decision. Volume I, Chapter 1, of the WM PEIS includes a discussion on which wastes were included and excluded, with supporting rationale.

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Comment (4015)
DOE should update the BNL portion of Table 4-2 in Volume I because (1) for low-level mixed waste, the table reports 85 cubic meters in inventory and 110 cubic meters to be generated over 20 years, while Chapter 11 shows 10 cubic meters and 20 cubic meters, respectively; and (2) the table does not list any low-level waste quantity for BNL, while Chapter 11 indicates that there are 400 cubic meters in inventory and 4,000 cubic meters to be generated over 20 years.

Response
The analysis in the Draft WM PEIS was based on inventory and projected waste volumes for each generating site as listed in the databases identified in the Draft. The sources of WM PEIS waste volumes are identified at the beginning of Chapters 6 through 10 and reflect a "snapshot in time." This snapshot is considered sufficient for the broad programmatic decisions to be made based on the WM PEIS.

Since the Draft WM PEIS was published, new information from updated databases has become available. Appendix I in Volume IV of the Final WM PEIS discusses updated waste-volume information and whether the new information affects any of the impacts described in the WM PEIS. Where the newer data were likely to cause significant increases in the impacts predicted based on the older data, sites are reevaluated. Where the new data showed decreases, however, the older analyses were retained to assure a conservative approach that captured the greater possible impacts. For BNL, the new data predicted low-level mixed waste decreases and low-level waste increases. Thus, low-level waste at BNL was reevaluated, while the existing low-level mixed waste evaluation was retained. Table 1.6-2 indicates the waste volumes used in the final analysis, which is 190 cubic meters of low-level mixed waste for inventory plus 20-year projected generation at BNL, based on the old data (see Appendix I, Table I.2-1). For low-level waste at BNL, the new data reports 5,640 cubic meters for inventory plus 20-year generation, as indicated in the revised Table 1.6-2 and in Appendix I. DOE has revised Volume I, Section 11.2, to be consistent with Table 1.6-2 and Appendix I.

Comment (4038)
Please note that there is controversy over whether the numbers for accumulated radioactive and hazardous waste from past nuclear weapons research and production on which the Draft WM PEIS is based are accurate. If the PEIS substantially understates the amount of environmental restoration waste, the balance between cleanup and ongoing weapons program waste management activities could be altered. This does not, however, change the fact that DOE is proposing new weapons research and production capabilities at a time when it has barely begun to address the problems caused by past activities.

Response
As described in WM PEIS Appendix B (Volume III) and Sections 6.15, 7.15 and 8.15 (Volume I), environmental restoration waste volumes were updated for the Final WM PEIS based on the database used for the 1996 Baseline Environmental Management Report, which was the best information available when the Final WM PEIS was prepared. The environmental restoration waste volumes at certain sites have substantially increased, based on the updated data. The WM PEIS contains a qualitative discussion on the potential effects of transferring some environmental restoration wastes to the Waste Management Program. Much of the environmental restoration waste is likely to be managed in place or in environmental restoration facilities. Appendix B provides details on environmental

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restoration wastes. Environmental restoration waste management decisions will be made on a site-by-site basis.

The waste-volume data used in the Draft WM PEIS were obtained from the best available sources of information at the time of the analysis about how much waste there was, and where it was at the time DOE prepared the Draft PEIS. Many of the more recent DOE documents have used waste-volume data from more recent databases on this subject, resulting in inconsistencies between the various DOE documents. Appendix I in Volume IV of the Final WM PEIS provides an update of all of the site-specific waste-volume data for low-level waste, low-level mixed waste, and transuranic waste. A partial reanalysis using these updated volumes has been accomplished by determining the chemical and radioactive emissions for particular low-level waste, low-level mixed waste, and transuranic waste alternatives. Appendix I in Volume IV discusses why these waste volumes have changed and how the new data might affect the impacts estimated by the WM PEIS analysis. Also, where large changes in impacts were likely, DOE reevaluated the impacts with the more recent data and revised the WM PEIS.

The WM PEIS analyzes the potential environmental impacts of managing the existing inventory and 20 years of projected waste inventory. Proposed new weapons research and production capabilities are outside the scope of the WM PEIS and, thus, are not addressed in the WM PEIS.

Comment (4044)
No two documents generated by DOE appear to agree on total volumes of particular categories of radioactive waste. For example, there are extremely wide variations in waste volumes between the 1995 WM PEIS, 1995 Baseline Environmental Management Report, and 1992 Integrated Data Base (particularly low-level and mixed wastes). This casts significant doubt on the statistical precision attempted in the risk assessment tables of the Draft WM PEIS, and on DOE's determinations of the extent of new facilities and transportation required to manage the large volumes of radioactive waste.

Response
The Draft WM PEIS identified the sources of waste volumes. Those sources represented the best available data at the time of the analysis on how much waste there was and where it was at the time DOE prepared the Draft WM PEIS.

Sites are constantly updating their data on inventory waste, performing additional analysis of their waste, and implementing pollution prevention practices, all of which result in different waste volumes. The WM PEIS used the official databases rather than individual site estimates to achieve a degree of consistency in the assumptions on existing inventories and projected waste generation. Generally, the waste volumes analyzed in the WM PEIS are higher and, therefore, provide a more conservative impact analysis. Updated inventory data for the individual sites are still within the range of the WM PEIS analysis (see Appendix I in Volume IV in the Final PEIS). DOE revised the applicable WM PEIS technical reports to include the updated waste volumes data.

Comment (4046)
The WM PEIS should not assume that the existing regulatory scheme for radioactive waste characterization will remain in effect for the indefinite future. The PEIS should also address the potential regulatory and financial consequences of the adoption of an alternative waste classification regime, especially since the administrative categories of low-level waste, high-level waste, and

transuranic waste have been criticized as not being based on human health risk, radioactivity, or half-life, but instead as rules of administrative convenience.

Response
The evaluation of the effects of a different waste classification system based on hazard rather than existing regulatory standards would be speculative and, therefore, impossible to meaningfully analyze.

The waste categories used by DOE to describe its wastes are established by statutes that define waste categories (e.g., the Nuclear Waste Policy Act). Regulations of EPA and NRC also use waste categories that incorporate the statutory scheme. Thus, changing to a risk- or hazard-based nomenclature system would require statutory changes by Congress.

While the present system of categorizing wastes might be imperfect, it does divide radioactive wastes into hazard categories that are useful as a first, "rough cut" approximation. In general, transuranic wastes do not need to be remotely handled, yet the plutonium and other transuranic radioisotopes have long half-lives and require permanent isolation from the human environment. High-level waste contains high concentrations of gamma-emitting radionuclides, as well as long-lived radioisotopes, and must be remotely handled. Low-level waste, *in general,* presents less of an external radiation exposure hazard than high-level waste, and contains lower concentrations of long-lived, alpha-emitting radionuclides than does transuranic waste.

Because the present nomenclature is not fully descriptive of the hazards of the wastes, DOE also considers the specific hazards of each waste stream when making waste management decisions. Different radionuclides emit different kinds (alpha, beta, and gamma) and strengths (measured in electron volt, eV, units) of radiation. For example, as described in Volume I, Section 1.5 of the WM PEIS, low-level mixed waste and low-level waste are further divided into the categories of contact-handled and remote-handled and alpha and non-alpha waste. Transuranic waste is divided into contact-handled and remote-handled categories. This depends on the specific radionuclides that are present in the waste, and their concentrations.

Thus, the WM PEIS analysis does take the major characteristics of the waste, within each waste type, into consideration in determining risks and other impacts from treatment, storage, and disposal.

Comment (4065)
Unless the Final WM PEIS includes an analysis of options for "legacy" waste *without* the addition of stockpile stewardship and management wastes and related research and development generated waste, it will continue to be grossly incomplete. Distinctions can and must be made between existing wastes currently in storage and programmatic wastes not yet generated, over which we can exercise a much greater degree of choice and, therefore, control.

Response
The WM PEIS was intended to provide an analysis upon which to make programmatic decisions and includes existing inventories and projected wastes from the Stockpile Stewardship and Management Program and related research and development. It was, therefore, necessary to include both inventory wastes, which are included in inventory volumes, and newly generated wastes in its WM PEIS analysis so that impacts would not be underestimated. Impacts of managing inventory wastes would be within the range of impacts described in the PEIS. However, because DOE must manage both inventory and

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newly generated wastes and would use the same facilities and technologies for both categories of waste, alternatives that handled them separately would not be considered reasonable and would likely be considered improper segmentation of the waste management actions under NEPA.

Appendix G in Volume IV of the WM PEIS does consider the distinction between inventory wastes and projected waste generation; however, by assuming potential waste minimization reductions to projected wastes and discussing how these reductions might affect impacts.

Comment (4457)
No evidence was presented in Section 6.1 of the Draft PEIS Summary document to support the assignment of radiological profiles uniformly to each transuranic waste (TRUW) stream at DOE sites, nor was the significance of nonuniformity assessed sufficiently to establish that the modeling used is adequate for DOE decisionmaking.

Response
DOE revised the information on nonuniformity, which is now presented in the Final WM PEIS in Volume I, Section 8.2.1.2, to clarify the derivation of TRUW radiological profiles. DOE also revised the Summary document.

Radionuclide concentrations for the 10 largest generators of TRUW were obtained from process knowledge, supplemented by limited sampling and analysis of stored TRUW. Smaller generators were assumed to have the same concentrations as LANL. Derivation of radiological profiles at each site was based on estimated radionuclide concentrations in the TRUW at the site. These profiles identify the radionuclides likely to be encountered, which influences risk and other impacts.

These methods were based on the best available data at the time the Draft WM PEIS analysis was performed. DOE, through its management and operations contractors, continues to develop better ways to determine radiological profiles as part of its ongoing site monitoring efforts.

Comment (4515)
The categories of waste in the Draft WM PEIS are oversimplified and inadequate to support the WM PEIS and associated analyses. The chemical and physical characteristics of waste (beyond their overall physical structure) need to be divided into many subcategories to determine the appropriate physical and chemical waste treatment processes needed to properly treat the waste and prepare it for disposal, and to estimate the associated environmental impacts.

Many of the radioactive waste categories need to be subdivided into wastes that pose a significant hazard over very long time periods those that would not pose such a hazard if stored for a few decades, etc.

Response
DOE performed its analysis of waste treatment by developing treatment categories based on the chemical and physical characteristics of the waste. The waste in each category would follow a unique set of treatment technologies, called a "treatment train," to achieve a prescribed level of decontamination. Dividing the waste into a number of different treatment trains would become very expensive because the economies of scale would be lost in the resultant small-throughput volumes of waste at each treatment facility. Too few treatment trains would be very inefficient, because efficient

destruction of the wide range of chemical contaminants that could be present in a particular treatment train would not be likely.

DOE carefully chose the categories of waste described in the WM PEIS analysis to avoid the problems discussed above. For example, the low-level mixed waste analysis in the PEIS used 23 different treatment categories for each of five handling categories (contact-handled non-alpha; contact-handled alpha; remote-handled non-alpha; remote-handled alpha; and polychlorinated biphenyls). DOE believes that this level of detail is appropriate for a programmatic analysis. More information on treatment categories is presented in the technical reports that support each of the waste-type chapters. The technical reports are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final PEIS.

To some extent, the current waste classification system addresses the half-lives of radionuclides. The distinguishing characteristic of transuranic waste is that it contains relatively high concentrations of radionuclides with long half-lives that must be isolated for long periods. The waste acceptance criteria for some DOE disposal facilities have classification criteria that require stabilization of waste with relatively high concentrations of certain long-lived radionuclides.

8.1.1 Low-Level Mixed Waste

Comment (1688)
Table 1.6-2 lists ORR with 26% of DOE's low-level mixed waste inventory. Explain what current or proposed ORR operations (excluding environmental restoration) are or will be responsible for generating over 25% of the low-level mixed waste in DOE's total inventory.

Response
The Draft WM PEIS estimates of low-level mixed waste current inventory and 20-year projected generation volumes were obtained from the 1992 Mixed Waste Inventory Report. This was the best source of low-level mixed waste data at the time DOE prepared the Draft PEIS. More recent mixed waste data are provided in the 1995 Mixed Waste Inventory Report, and DOE used the revised data in selected new analyses for the Final WM PEIS. Appendix I in Volume IV of the Final PEIS presents this updated waste-volume data. Table I.2-1 indicates a decrease in the estimated inventory plus 20-years generation of low-level mixed waste at ORR from 59,000 cubic meters to 50,000 cubic meters, based on the 1995 Mixed Waste Inventory Report. DOE has revised Table 1.6-2 to indicate that this more up-to-date information on waste volumes is located in Appendix I.

Activities that are responsible for the generation of low-level mixed waste at ORR include routine laboratory research, physical-plant activities and laboratory cleanout at ORNL, manufacturing and development engineering at the Y-12 Plant, and waste management at the K-25 Site.

A described in the 1995 Mixed Waste Inventory Report, the three largest sources of low-level mixed waste at ORR, and the type of waste generated, are sludge from the Y-12 Central Pollution Control Facility, ash from the K-25 TSCA incinerator, and sludge from the K-25 Central Neutralization Facility.

Comment (2002)
The WM PEIS discusses the radioactive portion of mixed waste; it should discuss the total concentrations of all constituents in the waste.

Response
For low-level mixed waste, the impact analyses, including health risks and ecological resource impacts, considered the impacts of releases of both radionuclides and hazardous constituents from waste management facilities.

Volume I, Section 6.2.1.1, of the WM PEIS describes the constituent chemical profiles that DOE assigned to identify the composition and concentration of RCRA hazardous chemical constituents that are expected to be present in low-level mixed waste. Sixteen hazardous chemical constituents (six toxic metals, three inorganic chemicals, and seven classes of organic chemicals) were evaluated, based on their presence in 32 mixed waste streams.

Concentrations of chemical constituents in most low-level mixed waste streams are not well known. DOE has performed chemical analyses of the RCRA hazardous constituents on only a limited number of low-level mixed waste streams. For most low-level mixed waste streams, information concerning the chemical constituents comes from what is known about the history of the site that generated the waste. The composition and concentration of hazardous chemical constituents for the low-level mixed waste streams were developed by (1) compiling chemical composition data presented in DOE's May 1994 edition of the Mixed Waste Inventory Report and (2) performing an engineering assessment of the industrial processes that generated the respective low-level mixed waste streams. Low-level mixed waste chemical profiles were assumed to be independent of the site that generated the waste and dependent only on the waste treatment code, based on information about historical DOE site operations and industrial processes, and Mixed Waste Inventory Report data.

Comment (2003)
Section 6.1.2 states that "waste volumes were extrapolated." List factors and assumptions made for low-level mixed waste extrapolations or cite references in this paragraph.

Response
Volume I, Section 6.1.2, describes how estimates of the current low-level mixed waste inventories and amounts DOE expects to generate were developed for each of the 37 low-level mixed waste sites. The 1994 Mixed Waste Inventory Report was the source of the mixed waste-volume data used for the WM PEIS analysis. This source of data was chosen to ensure consistency with quantities of wastes considered in the Site Treatment Plans required by the Federal Facility Compliance Act. The Mixed Waste Inventory Report lists (as of 1994) inventories of mixed waste and projected generation volumes of mixed waste for only 5 years. For the WM PEIS analysis, DOE needed waste projections for the next 20-year period of analysis. DOE used several techniques to obtain the 20-year projection. The data survey conducted to support Mixed Waste Inventory Report provided 20-year estimates for many individual waste streams. DOE used the 20-year estimates where available, and extrapolated the last year out to 20 years where the estimate was for less than 20 years. When the survey indicated that generation of a waste stream would end before 20 years, DOE also ended the projection, as indicated in the survey. A description of how these projections were developed is in the technical report, *Mixed-Waste Treatment Model: Basis and Analysis,* which is cited in WM PEIS.

Updated waste volume inventories are presented in Volume IV, Appendix I, of the Final WM PEIS.

Comment (2074)
Do the low-level mixed waste waste volumes listed in the WM PEIS include blend-down of highly enriched uranium with depleted uranium?

Response
As discussed in Section 1.8.2 of the WM PEIS, DOE issued the Disposition of Surplus Highly Enriched Uranium EIS in 1996. That EIS addresses the disposition of a nominal 200 metric tons of surplus highly enriched uranium (175 metric tons has been declared surplus to defense needs to date) to make the material non-weapons-usable and to recover its economic value where possible. The preferred alternative is to blend as much of the material as possible (up to 85%) for use as fuel in commercial nuclear power reactors and to blend the remainder for disposal as waste. The Record of Decision for that EIS, published in the *Federal Register* on August 6, 1996, opts for this preferred alternative. The blended waste is not included in the waste volumes in the WM PEIS although the cumulative impacts are included in Chapter 11 in Volume I. However, blended waste volumes from the disposition of highly enriched uranium would be small compared to the waste volume projections in the WM PEIS.

Comment (2421)
Volume I, Section 1.5.3, states that after characterization, some waste currently managed as transuranic waste might be reclassified as low-level mixed waste. DOE needs to distinguish between this alpha low-level mixed waste and other low-level mixed waste because current thinking, at least at

8.1.1 Low-Level Mixed Waste

INEL, is that alpha low-level mixed waste will be treated along with transuranic waste and both codisposed at WIPP.

Response
DOE recognizes that the sentence cited in the comment might have been confusing and deleted it from the PEIS.

The WM PEIS separates non-alpha low-level mixed waste from alpha low-level mixed waste, which DOE would manage at facilities designed for alpha waste. As stated in Volume I, Section 1.6.2. of the PEIS, variations in waste volumes, classification, and management are uncertainties that DOE does not expect will affect programmatic decisions. This discussion is elaborated in Appendix I (Volume IV). Sitewide or project-level NEPA reviews would consider site-specific data about the wastes.

The WIPP SEIS-II provides a detailed analysis of transuranic waste disposal.

Comment (2500)
In Volume I, Section 5.2.1, what is the third site for which DOE adjusted the low-level mixed waste analysis to correct waste inventories?

Response
DOE has revised the text in Section 5.2.1 to clarify which of the sites where corrections to waste inventories or projections were made. These sites are Colonie, RFETS and ETEC, ANL-E, and NTS.

Comment (2953)
Does the volume of low-level mixed waste for ORR in the Summary document include Portsmouth and PGDP, and wastes currently stored on the sites for treatment?

Response
The waste volumes presented in the Summary document and the body of the WM PEIS reflect current waste inventories and projections of future waste at ORR, the Portsmouth Plant, and PGDP as separate entities. However, wastes currently at ORR that originated at the Portsmouth Plant or PGDP are included in totals for ORR. The PEIS considers waste currently stored at a particular site part of the existing inventory at that site, regardless of its origin.

Comment (3189)
The total volume of PGDP low-level mixed waste reported in the WM PEIS is 600 cubic meters based on 1994 data. The PGDP Site Treatment Plan addresses a total volume of 1,032 cubic meters based on 1994 data. Please explain this discrepancy.

Response
The total volume of low-level mixed waste reported in the Draft WM PEIS was based on data from the 1994 Mixed Waste Inventory Report, which was the best available source of low-level mixed waste data at the time DOE prepared the Draft PEIS. The Final WM PEIS includes data from the 1995 Mixed Waste Inventory Report (see Appendix I), which lists 1,000 cubic meters of low-level mixed waste at PGDP.

8.1.1 Low-Level Mixed Waste

Comment (3761)
DOE needs to explain which waste volumes will be used in making the final decisions regarding ANL-E; the current waste volume of 8,000 cubic meters, or the projected waste volume of 140 cubic meters?

Response
The analysis of low-level mixed waste in the Draft WM PEIS was performed using waste data derived from the 1994 Mixed Waste Inventory Report. Since that analysis, the Mixed Waste Inventory Report has been updated using 1995 data. The changes in waste volumes at each DOE site as reported in the latest Mixed Waste Inventory Report are addressed in Appendix I. For ANL-E, the estimated inventory plus 20 years generation was revised downward from 8,400 cubic meters to 160 cubic meters. Those revised inventories were used to estimate impacts in the Final WM PEIS, and will be used to compare alternatives and support decisionmaking.

Comment (3987)
DOE has projected that the Portsmouth Plant will generate 25,000 cubic meters of low-level mixed waste (LLMW) within the next 20 years. Inventory is projected to be 33,000 cubic meters of LLMW. Did DOE use USEC operations to arrive at this projected volume of LLMW?

Response
LLMW volumes for the Portsmouth Plant include waste generated by USEC operations. The waste volumes given in Chapter 6 of the Draft WM PEIS were based on information from DOE's 1994 Mixed Waste Inventory Report. Updated data from DOE's 1995 Mixed Waste Inventory Report are contained in Appendix I in Volume IV of the Final PEIS. The updated data show a decrease in inventory plus 20 years of generation from 33,000 cubic meters to 15,500 cubic meters at the Portsmouth Plant.

Comment (3988)
It is extremely difficult to believe that DOE has not already made some assumptions about what treatments and processes will be used and where in order to arrive at the predictions listed in Table 6.1-1.

Response
Table 6.1-1 in Volume I lists quantities of low-level mixed waste that have been generated and are awaiting treatment, storage, and disposal at waste management facilities, or that are predicted to be generated over the next 20 years. These wastes will be generated by other organizations within DOE, such as Defense Programs, and will be transferred to waste management facilities. Sizing and siting of low-level mixed waste facilities addressed in this document will be based on what is needed to manage the waste volumes given in Table 6.1-1.

Waste volumes in Table 6.1-1 of the Draft WM PEIS were based on information in the 1994 Mixed Waste Inventory Report. Updated waste-volume data from the 1995 Mixed Waste Inventory Report are contained in Appendix I, Volume IV, of the Final WM PEIS. Table 6.1.1 has been changed in the Final WM PEIS as a result of the discussion presented in Appendix I.

8.1.1 Low-Level Mixed Waste

Comment (3989)
Table 6.1-2 indicates that the Portsmouth Plant capable of treating 7,781,620 cubic meters per year and planned capacity of an additional 84,528 cubic meters. What aqueous treatment facility is currently being planned for Portsmouth? Portsmouth current capacity for aqueous treatment already exceeds all other listed major sites, according to this chart.

Response
The WM PEIS Affected Environment Technical Report describes the Portsmouth Plant current aqueous waste treatment capacity as a 7,400,000 cubic-meters-per-year liquid effluent control facility, three groundwater treatment facilities with a total capacity of 267,516 cubic meters per year, and a small filtration and neutralization facility. Section 2.11.0 of that technical report lists a planned capacity of 169,098 cubic meters per year for two groundwater treatment facilities under construction. The technical report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

8.1.2 Low-Level Waste

Comment (495)
"The definition of LLW [low-level waste] is <100 nCi/g." Not enough attention has been given to this definition and the possibility that LLW might be redefined. There needs to be a lower end to the definition for LLW, such as how much above background. The definition for LLW needs to be definitized. DOE needs to tell the public what would happen to the risks if the nanocurie level defined for LLW changed upwards.

Response
The WM PEIS uses standard and approved definitions for each of the five waste types. LLW is defined in Section 11(e)(2) of the Atomic Energy Act of 1954 (42 USC 2011 *et seq.*) as waste containing radioactivity that is not classified as high-level waste, transuranic waste (TRUW), or spent nuclear fuel, and is not byproduct tailings containing uranium or thorium from processed ore. LLW can also be test specimens of fissionable material irradiated for research and development if the concentration of transuranics is less than 100 nanocuries per gram of waste. It is both beyond the scope of the WM PEIS and inappropriate to change the definitions of waste types. It is assumed that the reference in the comment to concentrations less than 100 nanocuries per gram refers to the boundary between LLW and TRUW. This boundary pertains only to waste containing alpha-emitting transuranic radionuclides with half-lives greater than 20 years. There is no limit on the concentration of radionuclides otherwise.

Comment (1089)
DOE should address wastes with very low levels of radioactivity, including the large quantity of very low-level waste at FEMP.

Response
Low-level waste is one of the five waste types analyzed in the WM PEIS, and is addressed in detail in Volume I, Chapter 7, of the WM PEIS. DOE assumes the commentor is referring to environmental restoration low-level waste, because FEMP has no low-level waste for which the Waste Management Program is responsible. Some of FEMP's low-level waste is only slightly radioactive.

Comment (1358)
The WM PEIS identifies a total current inventory plus 20-year projected volume of 220 cubic meters of low-level waste at the Princeton Plasma Physics Laboratory (PPPL). This amount appears to be low when compared to the projections made in the Environmental Assessment for the Tokamak Fusion Test Reactor Decontamination and Decommissioning Project and the Tokamak Physics Experiment.

Response
DOE obtained the low-level waste volume data used in the WM PEIS from the 1992 Integrated Data Base and the 1994 Waste Management Information System Database. These sources provided the best available data on waste inventories and generation at the time DOE prepared the Draft WM PEIS. The information in the *Tokamak Fusion Test Reactor (TFTR) Decontamination and Decommissioning Project and the Tokamak Physics Experiment Environmental Assessment* is newer than the information used in the Draft WM PEIS. In addition, that environmental assessment includes wastes from decontamination and decommissioning that were not included in the WM PEIS waste volumes. However, even if DOE considered the 1,450 cubic meters of low-level waste reported in the Tokamak environmental assessment in the WM PEIS, PPPL would still be a small generator and not a "major"

8.1.2 Low-Level Waste

site. Therefore, the WM PEIS alternatives would not change, and PPPL would continue to ship wastes to other sites under all WM PEIS alternatives.

The Final WM PEIS includes updated waste-volume data and an evaluation of how the new data on low-level waste, low-level mixed waste, and transuranic waste could affect the analyses of alternatives in the PEIS (see Volume IV, Appendix I).

Comment (1498)
One commentor stated that low-level does not mean low hazard and that low-level wastes could be contaminated with a number of different radionuclides, up to and including plutonium.

Response
Low-level radioactive waste is defined by what it is not (spent nuclear fuel, high-level waste produced in reprocessing spent nuclear fuel, transuranic waste). Some low-level waste is slightly contaminated; other low-level waste might be highly radioactive. DOE low-level radioactive waste might contain small quantities of plutonium. However, since plutonium is a transuranic element (its atomic number is greater than that of uranium), the amount of plutonium in low-level waste is greatly limited. Waste that contains more than 100 nanocuries per gram of alpha-emitting transuranic radionuclides with half-lives greater than 20 years is transuranic waste.

Comment (1747)
The low-level waste volumes listed for ORR are not consistent with the solid low-level waste volumes data from the DOE ORNL Waste Management Remedial Action Division. If both liquid and solid waste volumes are considered in the WM PEIS, the volume of solid waste alone would seem to be the more pertinent number, since liquid low-level wastes will probably continue to be treated onsite, and only secondary waste streams from liquid waste treatment will be disposed of, with a much larger volume of the treated waste stream being discharged under NPDES or air pollution permits. Please clarify. Are Table 7.1-1 low-level waste volumes given prior to compaction of these materials?

Response
Table 7.1-1 of the WM PEIS provides estimates of the current inventory and 20-year projected generation volumes for solid low-level waste prior to compaction. It does not include wastewater volumes. These estimates were derived from the 1992 Integrated Data Base and are generally higher than the estimates contained in more recent reports (see Volume IV, Appendix I). Changes in low-level waste volumes as a result of compaction were taken into account in the PEIS analysis.

Comment (1929)
The figure for low-level radioactive waste at the Pantex Plant, which shows a value of 40,000 cubic meters for current inventory plus 20 years production, is about 85 times too large.

Response
Volume IV, Appendix I, of the Final WM PEIS presents updated waste volume inventories and projections, and indicates a much lower amount of low-level waste for the Pantex Plant than was listed in the Draft WM PEIS.

8.1.2 Low-Level Waste

Comment (1938)
How much low-level waste will be stored at ANL-E and what is its half-life? Will this waste be from Illinois only or shipped from elsewhere?

Response
Low-level mixed waste and low-level waste are described in Volume I, Sections 1.5.1 and 1.5.2, respectively, of the WM PEIS. Most low-level waste can be handled without additional shielding or remote-handling equipment. Low-level waste could contain isotopes with either long or short half-lives. For example, uranium-238 is a naturally occurring isotope that has a half-life of several billion years. Isotopes of other elements in low-level waste could have half-lives of less than 1 year. A full discussion of the quantities and radiological profiles of low-level waste and low-level mixed waste used in the WM PEIS can be found in the technical reports for those waste types, which are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

New waste data became available after DOE prepared the Draft WM PEIS. These data are presented in Volume IV, Appendix I, and were used in new analyses for the Final WM PEIS.

Under the Decentralized Alternatives for low-level mixed waste and low-level wastes, ANL-E would manage its own wastes and a small quantity of low-level mixed waste and low-level waste generated at Ames and Fermi. Under the Regionalized and Centralized Alternatives, all ANL-E wastes would be managed at other DOE sites.

Comment (2080)
The Draft WM PEIS Summary document says the highest risks to offsite populations would occur at FEMP, LLNL, and the Portsmouth Plant when thermal treatment of tritium-contaminated waste is assumed. Is the tritium onsite at Portsmouth, and will Portsmouth receive tritium from offsite in the future?

Response
The tritium that would present the highest risks to offsite populations near the Portsmouth Plant under low-level waste Regionalized Alternative 4 and Centralized Alternatives 3 and 4 would originate at other DOE sites.

The Portsmouth Plant does not have tritium-contaminated waste onsite. Any risk that occurs from thermal treatment of tritium-contaminated waste would come from waste being shipped to the Portsmouth Plant. Sites that have this type of waste and would ship to the Portsmouth Plant under various low-level waste or low-level mixed waste alternatives include ANL-E, Princeton Plasma Physics Laboratory, and the Mound Plant. Under some alternatives, ANL-E and the Mound Plant would ship tritium-contaminated waste to FEMP for thermal treatment. Lawrence Berkeley Laboratory would ship its tritium-contaminated waste to LLNL. LLNL would also treat its own tritium waste under the alternatives in which it conducts thermal treatment of wastes. The WM PEIS Low-Level Waste Technical Report identifies sites with tritium-contaminated low-level waste. DOE assumed that the low-level waste portion of low-level mixed waste at those sites would have the same characteristics. Chapters 6 and 7 of the WM PEIS identify where each site would ship low-level waste and low-level mixed waste for treatment.

8.1.2 Low-Level Waste

Comment (2200)
The PEIS failed to include as low-level waste the surplus facility reactor cores and the naval submarine cores.

Response
The management of spent nuclear fuel is analyzed in the SNF/INEL EIS and is included in the WM PEIS cumulative impacts analysis (see Chapter 11 in Volume I). The deactivated reactor vessels and their internals are decontamination and decommissioning wastes that are the responsibility of the Environmental Restoration Program (at least at Hanford). Environmental restoration waste is included in the WM PEIS only to the extent that it might affect the comparison among waste management alternatives (see Appendix B in Volume III).

Naval submarine reactor compartments are disposed of with the spent nuclear fuel removed. The defueled naval submarine reactor compartments are not included in the WM PEIS because their disposal is addressed in the SNF/INEL EIS.

The disposition of some defueled naval reactor plants is discussed in *Final Environmental Impact Statement on the Disposal of Decommissioned, Defueled Cruiser Ohio Class and Los Angeles Class Naval Reactor Plants*, issued by the Navy in April 1996. More than 40 defueled naval reactor plants have been shipped from the Puget Sound Naval Shipyard to the Hanford Site and disposed of in Trench 94 in the Hanford burial grounds. The reactor compartment packages currently in Trench 94 are regulated as a mixed waste because they contain activated metals, solid lead shielding regulated by Washington State, and polychlorinated biphenyls regulated under the Toxic Substances Control Act. The preferred alternative in the above-referenced EIS is to continue to ship this material to Hanford for disposal in Trench 94.

Naval reactor compartment packages already disposed of are not subject to additional waste management activity and, therefore, are not included in the waste volumes in the WM PEIS. WM PEIS Appendix I (Volume IV) lists 37,000 cubic meters of mixed waste to be shipped from Puget Sound to Hanford for disposal. Thus, disposal of surplus naval reactor cores is included in the WM PEIS to the extent that they are in the 1995 Mixed Waste Inventory Report.

Comment (2341)
In the activated bulk metal/equipment category, cobalt-60 is the only one being considered. I believe nickel-63 should also be considered in Table 7.2-1. I mention nickel because of absorption of this into the steel beams of old nuclear power plants. These power plants are to be dismantled and I assume will be included in your bulk activated items.

Response
Table 7.2-1 in Volume I of the WM PEIS identifies the radiological categories, but does not list all the nuclides in each category. The nuclides in each category, including nickel-63, are listed in the WM PEIS Low-Level Waste Technical Report. Nickel-63 is a component of the Induced Activity radiological category. DOE has modified the supporting text for Table 7.2-1 to reference the technical report for detail on the radiological categories.

8.1.2 Low-Level Waste

Comment (2440)
Where does the WM PEIS account for the alpha-contaminated low-level waste stored at INEL's Radioactive Waste Management Complex (RWMC)? Approximately 27,000 cubic meters of the 65,000 cubic meters of transuranic waste stored at the RWMC are of this type. Because the INEL alpha waste is to be treated and disposed of along with the INEL transuranic waste, DOE should include it in the transuranic waste chapter of the WM PEIS.

Response
DOE used standard definitions for each of the waste types analyzed in the WM PEIS that do not necessarily reflect site-specific definitions. In the PEIS, transuranic waste is defined as radioactive waste having concentrations greater than 100 nanocuries per gram of transuranic elements. Although at INEL all alpha low-level waste with greater than 10 nanocuries per gram is considered to be mixed and treated and disposed of as transuranic waste, this is not the case in the PEIS. Rather, the PEIS accounts for these wastes as alpha low-level mixed waste, and they are included in the low-level mixed waste chapter (Chapter 6).

Comment (2783)
Use of the 1992 Integrated Data Base is obviously inappropriate for BNL, as it shows BNL producing no low-level waste (LLW). Since there is no quantification of LLW produced at BNL, I assume that all LLW risk analyses are fatally flawed, even by DOE standards, because it is also assumed throughout that BNL does indeed produce LLW. This must be addressed.

Response
The 1992 Integrated Data Base, the source of LLW data for the Draft WM PEIS, did not provide LLW data for BNL. Thus, the evaluation in the Draft PEIS for BNL did not include impacts from management of LLW. However, Tables 1.6-2 and 7.1-1 in Volume I of the Final PEIS show that the projected LLW volume at BNL is 5,600 cubic meters. The updated data were obtained from the 1995 version of the Integrated Data Base. Consideration of updated LLW estimates for BNL are included in Appendix I in Volume IV of the Final PEIS. Appendix I addresses the issue of how updated waste projections affect WM PEIS alternatives. The updated data for BNL were used to estimate impacts in the Final WM PEIS.

The PEIS considers BNL a candidate site for disposal of its own LLW, but not a candidate for receipt of offsite LLW. Consideration of BNL as a site for disposal of onsite LLW does not mean that it will be selected as a disposal site.

Comment (3796)
The definition of low-level waste (LLW) is all-encompassing and exclusionary. The definition needs to be reviewed. Curie content and half-life should be considered in the definition.

Response
It is outside the scope of the WM PEIS to change the definition of LLW. LLW can be only slightly radioactive or highly radioactive and can contain radionuclides with a range of half-lives; therefore, DOE does not manage all of its LLW in the same way. As discussed in WM PEIS Volume I, Section 1.5.6, DOE manages two classifications of LLW that are not suitable for near-surface disposal. These are special-case LLW generated by DOE operations and LLW generated commercially that is more highly radioactive than Class C LLW according to the NRC rules in 10 CFR Part 61 (greater-

8.1.2 Low-Level Waste

than-Class-C LLW). DOE manages special-case and greater-than-Class-C LLW differently than other LLW.

DOE does not manage all LLW that is suitable for near-surface disposal the same. Disposal facilities impose waste acceptance criteria on the waste that they accept. For example, the waste acceptance criteria for the LLW disposal facility at Hanford categorize waste on the basis of the curie content of key radionuclides, including those with long half-lives. More highly radioactive or long-lived waste is required to be more highly stabilized and immobilized than other wastes.

Comment (3964)
Please clarify how FEMP can be listed as having no low-level waste (LLW) yet be listed for management of LLW and included in alternatives for disposal and treatment of LLW.

Response
When FEMP was identified as a candidate site for LLW treatment and disposal (disposal of onsite waste only), both environmental restoration and waste management wastes were to be evaluated in the WM PEIS. Because all LLW at FEMP is currently environmental restoration waste, which is no longer within the scope of the WM PEIS, only offsite waste is evaluated for treatment at FEMP. Disposal is not evaluated because FEMP disposal is limited to its own onsite waste in the definition of the alternatives. DOE revised WM PEIS Table 7.3-1 to make this distinction.

The PEIS does not evaluate environmental restoration alternatives and, therefore, does not quantitatively evaluate environmental restoration wastes at FEMP or other sites. The PEIS does evaluate how the comparison among waste management alternatives could be affected by the transfer of environmental restoration waste to the Waste Management Program. See Appendix B in Volume III. FEMP is currently included in the DOE Environmental Restoration Program. Wastes generated at FEMP will be the result of environmental restoration activities.

New data from the 1995 Integrated Data Base reported no waste management LLW generated or stored at FEMP, with no projected waste generation. Details on the amounts and characteristics of LLW that would come to FEMP are provided in the WM PEIS Low-Level Waste Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. Appendix I in Volume IV of the PEIS provides a comparison of the latest waste volumes reported by DOE to the waste volumes used in the Draft PEIS.

Comment (4069)
All of DOE's buildings (e.g., LANL's Chemical and Metallurgical Research Facility) are solid, hazardous, low-level waste, and should be shut down, sealed in concrete, and monitored for migration of contaminants.

Response
DOE does not agree with this approach because of environmental, safety, regulatory, and health concerns.

8.1.3 Transuranic Waste

Comment (1748)
Much of the transuranic waste (TRUW) that was retrievably stored was buried in a variety of container types that have since degraded. It is very likely that transuranic waste stored in such a manner has already or will very soon be released to the environment. Discuss in greater detail the recoverability of transuranic waste that has been retrievably stored for the past 25 years.

Response
Waste volume source terms and radionuclide and hazardous chemical concentrations of retrievably stored TRUW are discussed in the WM PEIS Transuranic Waste Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. No significant emissions of radioactive or hazardous chemical constituents are expected during recovery of retrievably stored TRUW if storage containers remain intact. Corroded or damaged waste containers could result in releases during retrieval operations. Preliminary estimates indicate that about 72% of TRUW retrievably stored in drums has been stored for 10 or more years, and up to 30% of the drums might be badly deteriorated. Based on actual experience from waste container sampling programs at INEL, DOE assumes that 0.01% of the gaseous hazardous and radioactive constituents and 0.0001% of the hazardous and radioactive particulates would be released from breached containers and become airborne during retrieval operations. Retrieval operations, including repackaging, can be performed within enclosed structures maintained slightly below atmospheric pressure to minimize potential risk from emissions. High-efficiency particulate air filters can be used to reduce particulate emissions.

Comment (1758)
Are transuranic waste residues included in the WM PEIS analysis and would they go to WIPP? There has been conflicting information regarding disposal of plutonium residues at RFETS. We have been told that plutonium residues will go to WIPP. However, a DOE WIPP official told an audience at a meeting of the Rocky Flats Citizens Advisory Board on December 1, 1994, that WIPP does not have enough room for the RFETS plutonium residues. The WM PEIS does not clarify this issue.

Response
The WM PEIS analysis of transuranic waste at RFETS does include plutonium residues, as shown in Table 8.1-1. DOE plans to handle these residues like other types of transuranic wastes. Decisions concerning disposal of RFETS residues will be based on the analyses in the WIPP SEIS-II and other information. DOE is also preparing a separate EIS on treatment of the RFETS plutonium residues.

Comment (2071)
DOE needs to explain why transuranic waste was not included in the WM PEIS for the Portsmouth Plant. DOE needs to consider transuranic waste in the analysis because it is being mixed with low-level waste and oil contaminated with polychlorinated biphenyls.

Response
DOE obtained transuranic waste-volume data from the 1993 Mixed Waste Inventory Report and the 1992 Integrated Data Base, which were the most current sources at the time the Draft WM PEIS was prepared. Neither of these sources reported any inventory or projected generation of transuranic waste at the Portsmouth Plant. In preparing the Final PEIS, DOE considered newer sources of waste inventory data (see Appendix I in Volume IV). These sources also report no inventory or projected generation of transuranic waste at Portsmouth.

8.1.3 Transuranic Waste

As discussed in Section 1.6.2 in Volume I, the waste volumes analyzed in the WM PEIS represent a "snapshot in time," accurate to the extent existing inventories and future operations were understood when the databases were developed. Recognizing these uncertainties, DOE believes the waste volumes used for the WM PEIS analysis are sufficiently accurate for programmatic decisionmaking.

Comment (2343)
Considering transuranic waste as mixed waste creates the paradox of thermal treatment emitting radionuclides or having to abide by rules that require solvents and heavy metals be treated to land disposal restrictions criteria.

Response
As stated in Volume I, Section 8.1 of the WM PEIS, although approximately 60% of transuranic waste contains both radioactive and hazardous components, DOE assumes that all transuranic waste is mixed waste only for purposes of the WM PEIS analysis. The WM PEIS analysis includes alternatives under which TRUW would be treated to meet land disposal restrictions. Although the WIPP Land Withdrawal Act amendments contained in the 1997 Defense Authorization Act exempt waste to be disposed of at WIPP from RCRA's provisions regarding land disposal restrictions, land disposal restriction treatment alternatives are reasonable in that they allow DOE to evaluate the impacts of treating TRUW that might not be sent for disposal at WIPP. WM PEIS conclusions will support decisions for siting transuranic waste storage and treatment facilities. DOE will evaluate the level of treatment needed to support the safe disposal of transuranic waste at WIPP in the WIPP SEIS-II, and a decision will be announced in the WIPP SEIS-II Record of Decision.

Comment (2441)
Under Regionalized Alternative 3 for transuranic waste (Table 8.3-5), the 31% INEL would receive from offsite for treatment is more significant than it seems, as INEL has the largest volume of transuranic waste of all the DOE sites.

Response
The WM PEIS was designed to evaluate a range of treatment, storage, and disposal alternatives for the management of DOE's radioactive and hazardous wastes. In the case of transuranic waste, three treatment schemes (treatment to meet RCRA land disposal restrictions, treatment to reduce gas generation potential, and treatment to meet the WIPP waste acceptance criteria) are considered for Decentralized, Regionalized, and Centralized Alternatives. In moving from decentralized to regionalized treatment, transuranic waste is transferred to the sites having the most waste because the receiving sites have the greatest experience handling this waste and less untreated transuranic waste would have to be transported. As the site with the most transuranic waste, INEL is a reasonable candidate for a transuranic waste treatment facility.

Comment (2575)
What will happen to the transuranic waste that cannot be sent to WIPP either because it is pre-1970 (buried) transuranic waste or it would not meet waste acceptance criteria?

Response
As stated in Section 8.1.1 in Volume I of the WM PEIS, disposal of transuranic waste cannot begin until DOE meets a series of regulatory requirements imposed under the Waste Isolation Pilot Plant Land Withdrawal Act of 1992. Before it is shipped for disposal, all transuranic waste will be required

to meet the WIPP waste acceptance criteria being established by DOE in consultation with EPA and the State of New Mexico (DOE, 1991). These waste acceptance criteria are not yet final, but will be determined prior to operating WIPP as a disposal facility. For wastes that initially do not meet final waste acceptance criteria, further treatment might be necessary for it to be disposed of at WIPP. For purposes of analysis, DOE assumed that all transuranic waste will meet final WIPP waste acceptance criteria.

The WM PEIS analyzes retrievably stored defense transuranic waste, which has generally been stored since 1970. Before 1970, DOE buried transuranic waste. As it is considered environmental restoration waste, it will be managed in accordance with the CERCLA. While management of environmental restoration wastes are not within the scope of the WM PEIS, Section 8.15 in Volume I contains information regarding transuranic waste generated as a result of environmental restoration activities (including retrieval of buried transuranic waste) and the extent to which these waste volumes might influence WM PEIS alternatives.

DOE has prepared the WIPP SEIS-II to evaluate the potential impacts of disposal of transuranic waste, including pre-1970 buried waste, at WIPP. For further information on the WIPP SEIS-II and its relationship with the WM PEIS, see Section 1.8.1 in Volume I.

Comment (2576)
How was INEL's transuranic waste inventory calculated? There are currently 65,000 cubic meters of transuranic waste stored at INEL. Why does the inventory in the WM PEIS only show 39,000 cubic meters stored and generated over the next 20 years? Where is the remaining waste?

Response
The transuranic waste-volume data presented in Volume I, Chapter 8, of the Draft WM PEIS as current inventory were obtained from the 1993 Interim Mixed Waste Inventory Report and the 1992 Integrated Data Base and represent waste management wastes only. The data were extrapolated to estimate waste volume totals for the 20-year period of analysis. However, these waste inventories do not include wastes projected to be generated as a result of environmental restoration activities, nor do they include pre-1970 transuranic waste (also known as buried TRUW). Table B.5-3 in Volume III shows that DOE estimates environmental restoration transuranic waste to be 9,700 cubic meters at INEL based on updated information from the 1996 Baseline Environmental Management Report. Appendix I in Volume IV of the Final WM PEIS addresses how newer waste-volume data obtained from updated versions of the Mixed Waste Inventory Report and the Waste Isolation Pilot Plant Transuranic Waste Baseline Inventory Report, Revision 2, might affect the analyses of alternatives in the WM PEIS.

Comment (2780)
Volume I, Section 1.5.3, states that, after characterization, some waste currently managed as transuranic waste may be reclassified as low-level mixed waste. This statement is of great concern as it implies that the more radioactive (and, therefore, more hazardous) transuranic waste could be reclassified as a less hazardous waste through a simple paper definition. The implication and meaning of this statement and policy must be fully revealed in the PEIS. Furthermore, it should be noted that BNL is completely inappropriate to receive this type of waste.

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Response
Radioactive wastes, including transuranic waste and low-level mixed waste, are classified in accordance with the waste type definitions provided in Volume I, Section 1.5, of the WM PEIS. The referenced statement in the Draft WM PEIS meant to acknowledge that some low-level mixed waste is currently managed with transuranic waste at some sites, as a result of previous management practices. As part of ongoing characterization efforts, this commingled low-level mixed waste may be segregated from the transuranic waste inventory and be managed separately.

DOE recognizes that the statement in Section 1.5.3 of the Draft WM PEIS was misleading and revised the section in the Final WM PEIS to state that low-level waste and low-level mixed waste could also contain transuranic isotopes, but with concentrations less than 100 nanocuries per gram of waste.

DOE does not consider BNL as a candidate site for receipt of any offsite waste analyzed in the WM PEIS.

Comment (2957)
Why is transuranic waste-volume data not more recent than 1991?

Response
The 1991 data were the most current data available at the time DOE began the WM PEIS. DOE used two primary sources to estimate transuranic waste inventory and annual generation rates for the WM PEIS. First, DOE relied on the 1993 Interim Mixed Waste Inventory Report and the 1992 Integrated Data Base. From these reports, waste volumes were extrapolated to provide waste totals for the 20-year analysis period. However, since the initial preparation of the PEIS, DOE has issued updated information on several types of waste. Appendix I in Volume IV of the Final PEIS addresses how updated data on low-level waste, low-level mixed waste, and transuranic waste could affect the analyses of WM PEIS alternatives. Also, where large changes in impacts were likely, DOE reevaluated the impacts with the more recent data and revised the WM PEIS.

Comment (3254)
The Final Supplemental EIS for WIPP estimates 969 shipments of transuranic waste from LLNL to WIPP (25-year period) in comparison to the WM PEIS estimate of 260 transuranic waste shipments. Although the time period for the estimate differs (20 versus 25 years), the WM PEIS should explain the large difference in projected shipments from LLNL.

Response
The number of transuranic waste shipments depend on transuranic waste volumes. The reason the shipment number for LLNL is much lower in the WM PEIS than in the 1990 WIPP Supplement EIS (SEIS-I) is that the estimated volume of transuranic waste at LLNL in the WM PEIS is much lower than that in the WIPP SEIS-I. The WIPP SEIS-I analysis was based on waste volumes presented in a 1987 database, whereas the WM PEIS analysis is based on more recent waste-volume data.

Comment (3597)
A footnote in Section 8.1.1 is shocking. DOE assumes to include non-defense transuranic waste (TRUW) with defense TRUW at WIPP, if all regulatory requirements are met. As you state, the WIPP Land Withdrawal Act of 1992 provides for disposal of defense TRUW. This is a blatant example of

DOE's disregard for the agreements and public acts made with the States, Congress, and the American people. WIPP is a project for the potential permanent disposal of defense TRUW.

Response
In accordance with the WIPP Land Withdrawal Act, DOE proposes to dispose of only defense TRUW at WIPP as stated in Section 8.1.1 in Volume I of the WM PEIS. At the time the WM PEIS analysis was performed, a small amount of non-defense TRUW was included in the TRUW volumes available. For purposes of analysis, all of the TRUW evaluated in the WM PEIS was assumed to be defense TRUW. This additional small volume of waste provided for a slightly more conservative analysis as it overestimates the amount of TRUW that will be sent to WIPP. DOE has revised the referenced footnote to make this clearer.

Specific information pertaining to the volumes of non-defense TRUW can be found in WIPP SEIS-II.

Appendix B in Volume III of the WM PEIS addresses environmental restoration TRUW that might be generated at DOE sites and managed in waste management facilities. Again, for purposes of a conservative analysis, all environmental restoration TRUW considered in the WM PEIS was assumed to be defense TRUW.

Comment (3598)
What small percentage of non-defense transuranic waste (TRUW) is destined for WIPP under your assumption? Where did it come from? Is there non-defense TRUW in the environmental restoration waste?

Response
In accordance with the WIPP Land Withdrawal Act, DOE proposes to dispose of only defense TRUW at WIPP (see Section 8.1.1 in Volume I of the WM PEIS). For purposes of analysis only, the WM PEIS assumed all TRUW is defense TRUW that will be disposed of at WIPP, including environmental restoration TRUW.

DOE has added updated waste-volume data to the Final PEIS (see Volume IV, Appendix I). Section I.4.1 states that the updated data include volumes of the majority of TRUW that is currently planned for disposal at WIPP and quantities of TRUW that currently are not planned for WIPP disposal. Non-WIPP TRUW, which is about 0.5% by volume of the WIPP TRUW, consists of small quantities of non-defense TRUW resulting from several activities. Most of the non-WIPP commercial TRUW waste was generated by commercial nuclear fuel reprocessing activities conducted at WVDP, while smaller volumes are from nuclear powered pacemakers manufactured by ARCO Medical Products. Sealed TRUW radiation sources used in non-defense laboratory operations at ORNL, and TRUW generated by life sciences and other types of non-defense research conducted at Lawrence Berkeley National Laboratory are some of the other sources of the non-defense TRUW inventory.

Comment (3601)
Two-thirds of the volume of WIPP was for waste to be generated until 2010 *only* by the formerly named Rocky Flats Plant. Exactly what waste is going to occupy the two-thirds capacity no longer needed for waste coming from Rocky Flats production processes? Since WIPP can only accommodate a minute amount of the total *current* transuranic waste (TRUW), where will the rest of the TRUW go once WIPP is full?

8.1.3 Transuranic Waste

Response
The WM PEIS was not intended to address the proposed disposal of TRUW at WIPP. As described in Volume I, Section 1.8.1, the WIPP SEIS-II discusses the sources and volumes of TRUW planned for disposal at WIPP.

The 1990 WIPP Final Supplement EIS (SEIS-I) identified a little over 2 million cubic feet of newly generated TRUW at RFETS that might be disposed of at WIPP. This represented about one-third of the 6.2-million-cubic-foot capacity authorized by the WIPP Land Withdrawal Act. Current waste volume estimates for RFETS in the WM PEIS show about 6,200 cubic feet of TRUW, consisting of both existing waste and waste that will be generated over the next 20 years.

In accordance with the WIPP Land Withdrawal Act (Public Law 102-579), the total capacity of WIPP is limited to 6.2 million cubic feet (approximately 175,600 cubic meters) of defense transuranic waste. According to recent sources discussed in Appendix I of the Final WM PEIS, approximately 132,000 cubic meters of current and projected transuranic waste was identified, which is well within the capacity of WIPP.

It is true that during the 35-year planned operational life of WIPP, the amount of transuranic waste projected to be available for disposal during this period could exceed the statutory capacity of WIPP. DOE is in the early planning stages of evaluating options for disposal of this excess transuranic waste.

Comment (3602)
The definitions and explanations of contact-handled transuranic waste (CH-TRUW) and remote-handled transuranic waste (RH-TRUW) are insufficient and uninformative. Also, there seems to be no analysis of the long-term effects of CH-TRUW and RH-TRUW on humans or the environment, or why 200 millirems is the dividing line. As stated, the difference between CH and RH is 200 millirems per hour. Is this per worker? How many hours total out of a year will a worker be allowed to work under CH conditions and be exposed to the 200 millirems per hour threshold, and/or any exposure level below 200? Is there a kind of buffer zone around the 200 millirem CH threshold? According to our estimates, where the DOE maximum estimated exposure per worker per year is 5 rems, a worker can only be exposed to the 200 millirems per hour threshold a maximum of 25 hours per year. This is only one parameter/scenario that does not take into account consecutive hours of exposure or how many hours of this type of exposure will be necessary to manage TRUW. DOE should fully explain the CH and RH classifications and how CH and RH waste classifications will be applied to workers and ensuring their safety, as well as for estimating potential costs of handling TRUW at CH levels.

Response
The 200 millirems per hour limit on CH-TRUW is found in DOE Order 435.1. It is consistent with definitions at 10 CFR Part 61 and 40 CFR Part 191, and with the maximum allowable radiation at the surface of a container transporting spent nuclear fuel or high-level waste codified in 10 CFR Part 71. The limit was codified as part of the WIPP Land Withdrawal Act (Public Law 102-579). The 200 millirems per hour is the upper limit on CH-TRUW; most CH-TRUW containers emit much less radiation. According to the WIPP Safety Analysis Report, the average radiation dose per CH-TRUW container is 5 millirems per hour for waste packed in standard waste boxes and 14 millirems per hour for waste packed in standard waste drums. Since the rate of radiation emission is measured at the surface of the waste container, and since most CH-TRUW containers are handled by machinery because of their weight, the radiation dose to workers is further reduced by their distance from the

waste package. The radiation dose to workers is measured by dosimetry devices; it is not computed based on the time that they spend in waste-handling activities. While it is theoretically possible for a worker to receive the 5 rem per worker per year dose limit in 25 hours working with CH-TRUW, DOE regulations in 10 CFR 835 limit occupational dose to less than 1 rem per year. The average radiation dose to workers from handling CH-TRUW, based on the most recent WIPP Safety Analysis Report, is approximately 700 millirems per year.

Comment (3605)
The hazardous chemical constituents in transuranic waste based on RFETS data do not accurately reflect the hazardous chemical constituents in the transuranic waste from other sites because not all the sites did the type of concentrated plutonium work RFETS did. Other sites might have other, just as dangerous or more dangerous, hazardous chemical constituents that are not included in DOE estimates because they are based on RFETS data, and not on site-specific waste streams.

Response
There are limited data on hazardous constituents in transuranic waste, and most of the data come from RFETS and INEL. DOE used RFETS data because it was the most complete data available. The WM PEIS analysis assumes all transuranic waste is mixed waste, although only 60% is actually mixed. Therefore, the WM PEIS overestimates the expected impacts from hazardous constituents in transuranic waste. This assumption is believed to be sufficiently conservative to compensate for the lack of extensive knowledge about the hazardous constituents in DOE transuranic waste.

Comment (3606)
The radionuclide concentrations based on LLNL's transuranic waste do not accurately reflect the radionuclide concentrations for all generators. LLNL's work is more experimental in nature and not production oriented. LLNL is listed in Table 8.1-1 as one of the smallest generators of contact-handled transuranic waste.

Response
The primary radionuclide data used in the WM PEIS for transuranic waste were from the 10 largest generator sites, which together generate approximately 99% of DOE's transuranic waste. The LLNL data were used only to represent the smaller generator sites. Because LLNL waste contains relatively large amounts of americium and plutonium compared to the waste from the other small generator sites, the assumption that the waste from all small generator sites is similar to LLNL includes the radiological impacts.

Comment (3608)
In Volume I, Section 8.2.3, explain what is meant by: "After the designated work-off period, TRUW is assumed to be treated as it is generated on an annual basis; however, this was not analyzed in the WM PEIS." It is unclear what this means. Does this include TRUW currently in inventory? Annually generated waste during work-off period? Waste annually generated after work-off period? All of the above?

Response
Transuranic waste volumes in inventory (storage) and generated during the 20-year period of analysis (consisting of 10 years of construction and 10 years of operations during which transuranic waste will be generated) are analyzed in the WM PEIS. The 20-year period of analysis includes a full 20-year

8.1.3 Transuranic Waste

operations period (i.e., no construction) for the No Action Alternative. Transuranic waste generated after this 20-year period is assumed to be treated annually as it is generated; however, the impacts of transuranic waste generated after the 20-year period are not analyzed in the WM PEIS. The impacts of storage beyond 20 years are analyzed as part of the No Action Alternatives in the WIPP SEIS-II. DOE revised Volume I, Section 8.2.3, to explain that, although not analyzed, the waste generated each year after the work-off period is expected to be small and its impacts are expected to be included by those analyzed in this study.

Comment (3614)
In Volume I, Section 8.2.4, what does "not to exceed 3 millirem per hour" for contact-handled transuranic waste mean? What does "not to exceed 7 millirem per hour" for remote-handled transuranic waste mean?

Response
The text in Section 8.2.4 has been corrected. It now states that the average external package dose rates were assumed to be 3 millirem per hour for contact-handled transuranic waste and 7 millirem per hour for remote-handled transuranic waste shipments at 1 meter from the shipping container. Section 8.2.4 also explains that these values were derived from site-specific information contained in the WIPP Final Supplement EIS, and are less than the regulatory limit of 10 millirem per hour at 2 meters from the container.

Comment (3622)
No plans are specified for dealing with remote-handled transuranic waste under the No Action Alternative.

Response
Volume I, Section 8.3.1, describes the No Action Alternative for transuranic waste (TRUW). DOE would continue to characterize and package newly generated transuranic waste to meet current WIPP waste acceptance criteria for storage at sites where existing or planned facilities are available.

Although transuranic waste consists of contact-handled transuranic waste and remote-handled transuranic waste, no distinction was made in the text because both are managed the same way under the No Action Alternative. However, only 6 sites have remote-handled transuranic waste, while 11 sites have contact-handled transuranic waste, as indicated in Table 8.3.1.

Comment (3623)
Under the Decentralized Alternative, will the 6 sites with smaller amounts of contact-handled transuranic waste (CH-TRUW) that will be shipped to the nearest of 10 sites continue to generate CH-TRUW after the removal of their CH-TRUW? Under Regionalized Alternatives 1 and 2, will the 10 sites with smaller amounts of CH-TRUW that will be shipped to the nearest of 5 sites continue to generate CH-TRUW after the removal of their CH-TRUW? Will RFETS continue to generate RH-TRUW? Under Regionalized Alternatives 1, 2, and 3, will the 3 sites with smaller amounts of remote-handled transuranic waste (RH-TRUW) that will be shipped to the nearest of 2 sites continue to generate RH-TRUW after the removal of their RH-TRUW? Under Regionalized Alternative 3, will the 10 sites with smaller amounts of CH-TRUW that will be shipped to the nearest of 3 sites continue to generate CH-TRUW after the removal of their CH-TRUW?

Response
Although it is likely that transuranic waste would continue to be generated after the 20-year period of analysis, projection of future waste generation is problematic. This is one of the reasons why the WM PEIS limits the analysis of impacts to 20-years. Continuation of the past 20-years activities that generate TRUW is uncertain at this time.

As discussed in Section I.1.5 in Volume IV, circumstances that may affect future TRUW generation includes:

- Changes in DOE's site missions that are not reasonably foreseeable at this time;
- Changes in regulations and statutes concerning the definitions of waste types;
- The success of pollution prevention efforts;
- Waste characterization techniques that may affect the waste type assigned to a given inventory. Some waste currently classified as TRUW, for instance, may not contain 100 nanocuries of alpha-emitting transuranic isotopes per gram of waste and may require reclassification as LLMW or LLW. Conversely, some LLW could be reclassified as TRUW; and
- Volume reduction of LLMW and LLW during treatment may result in a residue with sufficient concentrations of transuranic elements to warrant reclassification of the residue as TRUW. Regardless of classification, DOE may choose to manage certain waste streams together, even though they are different waste types, because they have similar characteristics and pose similar risks, such as alpha LLW and TRUW.

Transuranic waste volumes in inventory (storage) and generated during the 20-year period of analysis (consisting of 10 years of construction and 10 years of operations during which transuranic waste would be generated) are analyzed in the WM PEIS. Transuranic waste generated after this 20-year period is assumed to be treated annually as it is generated; however, the impacts of transuranic waste generated after the 20-year period are not analyzed in the WM PEIS. DOE revised Volume I, Section 8.2.3, to explain that, although not analyzed, the waste generated each year after the work-off period is expected to be small and its impacts are expected to be bounded by those analyzed in this study.

In January 1992, the termination of nuclear weapons production changed the primary mission of the RFETS from nuclear weapons production to cleanup and restoration. Nuclear weapons activities at RFETS have ceased, and special nuclear materials and wastes are being stabilized and stored for safe final disposition. The 1996 Baseline Environmental Management Report (BEMR) assumes that all special nuclear material will be transferred offsite by FY 2020. With this material transferred offsite, additional waste management TRUW would not be generated. According to the 1996 BEMR, plans call for the treatment of all RFETS TRUW by 2028, and the shipment of all TRUW offsite for disposal in 2039.

Comment (3624)
There is no plan specified for managing remote-handled transuranic waste under the Decentralized Alternative.

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Response
Under the Decentralized Alternative described in Volume I, Section 8.3.2, DOE would process and package remote-handled transuranic waste at the six sites where it is currently located.

Comment (3625)
In Volume I, Figure 8.3-2, TRUW Decentralized Alternative, the "Treat (% Rec'd from Offsite)" row indicates (0) in all the columns. Is this correct?

Response
The figure is correct. Transuranic waste would be treated and packaged at the site of origin under the Decentralized Alternative. It would then be shipped to 10 sites, for storage only.

Comment (3632)
Is WIPP authorized for the treatment of contact-handled transuranic waste (CH-TRUW)? What containers will be used to transport waste to WIPP?

Response
WIPP currently has no facilities to treat CH-TRUW and is not pursuing licensing for any CH-TRUW treatment facilities. The WIPP Land Withdrawal Act (Public Law 102-579) requires use of containers certified by NRC for transporting TRUW to or from WIPP. The only currently available certified TRUW container is the TRUPACT-II, which DOE plans to use for shipping CH-TRUW. The RH-72B cask, which DOE plans to use for shipping remote-handled transuranic waste, is currently undergoing NRC certification. DOE is considering whether to develop and seek certification for other containers for transporting waste that currently cannot be shipped efficiently in existing containers because of its weight.

Comment (3808)
DOE needs to inform the public about the source and volume of transuranic waste onsite at ANL-E.

Response
Waste management transuranic waste at ANL-E is generated by the Chemical Technology Division, which conducts research on analysis of specimens of nuclear fuel elements. As provided in Table I.4-1 in Volume IV of the WM PEIS, new data suggest a waste management inventory of roughly 140 cubic meters of contact-handled transuranic waste at ANL-E (current inventory plus 20-year generation).

Comment (3923)
The public needs to understand the definition of transuranic waste.

Response
Transuranic waste is defined as radioactive waste having concentrations greater than 100 nanocuries per gram of alpha-emitting transuranic elements (elements that have atomic numbers greater than 92), with half-lives greater than 20 years, with certain exceptions. This definition, as well as a more detailed description of transuranic waste, how it is produced, and the nature of its effects are presented in Section 6.1 in the WM PEIS Summary document, and Sections 1.5.3 and 8.1.1 in Volume I.

8.1.3 Transuranic Waste

Comment (3941)
Has DOE projected the capacity of WIPP as sufficient to allow for disposal of existing transuranic waste and projected volumes to be produced for the next 20 years?

Response
The capacity of WIPP is limited by the WIPP Land Withdrawal Act (Public Law 102-579) and by the Consultation and Cooperation Agreement with the State of New Mexico. Under these limits, as analyzed in the WIPP SEIS-II, WIPP would not be able to accommodate all of DOE's defense remote-handled transuranic waste.

Comment (3995)
Please clarify the distinction between contact-handled (CH) and remote-handled (RH) transuranic waste (TRUW)? Why does DOE discuss the management of TRUW as a mixed waste with distinctions between TRUW and mixed LLW blurred, at least to me.

Response
As described in Section 8.1.2 in Volume I of the WM PEIS, TRUW is categorized as either CH or RH based on the level and type of radioactivity it emits. CH-TRUW consists primarily of alpha particles and low energy radionuclides with little penetrating power. CH-waste containers can be handled directly by humans. RH-TRUW typically contains a greater proportion of radionuclides that produce highly penetrating radiation (gamma radiation) and requires special shielding in treatment, storage, and disposal facilities.

Mixed waste includes both radioactive and hazardous constituents. Approximately 60% of TRUW is considered mixed waste because it contains both radioactive and hazardous components. However, mixed TRUW is different from mixed low-level waste in the content of the radioactive component. For purposes of the WM PEIS analysis, DOE analyzed all TRUW as if it were mixed TRUW. This is a more conservative analysis because it increases the hazardous components of the waste for the analysis.

Section 8.1.1 in Volume I states that because of its radioactive characteristics, TRUW falls under the jurisdiction of the Atomic Energy Act. In addition, mixed TRUW's hazardous constituents are regulated under RCRA (42 USC 6901 *et seq.*). The hazardous components, such as solvents and heavy metals, can be subject to RCRA land disposal restrictions (40 CFR 268) promulgated by EPA.

8.1.4 High-Level Waste

Comment (2198)
The WM PEIS discusses only selected radioactive isotopes contained in high-level waste, and ignores the longer-lived isotopes such as cesium-135, plutonium-242, and uranium-238.

Response
The WM PEIS high-level waste analysis does consider longer-lived isotopes such as cesium-135, plutonium-242, and uranium-238. Details on the amounts and characteristics of high-level waste are provided in the WM PEIS High-Level Waste Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2303)
Let the ultimate best forms of high-level waste drive the decisions, not the size, not the timing of the national repository.

Response
The WM PEIS addresses only the storage of treated high-level waste prior to its ultimate disposal in a geologic repository. The disposal of high-level waste is not within the scope of this PEIS. The environmental evaluation for geologic disposal will be presented in the DOE Yucca Mountain Repository EIS.

DOE is proceeding with plans to vitrify high-level waste to process it into a solid form. DOE believes that vitrification and encapsulation in stainless-steel canisters is the best final waste form for storing high-level waste.

Comment (2406)
The high-level waste section of the WM PEIS Summary document should include a section on the high-level waste vitrified product quality that will allow its acceptance at a geologic repository. This is an important issue for this PEIS. Analysis should consider what will happen to high-level waste that does not meet repository standards.

Response
The acceptability of vitrified high-level waste with respect to a geologic repository waste acceptance criteria is an issue related to high-level waste *treatment*, which is not within the scope of the WM PEIS. Section 9.1.2 in Volume I of the WM PEIS identifies references that provide information about high-level waste treatment at the Hanford Site, INEL, SRS, and WVDP. The Yucca Mountain Repository EIS will address issues related to acceptance of vitrified high-level waste at a geologic repository.

Comment (3145)
The WM PEIS does not include adequate consideration of most high-level waste (HLW) because (1) it fails to include HLW from commercial nuclear power plants and SRS, INEL, and Hanford; and (2) it focuses only on stored vitrified HLW as opposed to other storage, processing, and disposal issues.

Response
HLW is the highly radioactive waste material that results from the reprocessing of spent nuclear fuel and irradiated targets in nuclear defense, research, and production activities. Commercial nuclear power plants produce spent nuclear fuel, not HLW.

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The WM PEIS does not consider the storage or disposal of spent nuclear fuel. In addition, the scope of the WM PEIS is limited to analysis of the impacts of storing vitrified HLW. The decision to vitrify HLW is explained in Volume I, Section 9.1. HLW would be treated and packaged for disposal in a licensed geologic repository. HLW is currently stored at the Hanford Site, INEL, SRS, and WVDP.

The impacts of disposing of HLW in a repository are not within the scope of this PEIS, but will be analyzed in a DOE NEPA document relating to a geologic repository. Because the Yucca Mountain site is the only candidate repository site being studied at present, DOE assumed the existence of a geologic repository there to analyze the impacts of transporting the HLW to a potential disposal facility.

Impacts related to HLW treatment, where known, have been added to the revised cumulative impacts analysis sections of Chapter 11 for the Hanford Site, INEL, SRS, and WVDP. These estimates of potential risks from recent sitewide or project-level NEPA analyses (e.g., Hanford Tank Waste Remediation System and WVDP Completion and Closure EISs) are based on additional detailed site-specific information.

Comment (3537)
The WM PEIS considers management of vitrified high-level waste only, although this is a tiny percentage of the high-level waste that will eventually require storage. Thus, the WM PEIS minimizes the potential future problems with managing high-level waste.

Response
Storage of vitrified high-level waste (HLW) is evaluated in the WM PEIS. Storage of liquid or calcined HLW, treatment (vitrification) of HLW, and remediation of liquid HLW storage tanks is outside the scope of the WM PEIS.

Information about the storage and treatment of liquid and calcine HLW is available in other DOE reports. For example, information on Hanford HLW is available in the Safe Retrieval, Transfer, and Interim Storage of Hanford Tank Wastes EIS, and the Hanford Tank Waste Remediation System EIS. Information on INEL HLW is given in the SNF/INEL PEIS, for SRS it is given in the Defense Waste Processing Facility SEIS, and for WVDP it is given in the Completion and Closure EIS. Impacts related to liquid HLW storage and treatment, where known, have been added to the revised cumulative impacts analysis sections of Chapter 11 for the Hanford Site, INEL, SRS, and WVDP.

The WM PEIS considers storage of virtually all of the vitrified HLW that DOE expects to produce. Some confusion may have resulted because Section 9.1.2 in Volume I provides liquid HLW volumes that are much larger than the volume of HLW canisters that would be stored. This is because the HLW in its present form contains a mixture of radioactive and nonradioactive materials. DOE plans to separate the highly radioactive components of this mixture, a small portion of the material currently in the tanks, and convert it into a vitrified form. The nonradioactive portion of HLW consists of water and chemicals that were added during reprocessing and subsequent treatments. This material could be contaminated with some radioactive material and is considered to be low-level waste or low-level mixed waste, depending on whether it contains some hazardous materials such as solvents or heavy metals. This material will be immobilized and may be managed as low-level waste or low-level mixed waste.

8.1.4 High-Level Waste

Comment (3692)
Volume I, Table 9.2-1, shows a 2-year canister production period at WVDP under the high-level waste No Action Alternative, and 26 years for all other alternatives. Is this true?

Response
DOE revised Table 9.2-1 to show that, for WVDP, under No Action and all other Alternatives, the time between anticipated start of production and anticipated end of production is 3 years.

Comment (3929)
The WM PEIS should include an evaluation of high-level waste treatment and the corresponding direct and indirect impacts on human health and the environment.

Response
The decision to vitrify high-level waste is explained in Volume I, Section 9.1, of the WM PEIS. Currently, four sites store and manage high-level waste: the Hanford Site, INEL, SRS, and WVDP. DOE is proceeding with plans to treat high-level waste by processing it into a solid form that would not be readily dispersible into air or leachable into groundwater or surface water. This process is referred to as vitrification. Vitrification of high-level waste is addressed in other NEPA reviews. Thus, the WM PEIS only analyzes the impacts of the stored vitrified high-level waste. However, impacts related to high-level waste treatment, where known, have been added to the cumulative impacts analysis sections of Chapter 11 for Hanford, INEL, SRS, and WVDP. These estimates of potential risks from recent project-level and sitewide NEPA analyses (e.g., Hanford Tank Waste Remediation System and WVDP Completion and Closure EISs) are based on additional detailed site-specific information.

Comment (4304)
When will the current high-level waste at Hanford be permanently and safely stored?

Response
Approximately 213,000 cubic meters (56.3 million gallons) of high-level waste is currently stored at the Hanford Site in 177 belowground storage tanks built between 1943 and 1986. The proposed alternatives for vitrified high-level waste storage at the Hanford Site are discussed, along with potential impacts associated with each alternative, in Volume I, Chapter 9, of the WM PEIS.

The WM PEIS assumes, for purposes of analysis, that the Hanford Site high-level waste would be vitrified and packaged in canisters, with canister production beginning in 2009 and completed by 2028. DOE's preferred alternative is to store these canisters at the Hanford Site while they await disposal in a licensed geologic repository.

Comment (4423)
The WM PEIS should include alternatives to evaluate impacts, and associated mitigating measures, from high-level waste (HLW) treatment, because of the high potential for adverse effects. DOE should explain why treating HLW at sites other than where it was generated was not considered a viable alternative. DOE should further recognize that the measures (other than cost) that determined that these alternatives are inappropriate could be pertinent to continued storage of untreated waste and onsite transportation for treatment. Also, since the HLW No Action Alternative evaluates calcine and liquid HLW storage at INEL, impacts of pretreatment and vitrification should be addressed.

Response
The treatment of HLW is not within the scope of the WM PEIS, as explained in Volume I, Section 9.1.1. However, impacts related to HLW treatment, where known, have been added to the cumulative impacts analysis sections of Chapter 11 for the Hanford Site, INEL, SRS, and WVDP. These estimates of potential risks from recent NEPA analyses (e.g., Hanford Tank Waste Remediation System and WVDP Completion and Closure EISs) are based on additional detailed site-specific information. The treatment of HLW at sites other than where it was generated was not considered a viable alternative because of the risks associated with shipping untreated high-level waste.

To the extent known, the impacts of current storage of liquid and calcine HLW, and their subsequent treatment into an immobilized form for geologic disposal, are included in the cumulative impacts analysis for INEL, presented in Chapter 11 in Volume I of the WM PEIS.

Comment (4465)
What alternatives for the containment of the unvitrified high-level waste (HLW) at Hanford were considered under the No Action Alternative, and what mitigating measures? If none, what impacts from the non-vitrified waste could occur, including accidents, deliberate bombing, etc. The same issues apply to the calcine and liquid waste at INEL.

Response
The WM PEIS analyzes only the storage of vitrified HLW; the containment of liquid or calcine HLW that has not been vitrified is not within the scope of this document. Information about the storage and treatment of liquid and calcine HLW is available in other DOE reports. For example, information on Hanford HLW is available in the Safe Retrieval, Transfer, and Interim Storage of Hanford Tank Wastes EIS, and the Hanford Tank Waste Remediation System EIS. Information on INEL HLW is given in the SNF/INEL PEIS, for SRS it is given in the Defense Waste Processing Facility SEIS, and for WVDP it is given in the Long-Term Management of Liquid High-Level Radioactive Wastes EIS and the Completion and Closure EIS. These documents are among those listed in Table 11.2-1 and considered in the cumulative impacts analyses discussed in Section 11.2 in Volume I of the WM PEIS. Impacts of HLW treatment, to the extent known, have been added to the cumulative impacts sections for these sites in Chapter 11.

Section 3.1.3 of WM PEIS HLW Technical Report describes measures being undertaken at the Hanford Site concerning enhanced containment of unvitrified (liquid) HLW, namely:

- Upgrade of three piping systems for radioactive waste transfer;
- Addition of a large mixer pump in Tank 101-SY to control buildup of gases;
- Interim stabilization of presumed leaking tanks by removing most of the drainable liquid.

Section 3.5.3 in that report addresses similar issues at INEL. The report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

8.1.5 Hazardous Waste

Comment (255)
The Molten Salt Oxidation Test Facility should not be expanded to full size until (1) there is further public comment; (2) a site-specific EIS is completed; and (3) the WM PEIS is completed. The PEIS should identify the proposed treatment technology for LLNL, molten salt oxidation, as a type of incineration.

Response
DOE used incineration as the representative thermal treatment process for low-level mixed waste because it is the best demonstrated available technology for organic destruction of hazardous wastes. The WM PEIS describes the molten salt oxidation process as an emerging treatment technology for mixed waste (see Volume IV, Section H.3.3). There are a number of process uncertainties for the molten salt oxidation process that must be resolved, including the effect of ash and stable salt buildup on melt stability and spent salt processing; retention of particulates in the molten salt bed; and the process's tolerance to variations in operating conditions. Due to these technical concerns and the cancellation of the full-scale demonstration facility for molten salt oxidation at LLNL, DOE did not consider the molten salt oxidation process as the generic treatment technology in the WM PEIS. The WM PEIS analyzed the configuration of treatment and disposal sites, but will not support decisions regarding specific treatment technologies. Treatment technologies will be analyzed in site-specific NEPA reviews.

Comment (1749)
Provide updated data for Table 10.1-1, as this data fails to bring out current Toxic Substances Control Act incinerator totals.

Response
Table 10.1-1 in Volume I of the WM PEIS lists estimates of hazardous waste volumes at 11 large DOE generator sites. These estimates were derived from the 1991 EPA Information System biennial reports and DOE Site Inventory Reports. The data are considered sufficiently accurate for the purposes of the analysis, which requires a representative data set for a comparison of impacts for offsite commercial treatment versus onsite DOE treatment.

Comment (2038)
Referring to hazardous waste, EPA stated: "It was unclear where the numbers used to arrive at the 11% onsite treatment came from. The amount of waste to be treated does not match the amount of waste generated at the contributing DOE sites."

Response
DOE has revised Volume I, Table 10.3-5, which now indicates that a total of about 323 metric tons per year of hazardous waste would be treated by incineration and fuel burning at INEL, ORR, and SRS under the Decentralized Alternative. This waste is onsite waste; waste would not be received from offsite. Since the total volume of hazardous waste is 3,438.2 metric tons per year, this revised total volume is about 9% of the offsite commercial treatment hazardous waste totals presented in Table 10.3-5.

Comment (2118)
DOE should clarify why hazardous waste was not analyzed under four of the alternatives, even though hazardous waste is managed at BNL.

8.1.5 Hazardous Waste

Response
Chapter 10 in Volume I of the WM PEIS describes the environmental consequences associated with the No Action, Decentralized, Regionalized, and Centralized Alternatives for hazardous waste. The alternatives were selected to provide representative results for the range of onsite options. Hazardous waste has been generated, or is projected to be generated, at about 45 DOE sites. Based on RCRA uniform hazardous waste shipping manifests, facility reports, and hazardous waste generation and disposal information dating back to 1984, DOE estimates that more than 90% of the total hazardous waste (wastewater and nonwastewater) in a given year is generated by 11 or fewer DOE sites, although they are not the same every year. In general, only nonwastewater hazardous waste from these 11 larger sites was analyzed in this PEIS. Because BNL is not one of those 11 largest generator sites, the PEIS does not specifically analyze hazardous waste at BNL. However, the PEIS analysis is representative of DOE sites in general. In addition, hazardous wastes generated by environmental restoration activities are not covered in the WM PEIS.

Table 10.1-1 lists the quantities of hazardous waste at the 11 DOE hazardous waste generators used for the evaluation of WM PEIS alternatives.

Comment (2352)
In the hazardous waste section, incineration (thermal destruction) is emphasized. By the very nature of incineration, secondary "new chemicals by fire" are created. I believe these secondary chemical compounds should be covered.

Response
DOE did evaluate the effects of incineration emissions from the treatment of hazardous waste, including combustion products. Section D.3.3.2 in Volume III of the WM PEIS describes special assumptions, including the source term for chlorinated organics and inorganics emitted in incinerator flue gases developed from a set of RCRA trial burn data from a commercial facility that currently processes similar DOE-generated hazardous waste.

Thermal destruction is the efficient burning of combustible solid and liquid wastes to destroy organic constituents and to reduce the volume of waste. The greater the destruction efficiency, the cleaner the air emissions. The thermal destruction technology assumed in the WM PEIS is incineration. Additional information on thermal treatment methods is provided in Section 6.2.2 in Volume I, which states that EPA considers incineration the best demonstrated available technology for treating organic waste. Properly designed and operated incinerators have been shown to be as or more effective than other proven treatment technologies, and DOE does not preclude their use at any site.

Comment (2404)
The WM PEIS Summary document states that 99% of DOE's hazardous waste is wastewater that will be treated by DOE, and 1% of the hazardous waste will be treated and disposed of at commercial facilities. The significance of these values and materials involved should be explained more clearly in the Summary document.

Response
The WM PEIS summary document presents only the highlights of the entire document. Details on the significance of these values and materials and the hazardous waste impact analysis are provided in Volume I, Chapter 10, of the WM PEIS.

8.1.5 Hazardous Waste

Comment (2587)
Where do the hazardous waste residues end up? Disposal seems to be left out of most of the alternatives. Is 1991 the most current data for hazardous waste treatment tonnage?

Response
Hazardous waste is stored onsite only for a limited time in order to accumulate sufficient quantities for treatment. All of the treatment residues of listed hazardous waste are sent to EPA-permitted commercial hazardous waste disposal sites. Since the environmental impacts and risks from the commercial treatment and disposal of hazardous waste are covered under RCRA Part B permits, these potential impacts are not specifically addressed in the WM PEIS.

At the time the WM PEIS alternatives for the management of hazardous waste were developed, 1991 data for onsite treatment and storage volumes and 1992 data for offsite shipment to commercial treatment were the latest available data, as described in Volume I, Section 10.1.2. The hazardous waste analysis requires representative data to evaluate the alternatives of onsite or commercial treatment; the 1991 and 1992 data are considered representative. DOE believes that although more recent hazardous waste volume information is now available, the data would not significantly change the results of the hazardous waste analysis, including identification of the preferred alternative. (See Volume I, Section 3.7). The hazardous waste analysis compared more onsite treatment of hazardous waste with continued reliance on offsite commercial vendors. For this analysis, DOE required only a representative set of sites and hazardous waste data. The 1991 and 1992 data are sufficiently accurate for this purpose.

Comment (2855)
The Summary document, Section 8.1, states that most DOE hazardous waste consists of wastewater that contains less than a 1% concentration of organic hazardous waste materials. This might mislead the reader into assuming that dilution lessens the hazards compared to hazardous waste in its pure form. Hazardous wastewater has the greatest impact to groundwater and surface water resources (e.g., a 1% aqueous solution of benzene would be 2,000 times greater in concentration than the allowable maximum contaminant level under the Safe Drinking Water Act). Please clarify.

Response
The statement referred to in this comment is a factual statement about a characteristic of the wastewater. No information about risk is stated or implied. The reference to 1% concentration of organic material in DOE wastewater refers to the concentration before it goes to wastewater treatment and not the concentration in the effluent stream. To avoid the impression that this is the diluted effluent concentration, DOE has revised Section 8.1 of the Summary document to read, "Most DOE-generated hazardous waste consists of wastewater which, by definition, contains less than a 1% concentration of organic hazardous waste materials." This section was also revised to clarify that DOE hazardous wastewater requires treatment before it can be safely discharged to the environment.

8.2 Waste Types Considered

Comment (1108)
Commentors prefer for the WM PEIS to include special-case waste and greater-than-Class-C waste, and asked whether special nuclear material is addressed. They also asked about the location and quantity of greater-than-Class-C and special-case wastes. If these are not to be included in the WM PEIS, justification is needed.

Response
The WM PEIS does not address management of greater-than-Class-C (GTCC) wastes and wastes that are frequently designated "special-case" wastes by the generating site. Therefore, locations and quantities of such wastes are not provided. Section 1.5.6 in Volume I of the WM PEIS describes why GTCC waste is not considered for analysis. Because of their high radioactivity levels and long half-lives, special-case wastes and greater-than-Class-C low-level wastes must be isolated from human exposure for periods in excess of hundreds or, in many cases, thousands of years. Unlike transuranic waste and high-level waste, however, neither of these waste types is authorized under the Nuclear Waste Policy Act (42 USC 10101-10270) for disposal in a geologic repository. Furthermore, both special-case wastes and greater-than-Class-C low-level wastes vary considerably in their nature. DOE is developing management strategies for both greater-than-Class-C low-level wastes and special-case wastes that include disposal. On March 13, 1995, DOE published a notice in the *Federal Register* inviting interested parties to provide input into the development of strategies. Subsequently, two workshops were held to discuss preliminary strategies. Based on the input received, alternative strategies will be evaluated under NEPA once a proposal is developed.

The impacts of storage and disposition of special nuclear materials is outside the scope of this PEIS except where these impacts could be cumulative with impacts from waste management activities. Impacts of the management of special nuclear materials are being or have been evaluated in the Storage and Disposition of Weapons-Usable Fissile Materials PEIS, the Disposition of Surplus Highly Enriched Uranium EIS, and certain sitewide NEPA reviews. The relationship between the WM PEIS and these other NEPA documents is described in Volume I, Section 1.8.1, of the WM PEIS. DOE has coordinated the preparation of its NEPA reviews in an attempt to provide consistent information to the public and account for all cumulative impacts.

Comment (2267)
There are concerns about the large amounts of spent nuclear fuel being stored at the K-West and K-East Basins at Hanford. DOE should calcine and/or vitrify those wastes. Wet storage is thermally unstable and will burn. Placing it in a number of different locations would be a better strategy.

Response
Management of spent nuclear fuel is outside the scope of the WM PEIS. The impacts of the management of DOE spent nuclear fuel were analyzed in the SNF/INEL PEIS. The Final EIS on the management of spent nuclear fuel currently stored in the K-Basins was issued in February 1996, and is described in Volume I, Section 1.8.1, of the WM PEIS. Cumulative impacts from both these EISs are analyzed for the Hanford Site in Volume I, Section 11.6, of the WM PEIS.

Comment (2422)
The storage, treatment, and disposal of hazardous wastewater, sanitary and industrial wastes, special-case waste, and commercial greater-than-Class-C low-level waste are not covered in this EIS. This is the first of several examples of segmentation. It might be reasonable to leave out sanitary and

8.2 Waste Types Considered

industrial wastes and maybe even commercial greater-than-Class-C low-level waste, but why leave out special-case waste at DOE facilities? Just because DOE hasn't figured out what to do with it doesn't mean it does not have an environmental impact.

Response
As indicated in Section 1.5.6 in Volume I, some wastes within the radioactive waste type categories, such as low-level waste, transuranic waste, and high-level waste, have characteristics that require special considerations and different management than most of the other waste within that category. These wastes are special-case wastes managed on a case-by-case basis and are not specifically evaluated under the WM PEIS alternatives, although the WM PEIS waste volumes largely account for them. Section 1.5.6 describes waste types not considered in the WM PEIS including non-hazardous and nonradioactive sanitary waste, non-hazardous solid waste, hazardous and low-level process wastewater, special-case waste, and commercial greater-than-Class-C low-level waste. DOE agrees with the commentor that it is reasonable to not consider these waste types. DOE also believes that it is reasonable to not consider special-case wastes.

Because of their high radioactivity levels and/or long half-lives, special-case wastes must be isolated from humans for periods in excess of hundreds or, in many cases, thousands of years. Unlike transuranic waste and high-level waste, however, special-case wastes are not authorized under the Nuclear Waste Policy Act (42 USC 10101-10270) for disposal in a geologic repository. Furthermore, special-case wastes vary considerably in their nature. DOE is currently developing management strategies for special-case waste that include disposal. On March 13, 1995, DOE published a notice in the *Federal Register* inviting interested parties to provide input to the development of strategies. Two workshops were held to discuss preliminary strategies. Based on the input received, alternative strategies will be evaluated in a NEPA review once a proposal is developed.

8.3 Waste Management Facilities and Technologies

Comment (185)
We need to develop ways to safely store and dispose of waste.

Response
DOE is committed to managing its wastes to protect human health and the environment, including the safe storage and disposal of waste. The WM PEIS describes accepted, readily available technologies for managing wastes. DOE would employ improved technologies as they become available. Volume IV, Appendix H, describes emerging technologies that could influence the WM PEIS alternatives or mitigate impacts.

Comment (227)
A commentor is concerned that DOE will choose the least expensive and controversial disposal methods and will not provide for development of appropriate technologies for efficient treatment, storage, and disposal of each waste type as it is generated.

Response
DOE is committed to managing its wastes to protect human health and the environment, including the safe storage and disposal of waste. The WM PEIS analysis was based on the uniform application of currently available treatment, storage, and disposal technologies. The specific technologies used at a site to implement an alternative would depend on a number of factors that would be further evaluated at the site and project levels. Appendix H in Volume IV of the PEIS describes DOE's ongoing program of technology development. The discussion outlines the approach taken by DOE's Office of Environmental Management through its Office of Technology Development. DOE will continue to develop alternative technologies and implement them as quickly as feasible.

Comment (1286)
A commentor asked DOE to include the following environmental technologies in the WM PEIS: pollution cleanup, remediation of groundwater, new cleanup technologies, environmental sensing, and monitoring.

Response
Appendix H in Volume IV of the WM PEIS addresses the development of waste management technologies, including baseline and emerging technologies. The DOE Office of Technology Development will continue its systematic approach to solving key problems in waste management, including the assessment of environmental technologies, pollution cleanup, remediation of groundwater, new cleanup technologies, and environmental sensing and monitoring.

Comment (1287)
The WM PEIS should consider green manufacturing processes, including the production of long-lasting, light-weight materials; recycling technologies; and toxic reduction and resource conservation.

Response
DOE is strongly committed to waste minimization. The Office of Waste Management is responsible for coordinating and consolidating DOE's Waste Reduction Policy based on Executive Order 12856, which requires DOE installations to engage in waste minimization and to have an established program for implementing this policy.

8.3 Waste Management Facilities and Technologies

DOE's waste minimization program applies to all DOE activities and all types of waste that these activities generate. Source reduction by waste generators in Defense Programs, Energy Research, and other DOE programs will reduce the amount and radioactivity level of waste coming into the waste management complex, the cost of constructing and operating these facilities, and the human health risks to the public and workers.

Individual DOE sites have site-specific waste minimization and pollution prevention programs and plans in place. Waste reduction is achieved through (1) source reduction (reducing the quantity of waste that is transferred to waste management facilities) and (2) recycling. Appendix G in Volume IV of the WM PEIS addresses pollution prevention on a programmatic rather than site-specific scale. Appendix H, also in Volume IV, addresses development of waste management technologies, including baseline and emerging technologies. The DOE Office of Technology Development will continue its systematic approach to solving key problems in recycling technologies, resource-use reduction, and waste management.

Comment (1450)
DOE should research even safer and more space-efficient storage in the established areas, as well as technologies such as fusion power generation, which have little or no waste.

Response
DOE is committed to managing its wastes to protect human health and the environment, including the safe storage and disposal of waste. For the WM PEIS analysis, DOE used accepted, readily available technologies for managing wastes. Improved technologies would be utilized as they become available. Appendix H in Volume IV describes emerging technologies that could influence the WM PEIS alternatives or mitigate impacts.

Issues of power-generation technologies are not within the scope of the WM PEIS, which is DOE's evaluation of alternatives for managing its radioactive and hazardous waste across the nation.

Comment (1725)
DOE should minimize airborne releases by using available temporary containment strategies.

Response
DOE assumes the commentor is referring to environmental restoration activities, for which appropriate containment strategies will be developed at the project level. DOE intends to undertake environmental restoration activities only after completion of appropriate risk analyses and rulemaking decisions. These environmental restoration actions will be conducted in accordance with standard safety practices to minimize potential releases of contamination and exposures to members of the offsite population and environmental restoration workers. DOE also intends to minimize airborne releases from waste management activities.

Comment (1743)
Given the funding, regulatory and legal delays in siting, construction, and operation of a waste disposal facility, is the 10-year period to have facilities operational realistic?

8.3 Waste Management Facilities and Technologies

Response
Volume I, Section 6.2.3, discusses the DOE assumptions about the treatment and disposal facilities used in the impacts analyses. DOE believes that the estimated 10-year construction period, which includes all permitting actions and additional NEPA documentation, is a realistic period in which to have waste management facilities operational.

Comment (1769)
What about the $150 million allotment for innovative technology development and what, if any, outcomes were there at RFETS from this money?

Response
The $150 million referred to by the commentor for funding proposed development of innovative technologies was not allocated in the current RFETS budget.

Comment (1774)
Technologies associated with safety and transportation are important issues that need public discussions.

Response
DOE welcomes any suggestions about the relative safety of various waste management and waste transportation technologies. The public hearings and comment period following publication of the Draft WM PEIS were part of ongoing efforts to involve the public in DOE's decisionmaking. Sitewide and project-level NEPA reviews would provide additional opportunities for public comment and dialogue on these issues.

For the WM PEIS analysis, DOE assumed the use of standard, currently available technologies for waste management and transportation. These are described in Chapters 6 through 10 in Volume I, Appendix D in Volume III, and Appendices E and F in Volume IV of the PEIS. Supporting technical reports provide additional information. In addition, DOE has an aggressive technical development program exploring alternative waste disposal technologies. Alternatives will be tested and deployed depending on their potential to safely and effectively treat and transport waste. Appendix H describes emerging technologies that could influence the WM PEIS alternatives or mitigate impacts.

Comment (1788)
There needs to be additional technology development for waste storage/treatment.

Response
DOE has an aggressive technical development program exploring alternative waste disposal technologies. Alternatives will be tested and deployed depending on their potential to safely and effectively treat and store waste. Appendix H in Volume IV of the WM PEIS describes emerging technologies that could influence the WM PEIS alternatives or mitigate impacts.

Comment (2274)
One commentor noted that Section 5.2.3 of the Draft WM PEIS states that DOE used a modular approach to determine treatment technology requirements, transportation facility requirements, storage needs, and disposal requirements. From these modules, generic facility designs were determined for each waste type. The commentor asserted the Draft WM PEIS did not provide a detailed description of how these modules were designed or what criteria were used to determine design needs, and that

8.3 Waste Management Facilities and Technologies

although generic facilities were used to estimate acreage requirements, no description of these facilities is provided. Therefore, the assumptions and design criteria used to arrive at a generic design cannot be independently verified to ensure estimated acreage requirements are reasonable and appropriate. Due to the generic nature of the designs used to produce estimates of pollutant discharges, some conservatism needs to be incorporated into these estimates. One commentor asked DOE to send him all the waste facility design information used in the WM PEIS. Another commentor asked DOE to be more specific about the facility designs.

Response
Section C.3.1.1.1 in Volume III of the WM PEIS contains a more detailed description of the methods used to calculate land requirements for treatment, storage, and disposal facilities. Sections C.2.2 and C.2.3 contain the assumptions and design criteria used to develop the generic facility designs. Additional information about generic designs is provided in the waste management facility cost information reports (5 INEL reports), which are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (2674)
There is no known technology to safely treat and store nuclear waste and it will pollute the environment for years to come.

Response
DOE is committed to managing its wastes to protect human health and the environment, including the safe storage and disposal of waste. The WM PEIS analysis uses accepted, readily available technologies for managing wastes. In addition, DOE has an aggressive technical development program to explore alternative waste disposal technologies. Technology alternatives will be tested and deployed depending on their potential to safely and effectively treat waste. Appendix H in Volume IV describes emerging technologies that could influence the WM PEIS alternatives or mitigate impacts.

Comment (2926)
Can DOE assess the capabilities of different technologies, e.g., mobile compaction, advanced thermal technologies, etc., and what waste streams might be appropriate for specific technologies?

Response
Since the WM PEIS compares impacts across sites, treatment, storage, and disposal technologies were, for the most part, held constant for the analysis. This enabled DOE to compare "apples to apples," allowing only site environmental factors to be discriminators. Volume I, Section 1.7.3, discusses various levels of NEPA documentation. Sitewide or project-level NEPA reviews would provide details on treatment, storage, and disposal technology alternatives. Sufficient comparative data would be provided in such studies.

DOE has developed a number of non-NEPA technical studies that can be used to compare various treatment, storage, and disposal technologies. These studies are available to the public through the DOE Office of Environmental Management, Office of Research and Development.

8.3 Waste Management Facilities and Technologies

Comment (3222)
The WM PEIS does not consider the effects of advances in waste management technology. DOE should begin a vigorous program for improved treatment and storage technology for radioactive wastes, including technology to make radioactive waste benign.

Response
DOE has an aggressive technical development program exploring alternative waste disposal technologies. Alternatives will be tested and deployed depending on their potential to safely and effectively treat and store waste. Appendix H in Volume IV of the WM PEIS describes emerging technologies that could influence the choice of technologies considered in sitewide or project-level NEPA reviews.

By "benign," DOE assumes that the commentor means, makes radioactive waste non-radioactive (stable). A technology that could accomplish this for selected radionuclides is nuclear transmutation, in which nuclear reactions are used to transmute one nuclide into another. It has been proposed that transmutation be used to change technetium-99, a semi-volatile, long-lived radionuclide, which can be extremely mobile in groundwater flow, into stable ruthenium-100. However, the feasibility of using transmutation on a production level has not been proven.

Comment (3270)
The WM PEIS does not consider potential advances in waste management technology, and the effects of such advances on waste management options. There are many public and private-sector efforts to develop new technologies. The WM PEIS should account for and consider advances in waste management technology.

Response
The WM PEIS analysis incorporates accepted, readily available, proven waste management technologies. DOE would use improved technologies as they become available.

Appendix H in Volume IV of the WM PEIS describes emerging technologies that could influence the PEIS alternatives or mitigate impacts. Many of these technologies are either not commercially available, have not been demonstrated for the waste types considered in the PEIS, or have not been shown to be economically or technically viable (i.e., have not achieved engineering breakthrough). Some of the technologies described in Appendix H might prove viable in the future and could warrant consideration as the technologies mature.

Comment (3423)
If reducing waste volume and treatment also reduces the possibility of waste leaching into the environment or groundwater at Hanford, then the cost is worthwhile.

Response
DOE is committed to managing its wastes to protect human health and the environment. Leaching of radioactive material into groundwater is of great concern for disposal. Certain treatments can reduce the amount of leaching. The primary means to reduce leaching is to stabilize the waste. The stabilization processes considered in the WM PEIS are grouting, polymerization, and vitrification.

8.3 Waste Management Facilities and Technologies

Volume reduction on its own does not necessarily reduce leaching. In fact, volume reduction may concentrate the radionuclides and hazardous constituents in such a fashion that leaching would produce a more toxic leachate. For example, although incineration effectively reduces the volume of the waste and destroys organic constituents, radionuclides and metals tend to be concentrated in the residual ash. Therefore, it may be necessary to combine a volume reduction technology with a stabilization process to reduce leaching.

The disposal container as well as the disposal waste form is a barrier to leaching. A disposal container with too high a void content is subject to distortion and loss of structural integrity. Compacting waste, a volume reduction technique, increase the stability of disposal containers by reducing void space and, thus, through physical means reduces the possibility of leaching.

In Volume I, Sections 6.2.2, 7.2.2, 8.2.2, 9.2.2, and 10.2.2, present the technologies and treatment processes evaluated in the WM PEIS. Decisions regarding treatment technologies will not be made as a result of the PEIS. The specific technologies used at a site to implement an alternative will depend on a number of factors that will be further evaluated at the site and project level.

Tables 6.14-2, 7.14-2, and 8.14-2 contain the cost, by alternative, of managing low-level mixed waste, low-level waste, and transuranic waste, respectively. For low-level mixed waste, the level of treatment is mandated by the need to meet RCRA land disposal restrictions. For low-level waste, volume-reduction treatment is approximately twice as expensive as minimum treatment; however, the higher treatment costs are offset in part by reduced disposal costs. Overall, low-level waste alternatives that include treatment to reduce waste volumes are estimated to cost 20 to 25% more than corresponding alternatives that include minimum treatment. For transuranic waste, treatment to meet RCRA land disposal restrictions is estimated to be approximately 30% more expensive than meeting the WIPP waste acceptance criteria. The decisionmakers will consider costs when selecting the future configuration of the waste management complex.

Comment (4481)
The Draft WM PEIS should document the reasonably anticipatable impacts of routine process upsets, poor equipment design, inadequate maintenance and operation, and human error in the estimates of expected impacts of the alternatives.

Response
Because of the programmatic nature of the WM PEIS and the large number of sites involved, generic facilities were used to evaluate impacts associated with various waste management alternatives. The same parameters were used to characterize particular types of treatment, storage, and disposal facilities regardless of where a facility would be constructed. The sources for facility characterization data are referenced in the waste-type-specific technical reports supporting the WM PEIS and included various design reports and documentation, the Mixed Waste Treatment Project Functional and Operational Requirements Report, and RCRA trial burn test results from permitted facilities. The parameters that define the substances and amounts released to the environment during facility operations reflect the available data; DOE conducted the WM PEIS analyses to ensure that no artificial biases were introduced. Releases resulting from anticipated occurrences during normal operations are accounted for in the normal operation releases, to the extent that the original source of data included such releases. Releases occurring under conditions that would be more severe than the anticipated occurrences are considered in the WM PEIS accident analyses (see Appendix F in Volume IV for

details). Summary information on potential health risks resulting from facility accidents is presented in Sections 6.4.3, 7.4.3, 8.4.3, 9.4.3, and 10.4.3 in Volume I.

The focus of the WM PEIS analyses was on programmatic issues and differences that would inform DOE and the public in making reasonable choices among the alternatives, as required by NEPA. Because the facilities were generic and the analyses were done at a programmatic level, it was neither possible nor appropriate to consider site- and design-specific issues such as monitoring, maintenance, equipment design, etc. However, uncertainties associated with these issues are included in the conservative approach used and described in the accident analyses in Appendix F (in particular, Section F.2.9). In addition, site- and design-specific issues will be considered in greater detail in site-specific NEPA operational reviews. Site operations also require that safety analysis reports, readiness reviews, and other necessary start-up activities occur prior to the start of facility operations. These reviews occur to verify proper equipment design and to ensure that adequate maintenance and operational procedures are in place in order to minimize or eliminate potential routine process upsets and minimize human error during operations.

In addition, DOE provides guidance and direction in the form of Safety Guides, Orders, and Rules that relate to these issues in conjunction with the management of these activities. These are discussed in a general way in Volume I, Chapter 12.

8.3.1 Treatment

Comment (7)
What is the volume of a canister of high-level waste after vitrification?

Response
The WM PEIS assumes that the stainless-steel canisters would hold between about 0.62 and 1.17 cubic meters of high-level waste. This information has been included in Volume I, Section 9.1.2.

Comment (8)
If the waste will not leach or disperse into air or soil after vitrification, why are containers (especially metal canisters) necessary?

Response
The Defense Waste Processing Facility EIS and its supplement contain full descriptions of vitrified waste form characteristics. The vitrified waste comes from the melter in the form of a very hot liquid, which is poured into stainless-steel canisters that serve as molds (or forms) for the glass. The hot liquid cools and hardens inside the steel canister. While the vitrified waste is highly resistant to leaching, the cooled glass is very brittle and susceptible to chipping and cracking. The canisters provide the physical integrity for handling the waste through disposal.

Comment (10)
What are the costs of canisters?

Response
DOE assumes that this comment refers to assumptions used for the storage and transportation costs of high-level waste canisters. The costs of storing and transporting high-level waste canisters are provided in Section 9.14 (Volume I) and are expected to remain stable at approximately $3.0 billion, for all high-level waste alternatives except the No Action Alternative. This would result in a unit cost of approximately $143,000 per canister based on a total of 21,600 canisters. Of this total, the cost of the actual canister is about $10,000.

Comment (11)
What is the additional weight and volume of canisters to be transported and stored after vitrification?

Response
Canisters are 2 feet in diameter and 10 feet long. The weight and volume of high-level waste in a canister varies with the fill level. A typical filled canister weighs 1.7 metric tons (3,700 pounds) and contains approximately 0.62 cubic meter of borosilicate glass that incorporates the waste solids.

See Volume I, Table 9.1-2, of the WM PEIS for more information about the characteristics of canisters.

Comment (33)
Is vitrification possible and economical for treatment of large volumes of materials?

Response
Vitrification is the process of converting materials into a glass, glassy substance, or slag, typically through a thermal process at temperatures in the range of 1,000 to 1,600°C. An example of a high-level waste

vitrification facility is the SRS Defense Waste Processing Facility, which was designed to vitrify 132.5 million liters (35 million gallons) of high-level waste over a 24-year period into a glass material encased in stainless steel cylinders that would be suitable for disposal in a geologic repository. The Defense Waste Processing Facility began operations in March 1996, and is expected to operate until 2018.

Evaluation of various high-level waste treatment technologies resulted in the selection of vitrification as the treatment technology best suited to the majority of DOE's high-level waste, based in part on the performance of the product glass because (1) of its long-term stability; (2) it is strong enough to resist stresses of disposal in a repository; (3) it withstands leaching under conditions that could potentially exist in a repository; and (4) it is suitable for large-scale, remote operations with highly radioactive waste.

Vitrification is an alternative to incineration for combustible mixed, transuranic, and low-level wastes, as well as a stabilization technology for incinerator secondary waste. However, capital equipment such as the melter, energy required for melting, and off-gas treatment requirements appear to be more expensive for vitrification in comparison with incineration. In addition, incineration is a proven technology, while vitrification of wastes other than high-level wastes has yet to be proven on a large scale.

Further information concerning vitrification is provided in Section H.3.3.5 in Volume IV of the WM PEIS.

Comment (35)
Has vitrification been done on more than small volume tests?

Response
Yes. DOE recently began full-scale vitrification at the Defense Waste Processing Facility at SRS and at the West Valley Demonstration Project, as identified in Volume I, Section 9.1.

Comment (176)
There should be no thermal treatment of nuclear waste at LLNL because (1) the technology is unproven and (2) there are large population centers nearby.

Response
The WM PEIS analysis used thermal treatment as a generic technology to enable a relative comparison of potential impacts across sites. DOE will select treatment technologies for sites after considering site-specific information in sitewide or project-level NEPA reviews.

The WM PEIS analyses were based on the uniform application of currently available treatment, at storage, and disposal technologies at each of the 17 major waste sites. The technologies used at a specific site to implement an alternative would depend on a number of factors that DOE will evaluate further at the site and project level. Such evaluations would explore alternative technologies more fully tailored to site-specific considerations.

Properly designed and operated incinerators are as or more effective than other *proven* treatment technologies, and DOE will not preclude their use at any site. DOE compared impacts from incineration to those from non-thermal treatment technologies and identified little or no difference in treatment risks to human health. In addition, DOE has an aggressive technical development program to explore alternatives

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to incineration. Alternatives will be tested and deployed depending on their potential to safely and effectively treat wastes.

Comment (186)
DOE needs to clarify whether low-level waste will be incinerated at the SRS.

Response
The WM PEIS is a programmatic document that evaluates treatment operations in a conceptual fashion, applying generic treatment capabilities across all sites as needed to reach the treatment levels specified in the alternatives. If the capability to treat a waste type is already present at a site or, as is the case for the Consolidated Incineration Facility at SRS, it will become available during the period of analysis, the site received credit for this capability, thereby eliminating the need for new construction and any impacts associated with such construction.

Incineration at SRS is evaluated in the PEIS, with credit given for the Consolidated Incineration Facility, under the following alternatives:

- Low-Level Waste: No Action; Regionalized 2, 4, and 5; and Centralized 3 and 4 Alternatives
- Low-Level Mixed Waste: No Action, Decentralized, and Regionalized 1, 2, 3, and 4 Alternatives

DOE also evaluated low-level waste incineration in the SRS Waste Management EIS. The Record of Decision for that EIS includes the incineration of low-level waste in the Consolidated Incineration Facility.

Comment (202)
DOE needs to consider the consequences of transuranic waste not meeting WIPP waste acceptance criteria.

Response
The WM PEIS analysis assumed that all transuranic waste transported to WIPP for disposal would have to meet WIPP waste acceptance criteria, which are being developed by DOE in consultation with EPA and the State of New Mexico. Although these criteria have not yet been finalized, they will be at least the minimum standards for safe shipment and delivery of transuranic waste. The WM PEIS considers the impacts of more stringent (above the minimum) waste acceptance criteria, such as reduced gas generation and treatment to meet land disposal restrictions. DOE assumes that it would treat all transuranic waste to meet the imposed criteria before shipping the waste for final disposal.

Comment (467)
Appendix H discusses technology development and its potential for future treatments; DOE should outline the potential for plasma hearth and transmutation technologies.

Response
Section H.3.3.3 in Volume IV contains a description of the plasma hearth process, including schedule for availability, cost, and technical limitations.

DOE assumes that by "transmutation technologies," the commentor is referring to the use of nuclear reactions to transmute long-lived radionuclides to short-lived or stable nuclides. Such transmutation could take place in accelerators or nuclear reactors. One transmutation reaction has concerned technetium-99, a troublesome radionuclide with a half-life of 225,000 years. In this process, technetium-99 would be bombarded with neutrons to form technetium-100, which decays quickly (16-second half-life) to ruthenium-100, which is stable. Transmutation also could be used on waste containing fissionable fertile nuclides (nuclides will be transmuted to fissionable nuclides upon neutron absorption) such as those in transuranic waste. The effect would be to convert long-lived fertile radionuclides in shorter-lived fission products through the fission process. These fission products would be disposed of as low-level radioactive waste.

However, the demonstration of the transmutation process has not been applied to transuranic waste, and has not yet been proven acceptable for production-size facilities. Because the feasibility of using transmutation technology for treating large volumes of waste is still speculative, it is not discussed in the WM PEIS.

Comment (507)
Advanced waste forms, e.g., vitrification and metals matrix, should be evaluated.

Response
DOE is committed to managing its wastes to protect human health and the environment, including the safe storage and disposal of waste. The WM PEIS analysis is based on the uniform application of generic, currently available treatment, storage, and disposal technologies. The specific technologies used at a site to implement an alternative will depend on a number of factors. Advanced technologies would be considered in sitewide or project-level NEPA reviews. DOE changed the PEIS to explain why advanced technologies were not used in the analysis (see Volume I, Section 5.2.2).

Appendix H in Volume IV describes DOE's ongoing program of technology development, which will continue to develop alternative technologies that will be deployed as quickly as feasible.

Comment (514)
Concerning the transuranic waste Centralized Alternative and waste treatment at WIPP, DOE should consider advanced treatment technologies, such as in a closed system.

Response
The WM PEIS transuranic waste analysis considered the possibility of treatment to three levels: (1) to meet current WIPP waste acceptance criteria, (2) to reduce gas generation, and (3) to meet RCRA land disposal restrictions. Each treatment process assumed currently available technologies that could be applied broadly across the system and compared between sites. However, DOE recognizes the importance of replacing these technologies as new, safer, and more cost-effective technologies become available.

The WM PEIS will support programmatic decisions on selecting sites to host transuranic waste storage and treatment facilities. Decisions on the minimum level of transuranic waste treatment needed to meet WIPP waste acceptance criteria will be based on the WIPP SEIS-II. DOE will consider all treatment technologies that can treat transuranic waste to meet this criteria.

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Comment (525)
DOE needs to clarify the relationship of waste incineration activities at LANL and those activities at INEL, and whether, based on waste quantities produced, these are contradictory to current practices.

Response
DOE clarified the WM PEIS to reflect that the hazardous waste Decentralized Alternative does not call for the construction of new incinerators (Volume I, Section 10.3.2). Due to the relatively low projected waste volumes to be processed at LANL, DOE canceled plans for an incineration facility there because operating such a facility would not be cost-effective. The Final WM PEIS indicates that under the Decentralized Alternative, DOE would incinerate hazardous waste at INEL.

Thermal treatment was used as a generic technology in the WM PEIS analysis to allow a relative comparison of potential impacts across sites. Site-specific treatment technologies would be selected after consideration of information in any sitewide or project-level NEPA reviews.

Comment (1117)
DOE should clarify the meaning of thermal destruction.

Response
Thermal destruction, or thermal treatment, is the efficient burning of combustible solid and liquid wastes to destroy organic constituents and reduce the volume of the waste. The greater the destruction efficiency, the cleaner the air emissions. The thermal treatment technologies analyzed in the WM PEIS are incineration and desorption, which are described in Volume I, Section 6.2.2, of the WM PEIS.

The definition for thermal treatment is included in the Glossary in Volume I of the WM PEIS.

Comment (1523)
Have the treatment technologies identified in the WM PEIS been decided? Are they already in place? The WM PEIS needs more discussion about the treatment technologies and their impacts on cost and potential emissions. This discussion is key to decisions, but is not available in the PEIS.

Response
The WM PEIS does not select specific treatment technologies for specific sites. The 17 major sites identified in the WM PEIS have been evaluated as potential treatment, storage, and disposal facilities for comparative purposes. The PEIS is a national study and, therefore, management facilities and technologies are assumed to have a generic design, which allows DOE to make comparisons across sites. Thermal treatment, for example, was used as a generic technology. However, treatment technologies for sites would be selected after considering site-specific information in any sitewide or project-level NEPA review. Such analyses would explore alternative technologies more fully tailored to site-specific considerations.

DOE would use existing units to the extent feasible. Chapters 6 through 10 in Volume I identify existing capacity. However, existing capacity would not be sufficient to meet all of DOE's treatment needs; therefore, additional generic facilities were hypothetically placed where needed to address the difference between existing capacity and capacity needed to meet the requirements of a given alternative.

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Comment (1694)
Thermal beds are not as safe as DOE thinks.

Response
DOE assumes that the reference to the safety of thermal beds is to the safety of fluidized-bed incinerators. In a fluidized-bed incinerator, waste is fed to a hot bed of inert granular material for combustion, where the high thermal mass and turbulent mixing action of the bed rapidly transfers heat to the waste. This technology has high applicability to resins and combustible dry heterogeneous solids. RFETS has studied this technology.

The WM PEIS analysis assumes the use of currently available generic treatment technologies; for example, the PEIS considers the rotary kiln incinerator. Therefore, incinerator accidents addressed in the WM PEIS were appropriate for rotary kiln incinerators, not fluidized-bed incinerators. Specific technologies used at a site to implement an alternative would depend on a number of factors that DOE would evaluate further in sitewide or project-level NEPA reviews.

Comment (1721)
DOE should give more attention to the use of innovative technologies for treating transuranic waste (e.g., LLTD microwave).

Response
DOE assumes the commentor is referring to one of two technologies being developed by DOE, low temperature thermal desorption, or microwave melting. The DOE Office of Technology Development has an active program to develop improved technologies for the treatment, storage, and disposal of DOE radioactive and hazardous wastes.

The low-temperature thermal desorption process under development at RFETS uses heat at temperatures below the point at which organic materials decompose to evaporate organic materials such as solvents from wastes. The organic materials would then be collected and treated and/or disposed of as appropriate. The residue would then be stabilized and disposed of as appropriate. The residues would be disposed of at WIPP. Several methods have been investigated as the best source for this process, but apparently not microwave heating.

Microwave treatment of mixed waste, which has been investigated for the in-container solidification and stabilization of nonorganic wastes such as incinerator ash, sludges, or soils, is in the demonstration stage. Dry waste material is vitrified inside a metal disposal container in either a batch or continuous feed mode. Melt temperatures range from 1,800 to 2,600°F and the resulting product is a glassy monolith that would meet radioactive waste disposal criteria for liquid and particulate content and RCRA land disposal restrictions for leaching of toxic hazardous constituents.

The WM PEIS will support programmatic decisions on selecting sites to host transuranic waste storage and treatment facilities. Decisions on the minimum level of transuranic waste treatment needed to meet WIPP waste acceptance criteria will be based on the WIPP SEIS-II. DOE will consider all treatment technologies that can treat transuranic waste to meet this criteria.

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Comment (1798)
One commentor stated that if low-level wastes can be safely biodegraded, he would favor biodegradation as a treatment method.

Response
The radionuclide constituents of low-level waste cannot be biodegraded. It might be possible to successfully biodegrade the organic fractions of low-level waste. However, because of the programmatic nature of the WM PEIS study, DOE chose generic treatment technologies, which included thermal treatment, compaction/supercompaction, solidification, size reduction, and evaporation/concentration.

Comment (2011)
Figure 6.2-1 does not include solidification and stabilization, the primary treatment options. Solidification and stabilization are being used for treatment of low-level mixed waste at a few sites, and should probably be included in this figure.

Response
Figure 6.2-1 in Volume I of the WM PEIS illustrates the "generic" treatment train used to evaluate treatment of low-level mixed waste. The diagram includes secondary treatment modules for grout and polymerization. Grouting and polymerization are solidification and stabilization treatment methods. The modules listed for pretreatment, primary treatment, and secondary treatment contain the basic technologies to treat low-level mixed waste to meet land disposal restrictions. Waste is routed to modules based on treatment requirements, and both polymerization and grout modules receive some waste directly from pretreatment, as well as some after other types of "primary treatment" are accomplished. Thus, solidification and stabilization, represented by processes contained in both the polymerization and grout modules, are evaluated in the WM PEIS. Greater detail about these technologies is in the WM PEIS Low-Level Waste Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Although the WM PEIS is not intended to select technologies and, thus, uses only a generic system for its evaluation, DOE is considering other means of solidification and stabilization for its low-level mixed waste. Vitrification, various cement matrices, and ceramics are also being investigated. DOE intends to treat all low-level mixed waste in accordance with the requirements of land disposal restrictions and all other applicable requirements.

Comment (2014)
Volume I, Section 6.2.2, states that an approved method recognized by EPA was selected to process each treatability group. Specify the approved treatment method and provide a list of treatment technologies that would be recognized by EPA.

Response
Treatment technologies were taken from recommendations of the *Mixed Waste Treatment Project: Functional and Operational Requirements for an Integrated Facility*, Los Alamos National Laboratory, 8/30/92. The Mixed-Waste Treatment Project was established to provide treatment technology and processing options for treating low-level mixed waste. These technology options were selected based on the technology-based standards identified in 40 CFR 268 and the treatment standards for hazardous debris identified in 40 CFR 268.45.

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The WM PEIS Low-Level Mixed Waste Technical Report, which is available in the DOE public reading rooms listed in Volume I, Section 1.9 of the Final PEIS, provides additional details about the treatment technologies that DOE evaluated for the WM PEIS. These waste treatment technologies are presented in terms of treatment modules for waste preparation, pretreatment, primary and secondary treatment, and preparation of treated waste for final disposal. This sequential linking of treatment modules constitutes a "treatment train." Each waste treatment form has a unique treatment train, as shown in Volume I, Figure 6.2-1, of the WM PEIS.

Comment (2016)
Volume I, Table 6.2-2, uses the term "Nonflame Technologies." DOE should use the term "Other Technologies," since "nonflame" is not a standard term used by EPA or States.

Response
DOE changed "Nonflame Technologies" to "Alternative Organic Treatment Technologies" in response to this comment.

Comment (2026)
The WM PEIS should include a complete environmental analysis of any new proposed disposal methods for mixed waste, especially with regard to the molten salt oxidation process.

Response
The WM PEIS does not propose specific treatment technologies for the candidate waste management sites. Because the PEIS is a national study, DOE assumed generic designs for management facilities and technologies, which allows comparisons across sites. Therefore, DOE used incineration as a generic thermal treatment technology in the PEIS analysis. DOE will select treatment technologies for sites after considering site-specific information in sitewide or project-level NEPA reviews.

DOE has an aggressive technical development program to explore alternatives to incineration. DOE will test and deploy incineration technologies depending on their potential to treat wastes safely and effectively.

Comment (2110)
I am in full support of waste treatment activities, including incineration.

Response
Thank you for your comment.

Comment (2117)
The concept of incineration and how it relates to the accelerator at BNL should be clarified.

Response
Incineration is a waste treatment activity that provides for the efficient burning of combustible solid and liquid wastes to destroy organic constituents and reduce the volume of the waste. An accelerator generally accelerates atomic or subatomic particles and causes them to collide with a target, which enables scientists to study the structure of matter. Thus, there is little relationship between incinerators and accelerators.

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Comment (2175)
Commentors oppose Vortec or glass encapsulation of radioactive waste. The glass frit produced during the Vortec process does not seem to be of high quality and there is a potential for leakage. DOE needs to pay attention to quality control when treatment technologies such as vitrification are being carried out.

Response
The Vortec process is an oxidation and vitrification process for the remediation of soils, sediments, and sludges that are contaminated with organics and heavy metals. A 20-ton-per-day pilot-scale facility at an EPA-funded site has operated successfully since 1988, producing a vitrified product that passes toxicity characterization leaching procedure standards. Large pilot plants are available for testing and large field demonstrations are underway. Transport systems are being designed for the treatment of DOE mixed wastes.

Due to its programmatic nature, the WM PEIS does not propose specific waste treatment technologies; rather, it includes environmental impacts from treating waste with existing and generic treatment facilities. DOE used representative technologies to estimate waste management impacts, but will not use the PEIS to select specific technologies (such as the Vortec process) for waste management.

With regard to the quality of the glass frit from the Vortec process, the following statement is from DOE Order 5700.6C, *Quality Assurance*: "It is DOE policy to establish quality assurance requirements to ensure that risks and environmental impacts are minimized..." One of the DOE quality assurance criteria is that "inspection and assurance testing of specified products and processes shall be conducted using established acceptance and performance criteria." This quality assurance requirement applies to the Vortec process, as it would apply to any treatment process.

Comment (2272)
At Hanford, DOE must pay particular attention to cultural impacts, especially to religious and cultural sites that are not on the National Register of Historic Places. The use of basalt from Gable Mountain for riprap could have cultural impacts; all areas along the river, as well as Gable Mountain and Gable Butte, are high risk for native remains.

Response
Section 4.4.4 in Volume I of the WM PEIS, which describes the affected environment at the Hanford Site, states that the Hanford Site contains numerous recorded archaeological and might contain additional cultural properties important to Native American groups. The Hanford Site contains no designated National Historic Landmarks. However, several industrial properties, including the B Reactor, are listed on the National Register of Historic Places.

Cultural resources, including historic and Native American resources, could be affected at sites where waste management facilities are ultimately built. However, the impacts of the construction of waste management facilities on cultural resources cannot be effectively analyzed at the programmatic level because the extent of those impacts depends on their specific location at a site. These impacts will be examined in sitewide or project-level reviews.

8.3.1 Treatment

Comment (2333)
It would be helpful to point out the fraction of treated mixed wastes in which the radioactive or non-radioactive contaminants are essentially negligible, approaching natural background at ORR.

Response
The analytic methodology used in the WM PEIS does not segregate the wastes following treatment. Thus, the waste that is analyzed for disposal has uniform concentrations of radioactive elements and chemicals that should not be characterized as negligible.

Low-level mixed waste is treated to provide for safe disposal of the constituent radioactive components and for disposal of the nonradioactive, hazardous components in conformity with RCRA land disposal restrictions. Treatment of low-level mixed waste does not remove radioactivity; only time can remove radioactivity, through decay. However, treatment does stabilize radioactive waste so that it can be disposed of. The impact to air quality of treating hazardous constituents depends on the nature of the constituents. RCRA requires that hazardous organic compounds be destroyed. On the other hand, RCRA requires that toxic metals be stabilized so that they not leach appreciably from disposal facilities. A technical report that is available in the DOE public reading rooms listed in Section 1.9 in Volume I contains further information about the radiological profiles and treatment categories of low-level mixed waste. Sitewide or project-level NEPA reviews would contain more detailed information about the waste to be treated at ORNL.

Comment (2340)
According to Figure 7.2-1 in Volume I, only bulk equipment is to be reduced. Is shredding and compacting for bulk items?

Response
The materials to be shredded are identified as "bulk metals/equipment." These materials are individual pieces of metal and equipment that are amenable to size reduction. They are referred to as "bulk" because the volume is of the item itself, including void spaces, not of the individual components.

Shredding is practical for lighter gauge materials. The more broadly defined shredding (i.e., size reduction [to include shearing, sawing, cutting torches, impact tools]) is practical for mechanical disassembly of equipment, structural pieces, and hoods. This is often a pretreatment step for packaging or compaction, where applicable. This is why DOE used the term size reduction instead of the more narrowly defined shredding.

Comment (2446)
Volume I, Section 10.3.2, mentions that the INEL incinerator will be placed in standby. This is not so. It will be used for low-level waste and low-level mixed waste treatment until the advanced Mixed Waste Treatment Facility comes on line and possibly after.

Response
The commentor is correct that the Waste Experimental Recovery Facility incinerator at INEL will not be placed in standby. The incinerator is currently treating and will continue to treat for some time low-level waste and low-level mixed waste.

8.3.1 Treatment

DOE revised Section 10.3.2 to identify INEL as one of the sites that would perform thermal treatment of hazardous waste under the Decentralized Alternative.

Comment (2552)
In Volume II, Table II-6.5.7, what is the source of vinyl chloride under the Regionalized Alternative?

Response
Table II-6.5-7 shows vinyl chloride emissions from hazardous waste treatment at 1% of the standard under Regionalized Alternative 2, but not in other alternatives. The vinyl chloride treated at INEL under Regionalized Alternative 2 would be shipped from the Hanford Site. Under Regionalized Alternative 1, this vinyl chloride (approximately 500 kilograms) would be treated onsite at Hanford, as shown in Table II-5.5-7. There are also small amounts of vinyl chloride waste generated at INEL and ANL-E.

Comment (2555)
Volume III, Table C.4-2. Is vitrification the only technological option for treating high-level waste? For other options, there is a potential for releases of radionuclides from high-level waste treatment.

Response
The analysis of high-level waste treatment alternatives is not within the scope of the WM PEIS. Section 1.5.4 in Volume I states that the WM PEIS addresses only alternatives for storage of vitrified high-level waste prior to its ultimate disposal in a geologic repository. The impacts of vitrification of high-level waste are included in the cumulative impacts in Chapter 11 (Volume I).

Comment (2570)
Summary document, Table 1.3-2, and Volume I, Table 1.5-1, Chapter 3, and Section 5.2. In these tables, why isn't there a row for "how to treat" and in text, why isn't there some consideration of treatment methodology options as well as locations? In other words, why were generic treatment facility designs assumed? Is "where to treat" a programmatic decision and "how to treat" a site-specific decision? For example, some treatment methods are not suited to some sites, and capital-intensive treatment methods would benefit most by centralization.

Response
The WM PEIS is a programmatic document that presents options for where to treat, store, and dispose of DOE's radioactive and hazardous waste. Due to its programmatic nature, the PEIS does not attempt to select actual locations for waste management facilities on sites or select specific treatment technologies for sites. Rather, the PEIS assumes a generic waste treatment technology to enable comparisons of siting alternatives. The technologies analyzed were chosen for analytical purposes only. DOE revised Sections 1.7.3 and 5.1.2 in Volume I to include this explanation. The comment is basically correct, in that evaluating alternatives for "how to treat" is more appropriate at the sitewide or project level.

DOE will consider factors such as cost and technology development when selecting sites for waste management operations.

Comment (2581)
DOE does not address the uncertainty related to the treatment technologies for high-level waste (i.e., the treatment technologies are not yet proven).

Response
The WM PEIS is a programmatic study that does not select technologies; rather, for purposes of analysis, it assumes a generic waste treatment train to enable decisionmakers to compare alternatives at a Department-wide level. However, Appendix H in Volume IV of the WM PEIS discusses selected examples of emerging technologies that could influence waste management alternatives or mitigate the impacts of waste management activities.

Issues related to treatment facilities and selection of treatment technologies will be addressed in the course of sitewide or project-level NEPA reviews.

Comment (2589)
The WM PEIS states that under the Decentralized Alternative for hazardous waste, DOE would implement its current plan to start incineration at LANL, ORR, and SRS, and to place the incinerator at INEL in a standby status. Does this statement really reflect current DOE plans? Our understanding is that there are no plans to restart the incinerator at LANL, and the incinerator at INEL is currently operating, with plans for continuing operation. Also, why is this alternative not discussed in Appendix D?

Response
DOE has modified the hazardous waste Decentralized Alternative by replacing LANL with INEL as an incineration site in Section 10.3.2. The incinerator at INEL is currently operating and will continue to operate.

The Decentralized Alternative is not discussed in Volume III, Appendix D. As can be seen by comparing the waste-volume estimates presented in Tables 10.3-4, 10.3-5, and 10.3-6 in Volume I, the Decentralized Alternative is a composite of the No Action Alternative (for INEL and ORR) and Regionalized Alternative 1 (for SRS). The health risk estimates for the Decentralized Alternative presented in Section 10.4 were compiled by using the estimates presented in Appendix D for the No Action Alternative for INEL and ORR and for Regionalized Alternative 1 for SRS.

Comment (2605)
Volume I, Section 7.4.3, states that thermal treatment technologies are the most effective in destroying the combustible hazardous constituents contained in low-level waste. Please clarify; this sounds more like hazardous or mixed-waste treatment.

Response
DOE has revised Section 7.4.3 to state that although there are many processes used for treating low-level waste, to date, thermal treatment technologies have been the most effective in destroying and reducing the volume of combustible materials contained in low-level waste.

Comment (2606)
In Volume I, Section 8.4.1.2, "thermal destruction of plutonium-238" should be changed to "thermal treatment or incineration of material containing plutonium-238," since plutonium cannot be destroyed thermally.

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Response
DOE revised Section 8.4.1.2 to indicate that this reflects thermal destruction of combustible material containing plutonium-238.

Comment (2651)
Commentors oppose incineration of radioactive and hazardous waste because of atmospheric inversions, production of potentially "lethal" airborne pollutants such as dioxins and furans to nearby population centers, and because the technology is unproven. Commentors suggest DOE wait until there is a safe alternative.

Response
DOE is committed to managing its wastes to protect human health and the environment, including the safe storage, transportation, and disposal of waste. The specific technologies used at a site to prepare waste for transportation to implement an alternative will depend on a number of factors that DOE will evaluate further at the site and project level. The WM PEIS does not select treatment technologies for specific sites.

The PEIS analyses were based on the uniform application of currently available treatment, storage, and disposal technologies. DOE used thermal treatment as a generic technology in the PEIS analysis to enable a relative comparison of potential impacts across sites. DOE will select a treatment technology at a site after considering site-specific information in sitewide or project-level NEPA analysis. Such analyses will explore alternative technologies more fully tailored to site-specific considerations.

Properly designed and operated incinerators are as or more effective than other treatment technologies, and DOE does not preclude their use at any site. EPA's combustion strategy states, "If properly designed and operated in compliance with regulatory standards, combustion is a technology that provides sound management of hazardous waste." Fact sheets on radioactive and mixed waste incineration published jointly by EPA and DOE (EPA 402-F-95-004 through 007, January 1996) recognize the effectiveness of incineration as part of the DOE Waste Management Program and that alternatives are not entirely comparable. Optimal operation of incinerators in conjunction with existing pollution control technologies, can minimize generation of dioxins and furans and radiation releases.

DOE compared impacts from incineration to those from non-thermal treatment technologies and identified little or no difference in treatment risk to human health. The Alternative Organic Treatment Technology Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS, evaluates the environmental impacts and costs of incineration versus a non-thermal treatment technology.

DOE has an aggressive Technical Development Program to explore alternatives to incineration. Alternatives will be tested and deployed depending on their potential to treat waste safely and effectively. The Technology Development Program is an integral part of the Office of Environmental Management's mission.

Comment (2848)
Cancer estimates in Volume I, Table 6.4-8, are based on conceptual thermal treatment with particulate radionuclide controls. DOE should clarify and specify what efficiencies were assumed for the high-efficiency particulate air filtration controls.

Response
High-efficiency particulate air filters are capable of trapping and retaining at least 99.97% of all monodispersed particles 0.3 micrometers in diameter or larger. To be conservative, the 99.97% efficiency was used in the WM PEIS analyses. DOE revised Section 4.3.1 in Volume I of the WM PEIS to include this specification. Supporting technical reports contain additional technology performance information. These reports are listed in Volume I, Section 15.2, and are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3133)
Referring to Section H.3.2, a commentor stated that it might be difficult to evaluate incineration (as the "national" baseline technology for organic destruction) for Hanford. Hanford costs have not been confirmed and perhaps are not calculable because Hanford has not used incineration due to political, public acceptability, or technical reasons.

Response
For the WM PEIS analysis, DOE assumed the use of standard, currently available technologies for waste management and transportation. These are described in Chapters 6 through 10 (Volume I) and Appendices D (Volume III), E, and F (Volume IV) of the WM PEIS. Supporting technical reports provide additional information. In addition, DOE has an aggressive technical development program to explore alternative waste disposal technologies. Alternatives will be tested and deployed depending on their potential to safely and effectively treat and transport waste. Appendix H in Volume IV describes emerging technologies that could influence the WM PEIS alternatives or mitigate impacts.

The WM PEIS does not select specific treatment technologies for specific sites. The 17 major waste sites identified in the WM PEIS have been evaluated as potential treatment, storage, and disposal facilities for comparative purposes. The PEIS is a national study and, therefore, management facilities/technologies are assumed to have a generic design, which allows DOE to make comparisons across sites.

DOE will use existing waste management units to the extent feasible. Chapters 6 through 10 identify existing capacity. However, existing capacity will not be sufficient to meet all of DOE's treatment needs; therefore, additional (generic) facilities were assumed where needed to address the difference between existing capacity and capacity needed to meet the requirements of a given alternative.

Comment (3134)
Section H.4.3.1 of the WM PEIS suggests using a cone penetrometer for dense, nonaqueous-phase liquids investigations. However, at Hanford, it might not be suitable to use a cone penetrometer for such investigations due to the depth of the groundwater and aquifer thickness.

Response
DOE revised Section H.4.3.1 in Volume IV of the WM PEIS to indicate that the cone penetrometer is generally used for shallow subsurface investigations.

Comment (3135)
Section H.4.3.1 of the WM PEIS states that ground-penetrating radar shows the most promise for detecting shallow pockets of dense, nonaqueous-phase liquids (DNAPLs). However, at Hanford, this technique would have limited capacities for delineation of DNAPLs, due to their expected depth.

8.3.1 Treatment

Response
Current developments are focused on improving the sensitivity at greater depth of detection technologies (seismic, passive and active magnetic, ground-penetrating radar, and inducted resistivity/polarization) that could be expected to detect shallow pockets of DNAPLs. Ground-penetrating radar shows the most promise. At present, none of these technologies is sensitive enough to be used alone or on all sites for DNAPL characterization, but when used in combination with other techniques such as the cone penetrometer, they can result in excellent delineation of DNAPLs.

Comment (3136)
The applicability of the heated steam technology for inorganics or organics is not confirmed for Hanford, where many of these contaminants are located at depths greater than 200 feet.

Response
Inclusion of technologies in WM PEIS Appendix H is not meant to imply that these technologies would be useful at all sites under all conditions. Technologies are described that could be applied given the appropriate environmental conditions.

Comment (3137)
The attachment to Appendix H of the WM PEIS notes that new methods need to be developed for removal of technetium-99 from groundwater. At Hanford, technetium-99 removal was successful, to non-detect levels, in the 200-BP-5 and -UP-1 Operable Units using ion-exchange resins.

Response
The attachment to Appendix H cited in the comment is a portion of the Office of Technology Development's fiscal year 1996 Budget Request Work Packages for Focus Areas and Crosscutting Programs. Among the many initiatives contained in the document is the development of new methods for removal of technetium-99 from groundwater. The existence of this initiative in the Office of Technology Development's fiscal year 1996 Budget Request Packages in no way implies that DOE believes that current technetium-99 removal methods are necessarily inadequate, nor does it imply that Hanford has not successfully removed technetium-99.

Comment (3149)
The WM PEIS does not provide a basis for treatment decisions since it fails to consider (1) treatment needed for waste characterization requirements, to reduce volumes and void spaces in drums, and to meet the EPA waste disposal assurance requirements, and (2) non-incinerator treatment.

Response
The WM PEIS is a national study on siting options for managing radioactive and hazardous waste safely and efficiently. For purposes of analysis, the PEIS uses generic treatment technologies to compare siting options. The PEIS will not be used to select actual treatment technologies. Therefore, there is no need to compare two technologies that have the same objective, such as incineration and another form of thermal treatment. However, the generic technologies considered in the document were chosen to meet regulatory requirements. For example, the generic technologies for low-level mixed waste and hazardous waste would meet the RCRA land disposal restrictions promulgated by EPA. Decisions related to the level of treatment needed for transuranic waste disposal at WIPP are addressed in the WIPP SEIS-II. Additional studies will be required before DOE selects actual treatment technologies for specific sites.

8.3.1 Treatment

Appendix H in Volume IV of the WM PEIS contains a description of technology development in general. In addition, several technical reports referenced in the PEIS provide technology-related information in different contexts. These reports are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3294)
It is unclear how various treatments affect the volumes requiring disposal. Would additional treatment significantly reduce the curies disposed, and if so, by how much?

Response
The degree of volume reduction achieved through treatment depends on the technology used. The WM PEIS technical reports for low-level waste and low-level mixed waste, which are available in the DOE public reading rooms listed in Section 1.9 in Volume I, contain volume reduction factors for the technologies represented in the WM PEIS. For solid combustible waste, incineration achieves the highest volume reductions. Overall volume reductions for alternatives can be obtained from the tables in Appendix I in Volume IV. Comparison of feedstock volumes and disposal volumes yields the effect of treatment.

Treating waste can change its physical and chemical characteristics and its volume, but does not affect the radioactive characteristics. Therefore, the curie content of the disposed waste is not reduced by treatment.

Comment (3330)
Nuclear energy wants to radiate and it will keep going until it is stopped by the exact science of nuclear waste management. Common sense dictates that the more one tries to move things around and change them, the more trouble in the end result. Use the actual scientific properties of nuclear waste to fully expend the radiation levels left. This will enable consolidation of future waste and the reclamation of current waste. The probability of cancer effects, genetic effects, and overall fatalities will drop.

Response
DOE is committed to the safe and efficient management of radioactive waste and waste that is defined as hazardous under RCRA. Treatment of this waste will put it in a more stable form, reduce its volume, and allow its permanent disposal. The physical, chemical, and radioactive properties of the waste are used to determine appropriate groups of treatment. For example, Figure 6.2-1 in Volume I illustrates how the treatment of low-level mixed waste depends on whether the waste is aqueous waste, organic liquids, solid process residues, soils, or debris.

Comment (3611)
See Volume I, Figure 8.2-2. What is the nongassing package for WIPP?

Response
The WM PEIS analysis of intermediate levels of treatment of transuranic waste considered technologies that could reduce hydrogen gas generation in the WIPP repository, in accordance with WIPP waste acceptance criteria. The technologies for reduced gas generation considered in the WM PEIS included shredding and grout stabilization, and packaging in a disposal overpack made from materials less likely to contribute to the generation of hydrogen gas. Figure 8.2-2 refers to this "nongassing package."

8.3.1 Treatment

Comment (3640)
Why is it necessary to incinerate plutonium-238?! And, what are the impacts of thermal destruction of plutonium? Thermal destruction, in essence, will increase risk to exposure of plutonium by humans and wildlife/fish.

Response
The interaction of radiation from plutonium-238 with organic materials can generate hydrogen gas. Transportation regulations limit the amount of this gas that is permitted in transportation containers. Incineration destroys the organic components in the waste, thereby eliminating the source of hydrogen. The incinerator ash, which would include the residual plutonium-238, would be stabilized in a grout or vitrified form prior to shipment for disposal.

The WM PEIS used currently available thermal technologies for the analysis of organic destruction; incineration was employed for the most intensive treatment of transuranic waste. High-efficiency particulate air filters were used for the off-gas systems. However, the WM PEIS was not intended to select technologies and the generic currently available systems provided a conservative analysis of impacts. For treatment of organics in plutonium wastes, DOE would consider proven alternative technologies when conventional thermal technologies such as incineration pose unacceptable risks. Site-specific designs would incorporate the best technologies for each waste treatment requirement and site.

Comment (3738)
DOE treats the land and habitat around Hanford as a free resource to sacrifice for burial of wastes without attempting to reduce volumes or treat the wastes before burial.

Response
Waste disposed of at the Hanford Site would be required to meet that disposal facility's waste acceptance criteria. The waste acceptance criteria for the Hanford low-level waste disposal facility require that all waste with greater than threshold quantities of key radionuclides be treated so that they be in a stable, immobilized form when disposed of. The wastes considered for disposal at Hanford in the WM PEIS are low-level waste and low-level mixed waste. The maximum amount of land potentially needed for low-level waste and low-level mixed waste disposal at Hanford is 137 acres, which is less than 3% of the recommended land area for future waste management activities. Both waste types would be treated to render them less hazardous, or to stabilize them before disposal. These processes also reduce volumes (i.e., for aqueous and organic wastes). The WM PEIS also specifically evaluated low-level waste alternatives that involved maximum possible volume reduction through thermal treatment, size reduction technologies, and super compaction prior to disposal, including disposal at the Hanford Site.

DOE is concerned about the future use of land at and surrounding its sites and facilities. Recommendations for future use of the Hanford Site are being developed by the Hanford Future Site Uses Working Group, which includes representations of Federal, Tribal, State, and local entities. Local entities include Benton County, Franklin County, and the City of Richland. For further information on DOE's efforts regarding future land uses, see DOE's 1996 publication, *Charting the Course: The Future Use Report,* which is available in the DOE public reading rooms listed in Volume I, Section 1.9.

8.3.1 Treatment

Comment (3745)
Hanford does not treat all liquid waste before disposing of it directly to the soil.

Response
It is the policy of DOE that use of soil columns to treat and retain radionuclides and nonradioactive materials in liquid waste streams be discontinued at the earliest practicable time in favor of wastewater treatment and minimization. To date, all of the wastewater streams at Hanford have been addressed in some manner with the cognizant State of Washington agency. These liquid effluent streams were evaluated to determine the best treatment and disposal options available. In cases where it was determined that the best available management option for the wastewater stream was treatment, the streams are being treated. For some of the streams it has been determined that the best available options are source control, minimization or administrative controls, or that no additional treatment is required.

At Hanford, except for the wastewater stream containing tritium, there are currently no liquid wastewater streams disposed to the ground that exceed the Safe Drinking Water Act maximum contaminant levels for radionuclides. Washington State Department of Ecology has agreed with DOE in the *Determination of Significance and Adoption of Existing Environmental Document*, published October 6, 1993, that there are presently no reasonable treatment technologies to remove tritium from the effluent. The Washington State Department of Ecology found the discharge option DOE selected to adequately protect human health and the environment.

There are some nonradioactive, non-hazardous liquid discharges at Hanford discharged to the soil for which the best treatment and disposal option has been determined, with concurrence from the State of Washington, to be source controls, minimization, or administrative controls. Examples of these liquid wastewaters are steam condensate and heating, ventilation, and air conditioning cooling water.

Comment (3773)
DOE needs to explain the water treatment technologies it will use, including evaporation, and how that water will be disposed of.

Response
Because of the programmatic nature of the document, the WM PEIS assumes generic treatment technologies. Generic treatment technologies for aqueous waste (wastewater) are shown in Figure 6.2-1 for low-level mixed waste, Figure 7.2-1 for low-level waste, and in Figures 8.2-1 through 8.2-3 for transuranic waste. More information on these technologies is given in the technical reports for these waste types available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Evaporation is a typical wastewater treatment technique; it is used to concentrate a liquid effluent by using heat to drive off relatively volatile components. It is used to concentrate aqueous wastes. Evaporation is conducted by vaporizing a portion of a solvent (typically water) to produce a concentrated solution or thick liquor of radioactive material (often called evaporator bottoms). The evaporated solvent, usually water, can be condensed and reused in process applications or can be discharged. Filters and adsorbents such as activated carbon are used to trap any hazardous materials in the vapors.

8.3.1 Treatment

Comment (3775)
The public is concerned about the amount of incineration and dumping taking place at ANL-E.

Response
DOE does not incinerate or "dump" radioactive or hazardous waste at ANL-E. Both radioactive wastes and hazardous wastes are sent offsite for disposal. There is no incineration of such wastes at ANL-E.

Comment (3912)
DOE needs to inform the public about the treatment technologies associated with the waste types and when or if incineration could be an option at ANL-E. The public is opposed to incineration in this area. DOE needs to explain when and where incineration will be used as a treatment technology.

Response
Because of its programmatic nature, the WM PEIS does not select treatment technologies. For purposes of analysis and comparison of siting alternatives, it assumes generic treatment modules such as thermal treatment. Sitewide or project-level NEPA reviews would address questions of technology selection.

The only alternative where thermal treatment at ANL-E is indicated is the Decentralized Alternative for low-level mixed waste. ANL-E has a small volume of solid process residues (15 cubic meters to be treated over 10 years), for which thermal treatment is indicated. However, it would not be very economical to use incineration to treat such small volumes. Therefore, DOE would probably consider a different thermal or non-thermal treatment suitable for treating small volumes.

Comment (3954)
Volume I, Tables 3.6-1 and 3.6-2 indicate volume reduction of low-level waste as a possible alternative. What methods of volume reduction are DOE considering other than incineration and disposal in sewerage systems? Both methods of "reduction" result in release of radioactive materials to the environment through air or water.

Response
Other volume reduction technologies considered in the WM PEIS are identified in Section 7.2.2 in Volume I, especially in Figure 7.2-1. Thermal treatment (incineration) is the generic volume reduction technology considered only for low-level radioactive waste classified as organic liquids or combustible. For low-level waste classified as compactible, compaction/supercompaction is the generic technology considered. For both surface contaminated and activated bulk metals and equipment, size reduction is the generic technology considered. Further information on these technologies is contained in the WM PEIS Low-Level Waste Technical Report available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

DOE is committed to managing its waste to protect the public health and safety and the environment. It does not dispose of radioactive waste in sewerage systems. Rather, it disposes of radioactive waste in land disposal facilities only after a performance assessment has shown that the waste can be disposed of there without endangering human health and safety and the environment. The performance assessment is a systematic analysis of a disposal facility and its environs for the purpose of demonstrating compliance with specific performance objectives.

8.3.1 Treatment

Comment (3990)
How can DOE claim to address treatment alternatives for low-level mixed waste openly in this PEIS, indicate a planned facility for increased aqueous treatment at the Portsmouth Plant, and then publish washing technologies while claiming to allow public comment on WM PEIS decisionmaking?

The WM PEIS does not consider aqueous washing treatment for low-level mixed waste, but indicates plans to increase capacity at the Portsmouth Plant for implementation of this treatment. The WM PEIS should fully address this treatment technology, especially since DOE plans to increase capacity at a specific site.

Response
The WM PEIS analyzes different configurations of these activities for DOE sites across the country and will be used to make programmatic decisions on treatment, storage, and disposal of certain wastes. The WM PEIS will not be used to select technologies for waste management. The technologies used in the WM PEIS are proven waste treatment methods that are representative of technologies that could be implemented at the sites and were used for analytical purposes to allow comparisons of impacts across sites. As shown in Figure 6.2-1, the technologies used for the evaluation included aqueous treatment. The top treatment process (nonwastewater) is an aqueous treatment process train that includes solids separation, neutralizations, wet oxidation evaporation, and water recycling. Thus, aqueous treatment listed for the Portsmouth Plant was evaluated in the WM PEIS.

The Alternative Organic Treatment Technology Technical Report was prepared to compare the impacts of thermal treatment (incineration) to non-thermal washing technology. Impacts for these technologies were found to be similar, supporting the validity of the analysis in the WM PEIS utilizing thermal organic destruction for impacts. The technical report is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final PEIS.

Comment (4003)
A commentor would like to request that DOE consider onsite treatment and storage alternatives using mobile treatment facilities that can be moved from site to site.

Response
As described in Section C.3.1.2 in Volume III, portable treatment facilities are considered in the WM PEIS for use at sites that have small quantities of waste requiring treatment. Permanent facilities would be constructed at sites having larger quantities of waste.

Comment (4235)
Land and habitat are resources that should be highly valued. Therefore, DOE should treat wastes to reduce volumes before burying them at Hanford.

Response
The alternatives considered in the WM PEIS do not consider specific treatment technologies for each waste type. Generic technologies are employed to provide decisionmakers a relative comparison across sites. Some form of volume reduction treatment technology (such as incineration, compaction, supercompaction, size reduction, evaporation/concentration) applicable for compactible, combustible, or organic liquid waste is assumed for several of the low-level waste alternatives (see Volume I, Section 7.2.2) for the purpose of comparing effects against the alternatives that employ only minimum

8.3.1 Treatment

treatment technologies. From comparison of Tables I.2-3 and I.2-4 in Volume IV, it can be seen that use of volume reduction technologies can reduce low-level waste disposal volume by nearly 50% compared with minimum treatment.

Comment (4460)
What alternative technologies did DOE consider for the treatment of transuranic waste to prevent or control the release of the radionuclides to the environment?

Response
Transuranic waste treatment is outlined in Volume I, Section 8.2.2; more detailed treatment technology data are provided in Volume I, Section 6.2.2 (low-level mixed waste treatment is conceptually similar to transuranic waste treatment). To prevent or control the release of low-volatility heavy metal particulates (including radionuclides), DOE would use particulate collection technologies, such as high-efficiency particulate air filters, in the off-gas stream from thermal treatment technologies.

Alternatives that assume the use of thermal treatment of organic wastes indicate potential releases of small quantities of radionuclides into the atmosphere. Such releases, particularly plutonium-238 and americium-241, would increase cancer risks to offsite populations and the probability of cancer to the maximally exposed individual at treatment sites. Most radionuclides from wastes would remain in residual ash after treatment or would be subject to capture by off-gas scrubbers and high-efficiency particulate air filters in an air pollution control system, which is a typical mitigation measure in a thermal treatment facility. On the other hand, alternatives using non-thermal treatment technologies, such as stabilization or solidification would reduce radionuclide release and consequently lower potential health risks.

Because of its programmatic nature, the WM PEIS does not select treatment technologies. For purposes of analysis and relative comparison of siting alternatives, it assumes uniform application of generic treatment modules such as thermal treatment. Sitewide or project-level NEPA reviews will address questions of technology selection and more fully tailor technology and associated mitigation measures to specific sites.

Comment (4467)
By summarizing only three hazardous waste treatment alternatives in the Draft WM PEIS, DOE has not adequately covered the range of realistic treatment alternatives, or the fact that different treatment processes are applicable to different types of waste, with different quantities and different contaminants.

Response
The PEIS does not select specific technologies for specific sites. The WM PEIS is a National and programmatic study to assist DOE in formulating and implementing a strategy to manage its radioactive and hazardous wastes; therefore, management facilities and treatment technologies are assumed to have a generic design, which allows comparisons across sites based on the uniform application of currently available treatment, storage, or disposal technologies. Thermal treatment was used as a generic technology in the PEIS analysis to enable a relative comparison of potential impacts across sites. DOE will select treatment technologies for sites after more fully considering alternative technologies and site-specific information and any sitewide or project-level NEPA reviews that might be conducted.

8.3.1 Treatment

Additionally, the WM PEIS assumes the use of currently available generic technologies for the treatment of low-level waste, low-level mixed waste, transuranic waste, and hazardous waste. Potential emissions from these treatment technologies, resulting impacts on health, ecological resources, and air quality, and the costs associated with their use are presented in Chapters 6, 7, 8, and 10 in Volume I. More information on these technologies is found in the WM PEIS Low-Level Waste, Low-Level Mixed Waste, Transuranic Waste, and Hazardous Waste Technical Reports available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

The specific technologies that DOE will use at a site to implement an alternative will depend on a number of factors that DOE will evaluate further at the site or project level. For the programmatic purposes of this document, the use of generic technologies is appropriate.

8.3.2 Storage

Comment (194)
Read Joanna Macy for the best plan to safely store radioactive waste.

Response
DOE does not agree with Joanna Macy's vision for "Nuclear Guardianship" (i.e. perpetual storage). Perpetual storage would pose too great a risk to waste management workers. DOE believes that properly treated waste can be safely disposed of and intends to pursue disposal to minimize risk.

Comment (438)
Are you studying the safest way to store radioactive waste at ANL-E?

Response
DOE is committed to managing its wastes to protect human health and the environment. DOE is always looking for ways to manage wastes that result in less impact to human health and the environment. Appendix H in Volume IV describes emerging technologies that could improve future waste management. DOE's policy is to maintain radiation exposure to workers and the general public to levels that are as low as reasonably achievable.

Comment (1540)
The WM PEIS shows no evidence of active faults in the LLNL area. It should discuss the procedures for the storage of the waste, given that there is an active fault in the area. DOE should also research the life of the metal containers used to store the waste.

Response
In the WM PEIS, DOE assumes some waste storage capability at each of its sites. The design of these facilities is a site function and would incorporate seismic criteria appropriate to the site. Accordingly, the WM PEIS did not consider seismic faults in the analysis of storage impacts. DOE does consider the expected life of metal storage containers in managing its wastes.

If DOE selected LLNL for a new storage facility, it would conduct additional analyses to identify specific design basis that would consider potential earthquake impacts. DOE would design its waste management facilities to the appropriate local seismic standard. DOE revised Chapter 12 in Volume I to include the potential for natural hazards such as earthquakes as a consideration in identifying programmatic mitigation measures.

Comment (1646)
DOE should prohibit underground storage of wastes anywhere in the U.S., and should plan for only temporary storage of wastes.

Response
DOE is committed to managing its waste to protect human health and the environment, including the safe storage and disposal of waste. For purposes of its programmatic analysis, the WM PEIS defines storage as the collection and containment of waste (in such a manner as not to constitute disposal) to await treatment or disposal. Thus, by definition, storage is not permanent. In the WM PEIS, new storage facilities are assumed to be aboveground facilities.

With regard to disposal, the disposal facility technology assumed is site dependent. At most sites, underground disposal is assumed. However, for sites where underground disposal would be expected to be inappropriate (e.g., ORR), disposal in aboveground engineered structures is assumed. Prior to construction of a disposal facility, a performance assessment will be done to ensure that human health and the environment will be protected.

Comment (1782)
Transuranic waste storage facilities at RFETS need to be upgraded.

Response
DOE is concerned about the condition of current waste treatment, storage, and disposal facilities throughout the complex and recognizes transuranic waste storage facilities at a number of its sites, including RFETS, need to be upgraded. DOE also is preparing the Sitewide EIS for RFETS, which will provide a basis for nuclear materials storage and waste management at RFETS.

Comment (2214)
I have a problem with the idea that this is going to be a temporary storage. I guess when you consider half lives of millions of years, then your idea of temporary holds true, but I don't consider your timeline very temporary.

Response
The WM PEIS addresses treatment, storage, and disposal strategies for the management of radioactive and hazardous wastes over the next 20 years. By disposal is meant emplacement of waste in a manner that ensures protection of human health and the environment within prescribed limits for the foreseeable future, with no intent of retrieval, and that requires deliberate action to regain access to the waste.

Comment (2302)
Waste forms that waste is put into at Hanford must be retrievable. You cannot count on a future repository given the rate at which Yucca Mountain and WIPP are proceeding.

Response
The waste described in the comment (high-level waste for Yucca Mountain; transuranic waste for WIPP) will have been treated and would be stored at the Hanford Site pending shipment. For the PEIS, storage, by definition, is not permanent, but rather, is the collection and containment of waste or spent nuclear fuel (in a manner that does not constitute disposal) to await treatment or disposal.

The PEIS analysis of high-level waste and transuranic waste, as it pertains to Hanford, discusses treated waste in a retrievable form. NEPA reviews for actual siting will address storage-related issues (aboveground, belowground, timing, etc.), including the storage of untreated high-level waste at Hanford, on a sitewide or project-level basis.

Comment (2381)
Aboveground monitored storage onsite. Watch the stuff.

8.3.2 Storage

Response
DOE is committed to managing its waste to protect human health and the environment, including the safe treatment, storage, and disposal of waste. DOE maintains comprehensive monitoring systems for all handling and management of radioactive wastes.

Comment (2540)
"Nonretrievably stored" sounds like disposal (see Volume I, Section 8.15).

Response
For the WM PEIS, all transuranic waste placed in storage after 1970 is considered retrievable and has been analyzed in the waste management transuranic waste analysis presented in Chapter 8 in Volume I. Nonretrievably stored transuranic waste is that which was buried prior to 1970 and will be managed as environmental restoration waste. DOE revised Section 8.1.2 to replace the term "nonretrievably stored" with "buried."

Comment (3161)
The State of Washington and the U.S. EPA should not allow DOE or the U.S. Department of Defense to transfer to the Hanford site any hazardous and radioactive waste until technical, economic, and equity concerns are addressed. Prolonged storage of offsite wastes prior to treatment, or of post-treatment residuals, generally should not be approved.

Response
The WM PEIS is a broad programmatic analysis of national waste management alternatives that does address technical, economic, and equity issues. Under some PEIS alternatives, the Hanford Site would receive and manage wastes generated at other sites. Under other alternatives, some of the Hanford Site's wastes would be transported offsite for treatment, storage, and/or disposal. The Hanford Site's potential role in managing each of the five types of waste, as considered under each management alternative, is detailed in Chapters 6 through 10 in Volume I of the PEIS. The PEIS analysis considered the technical and economic issues associated with the various waste management alternatives, including those involving storage. DOE will consider equity during the decisionmaking process that results in waste-type specific Records of Decision(s).

As discussed in Section 1.7.3 in Volume I, the implementation of waste management decisions made following the publication of the Final PEIS would require sitewide and project-level NEPA reviews.

Comment (3271)
Treatment and storage alternatives for transuranic waste (TRUW) are not sufficiently analyzed. Treatment and storage decisions are necessarily based on disposal options--where, when, and how waste will be disposed of will determine where, when, and how the waste will be treated and stored.

Response
DOE will decide where to treat and store TRUW based on evaluations in the WM PEIS. To support this, the analysis in the WM PEIS considered three different treatment options for TRUW to provide a range of impacts from different requirements that DOE might impose on TRUW disposal. The results of this analyses do not depend on where or when DOE would begin disposing of TRUW, but rather, what level of treatment is required. DOE is preparing a second WIPP Supplemental EIS prior to making the final decision to proceed with WIPP. The WIPP SEIS-II will be used as a basis for

deciding the minimum level of treatment that would be required, based on the impacts of treatment and performance of the repository, before disposal at WIPP. The Draft WIPP SEIS-II was issued for public review in November 1996.

DOE believes that to the extent possible, the WM PEIS analysis of TRUW takes into account the uncertainties associated with the disposal of TRUW and is appropriate for a programmatic evaluation of alternatives concerning where to treat TRUW.

8.3.3 Disposal

Comment (57)
A commentor believes that there might never be a waste disposal solution because DOE failed to address the problem when nuclear and other programs were started up.

Response
DOE has prepared the WM PEIS to enhance the management of its current and anticipated waste volumes on a national scale and provide an integrated examination of the impacts of Department-wide waste management decisions (including disposal). The potential environmental impacts of radioactive materials are better known now than they were when the nation's nuclear program began. Because of this, DOE has changed some of its practices and now manages wastes differently than in the past. DOE is confident it can make decisions as a result of this study that will help solve its waste problems.

Comment (199)
Why haven't we found a permanent repository for dangerous radioactive wastes?

Response
DOE is investigating the possibility of using the Waste Isolation Pilot Plant near Carlsbad, New Mexico, as a repository for transuranic waste, and a site at Yucca Mountain in Nevada as a repository for spent nuclear fuel and high-level waste. Both of these programs are the subject of separate NEPA evaluations, and are further discussed in Section 1.8.1 in Volume I of the Final WM PEIS. In addition, DOE currently disposes of its low-level wastes at six sites: The Hanford Site, ORR, INEL, LANL, NTS, and SRS. In the WM PEIS, DOE is analyzing the impacts of decentralized, regionalized, and centralized disposal of low-level and low-level mixed wastes. Decentralized disposal would be at as many as 16 sites; centralized disposal would be at either the Hanford Site or NTS.

Comment (389)
A commentor is "troubled" by indications that DOE might consider in-place disposal of most existing Hanford tank wastes.

Response
The WM PEIS only evaluates programmatic alternatives for storage of high-level waste after it is removed from the tanks and vitrified. The Hanford Tank Waste Remediation Systems EIS, identified in Volume I, Section 1.8.1 of the WM PEIS, evaluates alternatives for remediation of the high-level waste tanks. Potential impacts identified in that EIS are considered in the cumulative impacts analysis for the Hanford Site in Section 11.4 in Volume I of the WM PEIS.

Comment (506)
Based on the disposal sites listed and the performance standards being developed, the assumptions about the final waste form at the site need to be discussed in the PEIS.

Response
The assumed generic disposal facility for low-level waste and low-level mixed waste is shallow land burial in the West and aboveground disposal in the East (except at SRS). DOE would use either polymer or grout to stabilize wastes needing stabilization. The selection of form and facility type would depend on sitewide or project-level NEPA reviews and the results of performance assessments. The WM PEIS discusses this information in Sections 6.2.2 and 7.2.3.

8.3.3 Disposal

Comment (691)
Do not use shallow land disposal at LLNL.

Response
The WM PEIS is a national study and, therefore, assumes management facilities and technologies to have a generic design, which allows DOE to make comparisons across sites. DOE evaluated the major waste sites, including LLNL, that it identified in the PEIS as potential treatment, storage, and disposal facilities for comparative purposes.

The assumed generic disposal facility for low-level waste and low-level mixed waste is shallow land burial in the West and aboveground disposal in the East. The selection of the final type of facility depends on sitewide or project-level NEPA reviews and the results of performance assessments. DOE would conduct performance assessments of any disposal units proposed for LLNL at the project level to ensure the safety of the public.

Comment (1020)
DOE must find alternatives to "dumping."

Response
DOE is committed to managing its wastes to protect human health and the environment, including the safe storage and disposal of waste. DOE does not propose to "dump" waste, but to safely manage it. The WM PEIS describes accepted, readily available technologies for managing wastes. Disposal is a safe and proven method for managing waste when the design and construction of disposal facilities are in accordance with regulations and performance assessments.

Comment (1565)
Considering the alternatives for high-level waste, DOE needs to consider the opening of the Yucca Mountain facility questionable.

Response
This WM PEIS considered the impact of a geologic repository opening when it evaluated the impacts of storing of vitrified high-level waste. As discussed in Volume I, Section 9.3, two alternatives for the timing of the opening of the facility were used. In one alternative, DOE assumed that a geologic repository would begin accepting DOE-managed high-level waste in 2015. In the second alternative, acceptance of DOE-managed high-level waste at a repository is delayed past 2015. For the second case, impacts are presented on an annualized or incremental basis.

In addition, DOE will prepare a separate NEPA review that will explore the suitability of Yucca Mountain as a geologic repository for high-level waste disposal.

Comment (1674)
The WM PEIS should be rewritten to include the entire 75-year volume of waste that could be disposed of in Nevada, as described in the Baseline Environmental Management Report. The PEIS is an inadequate discussion of the entire amount of waste that could be sent to Nevada for disposal.

8.3.3 Disposal

Response
The WM PEIS used data from the Mixed Waste Inventory Report and the Integrated Data Base for volumes of waste from the Waste Management Program. The WM PEIS waste-type chapters (6 through 10) discuss the waste management waste volumes that each site generates and the percentage of the total volume of each waste that each site would receive for treatment, storage, or disposal under each alternative.

The WM PEIS considers the effects of environmental restoration wastes on the comparison among waste management alternatives based on estimates in the 1996 Baseline Environmental Management Report of the portion of such wastes that would enter the waste management system. See Appendix B in Volume III and Chapters 6, 7, and 8 in Volume I. The remaining environmental restoration waste would be managed in place or within the environmental restoration system. The PEIS analysis uses the 1996 Baseline Environmental Management Report estimate of 75 years of generating environmental restoration wastes. However, as stated in Section B.7, the PEIS assumes that most of the environmental restoration wastes generated over the 75-year period will be produced between 2003 and 2033.

DOE made the generalizing assumption that all waste management facilities necessary to implement a given WM PEIS alternative would be constructed in an initial 10-year period, which would be followed by a 10- to 20-year operations period. Exceptions to this include site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS. DOE recognizes that construction of actual facilities could occur within a much shorter time period and that waste will begin to be processed at some facilities before construction at all facilities is completed.

Most importantly, no EIS can meaningfully evaluate impacts over 75 years, as it is impossible to predict all the changes in technologies, missions, and needs that might occur over this time period.

The NTS Sitewide EIS evaluates the potential impacts of future mission activities, including waste management and environmental restoration activities as well as existing mission activities for the next 10 years.

Comment (1730)
A commentor asked about opportunities to submit proposals and ideas for waste disposal.

Response
The WM PEIS does not evaluate the impacts of private offsite commercial waste management. The WM PEIS assumes the use of generic treatment, storage, and disposal facilities located on DOE sites for waste management actions.

However, commercial facilities will be used as available and appropriate once waste management decisions are made. DOE personnel at individual sites can provide information about potential opportunities for private companies to participate in environmental management actions at that site.

Comment (1754)
The public is concerned about low-level waste dumps leaking. If we cannot fix it now, what makes DOE think they can manage this in the long-term?

Response
As described in Volume I, Chapter 2, DOE prepared the WM PEIS to enhance the management of its current and anticipated waste volumes on a national scale. The PEIS provides an integrated examination of the impacts of Department-wide waste management decisions (including disposal). Performance assessments for disposal units proposed at any DOE site would be conducted to ensure the safety of the public, and the development and construction of such facilities would be in strict accordance with regulations and requirements. Further site-specific NEPA reviews would be needed to examine site-specific conditions. DOE is confident, however, that it can make decisions as a result of this PEIS that will enhance and improve the management of DOE wastes.

Comment (1793)
A commentor expressed concern about the location of any future waste management sites in North Carolina, based on the potential impacts to forest lands. These include removal of acreage from timber production and the loss of trees due to the clearing of sites for construction of waste management facilities. The commentor suggested that if any sites are selected for North Carolina in the future, a separate EIS be prepared for each site to address potential impacts, including impacts to forest land. The commentor also expressed concern that hazardous waste disposal sites would become preserves and entry and utilization of timber resources would not be allowed.

Response
Section 1.6 in Volume I of the WM PEIS describes the 54 sites for which DOE has waste management responsibility that are within the scope of document. None of these sites are located in North Carolina. If DOE were to determine the need to construct a waste management facility at a location other than these 54 sites, additional NEPA analyses would be required. Such studies would include reviewing land resources required for such construction and other environmental impacts. If a commercial facility is interested in receiving, treating, or storing DOE waste, DOE could consider the facility. Such a commercial facility would have to comply with appropriate regulations.

DOE intends to maintain institutional control of its waste disposal facilities. Therefore, public access and public or private use of onsite resources probably would be limited. However, DOE has no current plans for constructing facilities in North Carolina. The Southeast Interstate Low-Level Radioactive Waste Management Compact has planned to construct a disposal facility in North Carolina.

Comment (1940)
A commentor from the ANL-E vicinity asked if there will be a written guarantee on how many years into the future there will be no leaks?

Response
DOE assumes that this comment relates to guarantees that there will not be leaks in the future from potential disposal facilities. DOE will comply with all applicable laws and regulations in the development and operation of any such facility. There are usually several barriers to prevent waste from leaking from disposal facilities. The waste itself can be processed into a solid form, such as a glass or concrete. This solidified form can then be encapsulated in a metal canister. Some disposal facilities would have concrete walls and caps.

Three types of disposal facilities were assumed for the WM PEIS analyses. Shallow land burial was assumed for all western sites except RFETS. At these facilities, leaching of wastes could begin

8.3.3 Disposal

immediately, although the rate of leaching would be low because of the arid conditions at those sites. For RFETS and all eastern sites except SRS, aboveground vaults in a tumulus design were assumed. These vaults are designed to maintain their integrity for 300 years. Disposal at SRS was assumed to be in belowground vaults, which are assured to maintain their integrity for 750 years before leaks could occur.

DOE Order 5820.2A requires that performance assessments be conducted for new disposal facilities. These assessments assume that engineered barriers, such as those described above, would degrade after several hundred years and that waste would leach out of the disposal facility. For the disposal facility to be approved, the performance assessment must show that in spite of leaching, a maximally exposed individual would not be at risk. Thus, rather than guaranteeing that there is no leaking, DOE evaluates, using conservative assumptions, future risks to a member of the public from waste disposal. Through careful selection of the location of the disposal facility, choice of an engineering design, selection of a stabilized waste form, and consideration of waste acceptance criteria, future risks from waste disposal are mitigated.

Comment (2445)
A discussion of disposal is needed in Volume I, Chapter 10, Hazardous Waste.

Response
As indicated in Volume I, Table 1.5-1, DOE will not decide where to dispose of hazardous waste on the basis of the WM PEIS and, therefore, it is beyond the scope of this analysis. Commercial facilities will continue to be used for disposal of DOE's hazardous waste. The commercial disposal facilities used for DOE's hazardous waste are permitted under RCRA and comply with all applicable Federal and State environmental regulations.

Limited disposal of hazardous waste in permitted landfills is discussed in Volume I, Section 10.2.2.

Comment (2759)
When Argonne first told Illinois of its research plans, it was not disclosed that our neighborhood would become a permanent waste storage site.

Response
The determination of where to store the radioactive and hazardous wastes from past, present, and future activities within the DOE complex is a controversial issue. To address the issue of safe and efficient management of such wastes, DOE first needs to develop an overall national strategy on which additional studies could be based. DOE evaluated 36 alternatives in the WM PEIS. The WM PEIS determined that the potential public health and environmental risks would be low at ANL-E under any of the waste management alternatives. DOE is committed to an open dialogue with members of the public to discuss any of their concerns.

Comment (2913)
When feasible, contaminants should be segregated by half-life so that short half-life disposal sites can be returned to normal use.

Response
DOE's current regulations and practice, which are predicated on protecting human health and the environment, do result in segregation of wastes for disposal based on half-life. DOE plans to dispose of transuranic waste, which has high concentrations of long-lived transuranic radionuclides as its defining characteristic, in a deep geologic repository rather than near the land surface. Also, DOE disposal sites are allowed to classify waste. The waste classification criteria are based on concentrations of specific key radionuclides. Wastes in different classes are disposed of in different disposal units and can require different levels of treatment before disposal. For example, in the classification scheme used at the Hanford Site disposal facility for low-level waste, most of the key radionuclides are long-lived. Thus, segregation is achieved through waste classification.

Comment (3253)
The PEIS relies on shallow land burial at all of its sites west of the Mississippi River for the "disposal" of low-level waste. However, it is impossible to dispose of material that remains radioactive for hundreds of thousands of years; the best you can do is store it until it has decayed. DOE should stop using the word disposal and shift its focus to finding ways to safely *isolate* radioactive waste from the biosphere.

Response
Near-surface disposal of low-level waste is the terminal emplacement of wastes on or near the earth's surface. Near-surface disposal of radioactive waste is used only for wastes of acceptably low radionuclide concentrations. Near-surface disposal facilities include shallow land burial, earth-covered aboveground vaults, and belowground vaults.

Shallow land burial consists of placing waste containers in an excavated trench, backfilling voids between containers with sand or other earthen material, compacting the backfill material, and covering the waste with a cover or cap of earthen material. The cap is multi-layered and serves as a low permeability barrier to restrict the infiltration of water into the disposal trenches. The cover system also restricts human, plant, and animal intrusion into the waste and reduces surface exposure rates. This disposal system safely isolates low-level radioactive waste from the biosphere.

Shallow land burial disposal was the only disposal method evaluated for the western United States disposal sites in the WM PEIS analysis because these sites are more arid, have deeper groundwater systems, and are located farther from highly populated centers than eastern sites. Wastes disposed of at these sites would thus require a lesser degree of isolation from environmental influences than is possible from other near-surface disposal facilities such as vault disposal. The actual disposal facility at a given site would be designed to account for site-specific conditions such as rainfall and depth to groundwater. Wastes would only be accepted at any disposal facility if they meet established site-specific waste acceptance criteria.

Additionally, DOE is conducting a comprehensive Department-wide review of its management of low-level waste and the radioactive component of low-level mixed waste. This review is being conducted in response to a recommendation by the Defense Nuclear Facilities Safety Board (DNFSB), which was established and authorized by Congress to oversee DOE. The DNFSB recommendation concerning conformance with safety standards at DOE low-level waste sites was issued in September 1994, and it is referred to as DNFSB Recommendation 94-2. Details on Recommendation 94-2, including its relationship to WM PEIS decisionmaking, are presented in Volume I, Section 1.8.2.

8.3.3 Disposal

Comment (3741)
Any storage container is designed to leak. The integrity of the cell cannot match the half-life of the radioactive materials. The public needs to understand how the waste storage vessel or container can be engineered to contain the waste throughout the decaying half-life of 15,000 years.

Response
DOE assumes that the comment refers to leakage from a disposal container. The WM PEIS analyses of disposal impacts are based on conservative assumptions that leakage will occur. DOE uses a conservative assumption that shallow land burial facilities lose integrity immediately, while vaults retain their integrity for 300 to 750 years. The analysis of contamination in the groundwater is based on this assumption that leakage begins at 0, 300, or 750 years, depending on the type of disposal facility.

To help ensure that a member of the public will not receive undue radiological dose from a disposal of radioactive waste, DOE requires that a disposal facility performance assessment be performed. This assessment takes into account the inventories and characteristics of waste expected to be disposed of and uses conservative assumptions about when disposal containers and disposal cells will lose physical integrity and allow the radioactive waste to leach into the ground. The performance assessment is conducted before a disposal facility is constructed and it must demonstrate that the maximally exposed member of the public would not receive a radiological dose that could cause harm. The WM PEIS estimates and discusses dose to the maximally exposed member of the public, a hypothetical farm family.

Due to its character as a national programmatic document aimed at developing a Department-wide strategy, the WM PEIS assumes generic storage technologies. At this level of analysis, the WM PEIS is not intended to develop and implement storage technologies. Questions pertaining to the design of an actual waste storage vessel or container will be addressed on a sitewide or project-level basis when actual facilities are sited. In the WM PEIS analysis, storage containers are necessary primarily for waste handling purposes and are assumed to lose their integrity subsequent to disposal.

The Office of Technology within DOE's Office of Environmental Management is responsible for managing a national program of applied research, development, demonstration, testing, and evaluation for waste management and related technologies. The development of new technologies will ensure a substantial reduction in risk to the environment, and improved safety for the public and workers.

Comment (3742)
How many monitoring wells will there be at ANL-E and who will be responsible for them? How often would the ground be tested for leaks? How big would the facility be, would it be aboveground or below ground, and who would monitor for the public's general health and safety? Would results be available to homeowners?

Response
DOE assumes that the commentor is referring to the alternatives for construction and operation of disposal facilities at ANL-E under the Decentralized Alternatives for low-level mixed waste and low-level waste.

As described in Section 2.14.2.2 of the WM PEIS Affected Environment Technical Report, groundwater is monitored for radioactive and nonradioactive parameters at 32 locations at ANL-E.

8.3.3 Disposal

Groundwater from the four onsite drinking water wells is also analyzed for radioactive and nonradioactive contamination. DOE would install additional monitoring wells if new disposal facilities were constructed at ANL-E. The WM PEIS Affected Environment Technical Report is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

DOE would monitor new waste management facilities as required by applicable regulations and DOE Orders. Monitoring results would be published in the site annual environmental monitoring reports that are available to the general public. As described in Section D.3.2.2 in Volume III of the WM PEIS, DOE anticipates that if the Decentralized Alternative was selected, disposal facilities would be constructed aboveground at ANL-E since it is east of the Mississippi River. DOE will address issues relating to actual placement of waste management facilities (e.g., design, size, location, well locations, monitoring frequency, etc.) at the project level.

Comment (3771)
DOE needs to explain what will determine whether the disposal facility will be aboveground or below ground.

Response
As a broad, programmatic study, the WM PEIS does not identify locations for disposal facilities on sites or specify designs of such facilities. This will be done on a site-specific or project-level basis.

For the purpose of analysis, the generic disposal technology assumed in the WM PEIS for eastern sites was aboveground vaults in a tumulus design. However, disposal at the SRS was assumed to be in below-ground vaults. At the western sites, shallow land burial was assumed except at RFETS, where aboveground vaults were assumed.

9. Environmental Restoration Wastes

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(No comments were received for this section)

9.1 Environmental Restoration Program

Comment (265)
The WM PEIS must include information on the timetable for cleanup.

Response
Individual DOE sites currently are developing Ten-Year Plans which will address environmental restoration activities, including the timetable for cleanup. As described in Volume I, Section 1.7.1, environmental restoration (cleanup) activities are site-specific and are not within the programmatic scope of the WM PEIS. Appendix B contains information on environmental restoration activities and their influence on the WM PEIS alternatives.

Comment (276)
Safe, responsible cleanup of existing waste sites at the expense of the responsible parties (the Federal Government and private corporations) is important.

Response
DOE agrees and, as part of its mission, is working to clean up a number of its sites throughout the United States.

The general process for making decisions on cleanup is provided by statutes, including the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), both of which apply to Federal agencies and private corporations. At specific DOE sites, the process is implemented through agreements among DOE, EPA, and, frequently, the State, or through the RCRA permit process. However, as explained in Section 1.7.1 in Volume I of the WM PEIS, environmental restoration alternatives are not within the scope of this PEIS because decisions related to environmental restoration are not suited to a programmatic analysis. Instead, such decisions should be made at the site level and should reflect local conditions.

Comment (1107)
Several commentors asked for clarification on how the PEIS deals with the environmental remediation wastes at Fernald Environmental Management Project (FEMP), including those that will not be disposed of onsite but instead will need to enter the Waste Management Program. In addition, one commentor specifically asked how the PEIS does or does not deal with the "legacy" wastes such as pit wastes, wastes from the silos, and thorium materials. One commentor stated that the WM PEIS should consider the several billion dollars that DOE will spend on CERCLA activities at FEMP, and that CERCLA decisions and their wastes should be included in the WM PEIS.

Response
Environmental restoration alternatives were included in the original scope of the WM PEIS, but DOE subsequently determined that cleanup activities were primarily site-specific and could not be appropriately addressed at the programmatic level. DOE concluded that remediation decisions, including the level of site remediation, must reflect site-specific conditions. Accordingly, the consideration of a programmatic environmental restoration strategy was dropped from the WM PEIS in January 1995. Section 1.7.1 in Volume 1 of the PEIS discusses the removal of environmental restoration activities from the scope of the PEIS. Appendix A in Volume III contains a discussion of the public notification and participation that occurred with regard to the change in scope.

9.1 Environmental Restoration Program

The Final WM PEIS will support programmatic decisions about DOE's waste management strategy by analyzing the impacts of waste management facilities (those required to treat, store, or dispose of wastes currently in storage and wastes that will be generated in the future as a result of DOE operations). Although this document does not analyze environmental restoration, it does contain information on the anticipated waste volumes generated as a result of environmental restoration and a qualitative discussion of the extent to which these wastes could affect the comparison among waste management alternatives. These discussions appear in Appendix B, which focuses on the Environmental Restoration Program (the types and volumes of materials present at specific DOE sites, and the role of these materials in the WM PEIS), and in Sections 6.15, 7.15, and 8.15 in Volume I. Transfer of responsibility for some environmental restoration waste to the Waste Management Program would not affect the basis for comparison of WM PEIS alternatives, because the sites selected on the basis of the WM PEIS analysis represent the minimum set necessary, regardless of the addition of future environmental restoration transferred waste. If necessary, during future site-specific NEPA reviews of site treatment or disposal facilities, additional capacity for environmental restoration transferred wastes would be analyzed.

DOE has revised Appendix B in Volume III to include updated information on volumes of environmental restoration waste expected to be generated at each site and the planned disposition of these wastes. Appendix B also explains the decisions that have been made under the CERCLA process for the waste pits and the silos at FEMP. As identified in Appendix B, a total of 2,500,000 cubic meters of low-level waste and 4,600 cubic meters of low-level mixed waste generated by environmental restoration activities are anticipated at FEMP. DOE might transfer 180,000 cubic meters of low-level mixed waste, and 2,200 cubic meters of low-level mixed waste to waste management facilities. Appendix B provides further details on the disposition of the remaining volume of environmental restoration waste anticipated at FEMP.

Comment (1685)
A commentor wants SRS cleaned up and has special concerns about environmental impacts, groundwater contamination, adequate medical care, and compensation for damages.

Response
DOE is committed to the cleaning up of all of its sites, including SRS, in accordance with Federal and State agreements under CERCLA and RCRA. Specific medical services and compensation for damages are outside the scope of the WM PEIS but are addressed by Federal regulations and DOE policies. Groundwater impacts and other environmental considerations are included in the PEIS for waste management activities only. Impacts of site cleanup and other environmental restoration activities are not within the scope of this PEIS, as explained in Volume I, Section 1.7.1. Additionally, the SRS Waste Management EIS and other EISs for SRS are described in Volume I, Section 1.8.1.

Comment (2096)
"Congratulations on the cleanup operations at the Portsmouth Plant. You may be doing your best, but the cleanup operations are not good enough."

Response
Cleanup of contamination caused by past practices is outside the scope of the WM PEIS. This comment has been forwarded to the DOE site office at Portsmouth.

9.1 Environmental Restoration Program

Comment (2121)
DOE should use some of its $18 billion in cleanup funds to address the 28 Superfund Areas of Concern on the BNL site.

Response
BNL was added to the National Priorities List under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA--also known as Superfund) in 1989. In 1992, DOE, EPA, and the State of New York entered into an interagency agreement that integrates both the response action requirements under CERCLA and the corrective action requirements under RCRA. The interagency agreement addresses the 28 Areas of Concern, which have been grouped into Operable Units and Removal Actions. Operable Units consist of large areas of the site that require extensive study prior to the implementation of a remedial action. In contrast, Removal Actions are expedited responses taken to eliminate a near-term or immediate potential risk to human health or the environment. BNL has completed a number of Removal Actions and continues to make progress on this work. DOE is continuing to fund these cleanup efforts through the Office of Environmental Restoration. As noted in Volume I, Section 1.7.1, environmental restoration activities were deleted from the scope of the WM PEIS. These activities include the Superfund areas of concern.

Comment (2146)
The public is concerned about DOE's past problems with nuclear materials and that the nuclear industry will not properly clean up waste sites. DOE needs to learn how to deal with past problems before they start adding new ones to the community.

Response
The cleanup of contamination caused by past practices is outside the scope of the WM PEIS. These activities are better addressed at each individual site, taking into account local environmental characteristics, the extent of contamination, and the priorities of regulators and local stakeholders. However, the WM PEIS does identify a subset of environmental restoration wastes for which responsibility could be transferred to the Waste Management Program, and considers the potential effect of these environmental restoration transferred wastes on the basis for comparison of WM PEIS alternatives. Environmental restoration transferred wastes are discussed in Appendix B in Volume III, and Chapters 6, 7, and 8 in Volume I.

Comment (2250)
There is no discussion in the WM PEIS of the $50 billion legacy of wastes and cleanup at the Hanford Site.

Response
The WM PEIS is a national and programmatic analysis that will assist DOE in formulating and implementing a strategy to manage its radioactive and hazardous wastes. Environmental restoration activities are not within the scope of this PEIS, as discussed in Volume I, Section 1.7.1. However, the WM PEIS does evaluate the effect that environmental restoration waste volumes for which responsibility may be transferred to the Waste Management Program could have on the WM PEIS alternatives. DOE has prepared the Hanford Remedial Action EIS, which addresses environmental restoration impacts at Hanford. This and other environmental impact statements for the Hanford Site or those that potentially could affect the Hanford Site, which are completed or in draft, are identified in Volume I, Section 1.8.1, of the WM PEIS.

9.1 Environmental Restoration Program

Information on the cost of cleanup of legacy waste at Hanford can also be found in the Baseline Environmental Management Report described in Volume I, Section 1.8.2. The Environmental Management Ten-Year Plan identified in Section 1.8.2 is being developed to address cleanup costs at Hanford.

Comment (2610)
A commentor wants Hanford cleaned up.

Response
Cleanup at the Hanford Site is occurring now under the Tri-Party Agreement between DOE, EPA, and the State of Washington. These cleanup activities will continue at the Hanford Site regardless of any decisions based on the WM PEIS. Although environmental restoration alternatives are outside the scope of the WM PEIS analysis, Appendix B, Section B.5, in Volume III identifies specific environmental restoration activities at Hanford and other DOE sites.

Comment (3346)
Digging up contaminated dirt and the like and moving it from one point to another is containment, not cleanup.

Response
Because radioactive elements cannot be eliminated through treatment, all forms of radioactive waste management endeavor to safely isolate the contaminants and waste from the public. The waste disposal facilities in which radioactive wastes would be isolated are facilities specifically designed for that purpose, and, at times, are preferred to containment in place. In situations involving chemical contaminants, it is often possible to treat and remove or stabilize the contaminant. In any case, the term "cleanup" is used broadly by DOE to describe activities that are intended to eliminate risks to the public or the environment caused by past practices. The evaluation of cleanup options are not suited to a programmatic analysis, such as that contained in the WM PEIS, and, therefore, will be performed at the local level.

Comment (3359)
PGDP is moving ahead with restoration projects, oblivious of the programmatic NEPA studies underway, and is doing so deliberately and with intent. This threatens to render the WM PEIS moot by the time it is finalized. The end result of this is that DOE is moving ahead with uninformed decisionmaking, in violation of NEPA. Is the public wrong to think that all the possible environmental considerations are being taken before actions are implemented, as NEPA requires, or is DOE just saying one thing and doing another?

Response
The WM PEIS is a programmatic analysis that evaluates alternatives for the management of wastes generated by DOE operations. DOE removed environmental restoration alternatives from the scope of the PEIS because environmental restoration alternatives must reflect specific conditions at each site. DOE is in compliance with NEPA with regard to the WM PEIS analysis. Environmental restoration projects such as those at underway PGDP are part of the Environmental Restoration Program, not the Waste Management Program. Site- or project-specific NEPA reviews will be conducted for environmental restoration activities, where appropriate. Those sites whose environmental restoration projects are subject to the requirements of CERCLA engage in the review process set forth in

9.1 Environmental Restoration Program

CERCLA for restoration activities, incorporating NEPA values or performing project-specific NEPA analyses where appropriate.

Although environmental restoration alternatives are beyond the scope of the WM PEIS, the waste that DOE projects it will generate from environmental restoration activities and transfer responsibility to the Waste Management Program were considered in the WM PEIS to determine whether they would influence the comparison of the WM PEIS alternatives (see Appendix B in Volume III, and summarized in Sections 6.15, 7.15, and 8.15 in Volume I).

Comment (3652)
Where will DOE treat and store the environmental restoration transuranic waste? What happens to the environmental restoration transuranic waste once it has been processed? DOE does not discuss disposal of the environmental restoration transuranic waste.

Response
The management of environmental restoration transuranic waste is outside the scope of the WM PEIS. However, the PEIS does contain estimates of volumes of environmental restoration wastes at each site, including the volume of transuranic waste expected to be generated from DOE's cleanup activities and transferred to the Waste Management Program for final disposition. Table B.5-3 in Volume III identifies the volumes of environmental restoration transuranic waste to be managed under the various disposition categories. Section B.3 explains that the remediation activities depend on the proposed land use for each site, and are generally categorized as either containment or removal. The WIPP SEIS-II examines alternatives for treatment and disposal of all volumes of transuranic waste estimated to be currently stored or buried, and transuranic waste that would be newly generated during the projected 35-year operational life of WIPP. This could provide the basis for a decision to dispose of environmental restoration transuranic waste at WIPP.

Comment (3807)
The last environmental restoration document in the library is dated 1993. DOE needs to get more current information to the public.

Response
Environmental restoration reports and studies conducted under CERCLA are available at each site in the Administrative Record and in their information repositories. A summary of environmental restoration activities at individual sites can be found in the 1996 Baseline Environmental Management Report, which is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final WM PEIS. Individual Site Treatment Plans also discuss environmental restoration activities, and can be found in the public reading room associated with a particular site.

Comment (3856)
The ANL-E 800 Area landfill has volatile organics. It is not easy to remove waste materials from a densely populated community.

Response
The activity referred to in the comment is an environmental restoration activity. The 800 Area landfill is located in an isolated part of the ANL-E site, relatively distant from other ANL-E activities. Being within the ANL-E fence, the 800 Area landfill is also separated from the surrounding community. The

closest habitations are nearly a mile from the 800 Area landfill. For those reasons, remediation of the 800 Area landfill would not be expected to affect the surrounding community. An environmental assessment is currently in preparation which discusses potential remedial activities for the 800 Area landfill.

Environmental restoration activities are not within the scope of the WM PEIS, primarily because of their site-specific nature. Site-specific issues include questions of cleanup levels, future land use, etc. The WM PEIS, on the other hand, lays out a programmatic strategy on waste management options. Volume I, Section 1.7.1, explains why environmental restoration activities were removed from the scope of the EIS.

9.2 Waste Management PEIS Scope Modification

Comment (207)
A number of commentors believe that environmental restoration and decontamination and decommissioning wastes should be included in the WM PEIS; one commentor stated that the exclusion severely reduces the value of the WM PEIS; some asked DOE to explain why those wastes are not included. Others questioned how the WM PEIS could be considered programmatic and whether DOE has violated NEPA, given that environmental restoration is not included in the analysis. One commentor asked whether the addition of environmental restoration waste would change impacts sufficiently to change the relative preferability of waste management alternatives. Another commentor stated that the WM PEIS should discuss environmental restoration wastes because the large volumes will affect storage facilities. Another commentor asked DOE to consider in the WM PEIS scales and types of technology appropriate for handling environmental restoration (ER) waste, backlogs of DOE waste, and the new waste generated at DOE sites on an ongoing basis. Some waste treatment alternatives may be more suited than others for handling the ER waste with minimum impacts than others that would require more shipping of waste, etc. In accordance with NEPA requirements, the impacts of all other actions at DOE sites should be included in the cumulative impacts section. Measures to reduce the amount of new waste generated should also be considered among the WM PEIS alternatives.

Response
On January 24, 1995, DOE announced in the *Federal Register* that it was removing ER, or "cleanup," from the scope of the WM PEIS. The Department felt that decisions related to ER (e.g., such as remediation of areas containing buried transuranic waste) were not suited to a programmatic level analysis, but instead should be focused at the local level and reflect site conditions. The 1995 announcement and response by the public is contained in Appendix A in Volume III of the WM PEIS.

Responsibility for the treatment, storage, and/or disposal of a subset of the wastes that will be generated by ER activities will be transferred to the Waste Management Program. It is not possible, however, to analyze the impacts from these "ER transferred" waste volumes in the same manner as the waste management waste volumes were analyzed because the current information about ER transferred waste is limited to volumetric estimates, and is not adequate to perform for a meaningful impact analysis. Unlike the information available for waste management wastes, DOE does not know the extent of radiological or chemical contamination, the physical/chemical characterization, or treatment categories of the ER transferred waste. In addition, DOE does not know when ER waste would be transferred to waste management facilities. Acquiring this information would require characterization of the ER waste at each ER site and a schedule for restoration.

Despite the absence of this information regarding ER transferred waste, DOE needs to proceed with programmatic decisions for its Waste Management Program, in order to make progress toward improving DOE's management of its wastes. The sites selected for waste management facilities on the basis of analysis in the WM PEIS are the minimum requirement, based wholly on the locations and quantities of waste management wastes, which would remain valid regardless of future ER waste requirements. Therefore, the analyses contained in the WM PEIS provides an adequate foundation to proceed with programmatic waste management decisions.

Decisions on which sites should host waste management facilities will consider trade-offs between transportation impacts and site-specific impacts. The necessity and justification for a waste management site selected on the basis of the WM PEIS analysis would remain, regardless of whether additional ER transferred wastes are present at that site or some other site. Should ER transferred wastes be generated at a site that was not selected to host a facility based solely on the WM PEIS analysis. DOE would perform a site-specific review for that site, possibly adding onsite treatment or disposal capability or transporting that ER transferred waste to a site that was selected for treatment, storage, or disposal based solely on the WM PEIS analysis.

When there is sufficient information to fully evaluate ER transferred wastes, DOE will perform site-specific reviews. If there is ER transferred waste at a site already selected to host a facility based upon the WM PEIS analysis, DOE would examine the specific conditions posed by the ER transferred wastes and determine whether that facility should manage the additional wastes and whether additional NEPA analysis is required to examine the impacts and alternatives. If that ER transferred waste is at a site not selected for a waste management facility, DOE would evaluate whether new treatment or disposal capability should be added to the site or whether the wastes should be transported to a site with the capability to treat or dispose.

Comment (2059)
The cost numbers used for remediation wastes are too low.

Response
As noted in Section 5.1.1 in Volume I, the WM PEIS analysis determined costs for waste management activities. The WM PEIS does not discuss the costs of managing environmental restoration wastes. DOE removed environmental restoration wastes from the scope of this programmatic EIS because it determined that environmental restoration decisions should reflect site-specific conditions, as well as input from State regulators and local stakeholders. Appendix A in Volume III contains public comments on DOE's proposed revisions to the scope of the WM PEIS, as well as the *Federal Register* notice announcing the scope change. The 1996 Baseline Environmental Management Report contains information on environmental restoration costs. That report is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final PEIS.

Comment (2415)
The WM PEIS states that environmental restoration decisions are usually made at the site-specific level and, therefore, are not covered in this PEIS. Such an approach is inadequate because looming budget cuts might force programmatic decisions on environmental restoration.

Response
The WM PEIS is a programmatic analysis that evaluates decentralized, regionalized, and centralized configurations for treating, storing, and disposing of wastes generated by DOE operations. DOE recognized after conducting preliminary analyses that programmatic decisions regarding environmental restoration cannot be made because these decisions should reflect the particular conditions at each site, as well as the involvement of State regulators and local stakeholders. This is why DOE decided to remove the environmental restoration alternatives from this document, as noted in Section 1.7.1 in Volume I, and why there are no current plans to prepare another programmatic EIS to address environmental restoration activities.

DOE believes the removal of the environmental restoration alternatives from the original scope of the PEIS will not affect the basis for comparison of the alternatives analyzed in the WM PEIS.

9.2 Waste Management PEIS Scope Modification

Because the Federal budget is ultimately controlled by the President and Congress, DOE is unable to guarantee full funding for specific projects and programs. However, DOE continues to request appropriate funding to meet its commitments and implement its decisions.

Comment (3183)
Some commentors stated that the WM PEIS should more clearly identify the fact that it does not include consideration of environmental restoration waste. Other commentors specifically identified Sections 6.2.3 and 6.15 as including environmental restoration waste in the scope of the WM PEIS, which seemingly conflicts with the decision to remove environmental restoration wastes during re-scoping.

Response
Sections 1.3 and 1.7 of the WM PEIS Summary document have been revised to explain that although the WM PEIS does not evaluate programmatic alternatives for environmental restoration wastes, Appendix B in Volume III provides estimates of environmental restoration waste volumes and identifies the potential effects of the environmental restoration waste for which responsibility will be transferred to the Waste Management Program on the comparison of WM PEIS alternatives.

The reference to Section 6.2.3 in Volume I which has been clarified to indicate that the section pertains to low-level mixed waste that is in storage awaiting treatment or disposal, and that is the responsibility of the Waste Management Program. Section 6.15 in Volume I summarizes the discussion, which is in Appendix B, regarding environmental restoration-generated low-level mixed waste that is expected to be transferred into the Waste Management Program.

Comment (3656)
The WM PEIS assumes that radiation and chemical exposure to offsite populations and noninvolved workers to treat environmental restoration wastes would be additive to their exposure to waste management emissions. The environmental restoration transuranic waste (TRUW) volumes are so small compared to waste management TRUW, however, that environmental restoration wastes are not likely to change the trends of impacts examined in the WM PEIS (Draft WM PEIS, p. 8-81). This assumption is difficult to believe, particularly since the WM PEIS also states that projections of future environmental restoration wastes are uncertain both in quantity and composition and that less than one-fourth of the environmental restoration release sites have been fully characterized and therefore the extent and type of contamination is largely unknown. (Draft WM PEIS, p. 8-77, footnote 1); and DOE projects that only RFETS, SRS, and ORR will have environmental restoration TRUW requiring treatment at waste management facilities when transuranic materials were used at the majority of DOE sites prior to 1970. In addition, because the amount of environmental restoration TRUW that exists is unknown, conclusions about transportation impacts based on the estimated environmental restoration TRUW volumes makes the public wary. Finally, all the relevant factors were not considered and no alternatives are given, as required under the NEPA mandate.

Response
DOE did not include environmental restoration alternatives in the PEIS, as described in Section 1.7.1 in Volume I, because of the site-specific nature of decisions to be made about environmental restoration activities. However, although the WM PEIS will not be used to make decisions about DOE's Environmental Restoration Program, DOE's projected volumes of environmental restoration waste

were considered in the WM PEIS to determine whether they could impact decisions regarding WM PEIS alternatives.

Section 8.15 in Volume I and Appendix B in Volume III of the WM PEIS have been revised to update the estimates of volumes of TRUW generated by environmental restoration. Table B.5-3 in Appendix B identifies ANL-E, the Hanford Site, INEL, ORR, RFETS, and SRS as the major sites with environmental restoration TRUW for which responsibility will be transferred to the Waste Management Program. All other environmental restoration TRUW will be addressed by the Environmental Restoration Program. The volume of environmental restoration TRUW requiring treatment in the waste management system is currently estimated to be about 70% of waste management TRUW requiring treatment. Typically, large volumes of environmental restoration transferred waste are found at sites that also have sizable volumes of similar waste management waste. The addition of environmental restoration transferred TRUW is not expected to affect the basis for comparison of the WM PEIS alternatives. At some sites, the environmental restoration transferred waste could affect the scale of site treatment or disposal facilities, which will be addressed in site-specific reviews. The effects can be managed by increasing the capacities of individual site waste management facilities, building facilities for environmental restoration TRUW, or sending environmental restoration TRUW to other sites for management.

The discussion in Appendix B does not include the effects due to transportation of environmental restoration wastes; however, transportation of environmental restoration waste is assumed to follow the same routing to sites for treatment and disposal as waste management waste. Section B.9 in Appendix B acknowledges uncertainties associated with environmental restoration activities at DOE sites.

Because the current data do not sufficiently characterize the environmental restoration transferred waste that might be sent to waste management facilities, the potential impacts to human health and the environment from treatment or disposal of environmental restoration waste cannot be determined. However, these impacts could be analyzed in sitewide or project-level studies. Further detail is provided in Appendix B in Volume III.

Comment (4047)

The Draft WM PEIS does not address the potential consequences of an EPA Cleanup Rule on present DOE environmental restoration and waste management projections, although a stringent cleanup rule could significantly influence the volume of low-level mixed waste and low-level waste to be treated and disposed of by projected hazardous waste facilities.

Response

DOE is not sure as to which rule the commentor refers. However, DOE must comply with all applicable laws and regulations in all of its activities. Waste management activities are not an exception to this policy. However, laws and regulations frequently are amended, and requirements that were effective when the WM PEIS was issued could change before facilities are permitted and constructed. While DOE cannot predict these changes, sitewide and project-level NEPA reviews would comply with regulatory requirements applicable at the time these reviews are prepared.

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Comment (4436)
Although DOE's consideration of the change in scope (i.e., to remove environmental restoration) was known by word of mouth prior to the decision, notification of the change in the *Federal Register* and discussion with the Environmental Management Advisory Board were inadequate in that requests for notification to the commentor were not met, and individuals such as the commentor were not given an opportunity to comment on the change in scope as a result of the inadequate notification.

Response
As noted in Section 1.7.1 in Volume I DOE placed a notice in the *Federal Register* on January 24, 1995 (60 FR 4607), inviting the public to comment on the proposed change in scope and name of the PEIS. In response to public requests, the comment period was extended to April 10, 1995. Thus, DOE complied with the NEPA requirements for advance notification, and took comments longer than required. DOE made this scope modification decision after consultation with and review by DOE's Environmental Management Advisory Board. Appendix A in Volume III of the WM PEIS contains a more detailed chronology of the decision and a summary of the comments and DOE's responses. Appendix A also outlines the means for public involvement in planning and decisionmaking for DOE's environmental restoration activities.

Another opportunity to comment on the scope of the PEIS became available during the public comment period on the Draft WM PEIS. DOE has incorporated all such comments, including those from this commentor, and DOE responses in this volume of the Final PEIS.

It is not clear to whom in DOE the commentor's request for individual notification was directed. DOE makes every reasonable effort to respond to public requests for information. DOE, nevertheless, regrets any inconvenience that might have been caused for the commentor.

Comment (4439)
Reasons for removing environmental restoration from the scope of the PEIS involved inadequacies in the alternatives identified and methods of analysis, although work continued on the study because some alternatives and methods were valid, a deadline existed, and a change in the team (providing data still needed) would have been costly. However, significant environmental restoration-related issues exist in terms of funding for remedial actions among sites, whether to implement the Keystone Report, potential differences in decision criteria for environmental restoration and waste management, and whether environmental restoration and waste management functions such as regulatory compliance, health and safety, and financial oversight should be integrated.

Response
The WM PEIS is a programmatic analysis that evaluates decentralized, regionalized, and centralized approaches for treating, storing, and disposing of wastes generated by DOE operations. As such, it is a programmatic NEPA document. DOE recognized, after conducting preliminary analyses, that decisions regarding environmental restoration should reflect the particular conditions at each site, and must involve State regulators and local stakeholders. This is why DOE decided to remove the environmental restoration alternatives from this document and why there are no current plans to prepare another programmatic EIS to address environmental restoration.

The potential effect of those environmental restoration wastes for which responsibility might be transferred to the Waste Management Program was considered in the WM PEIS. DOE recognizes the need to integrate information from the Environmental Restoration Program with the WM PEIS analysis, to the extent that this information could affect the basis for comparison of the WM PEIS alternatives. This approach allows for decisions about the Waste Management Program at the national level, while reserving decisionmaking about alternatives for the Environmental Restoration Program for the site level. If the integration of such functions as health and safety and financial oversight for environmental restoration and waste management can provide cost savings and improve the program, DOE will integrate them at the individual sites. DOE implements other functions, such as regulatory compliance, at the site level as required.

The implementation of the Keystone Report is beyond the scope of the WM PEIS, as are funding allocations among sites for remedial actions.

Comment (4458)
When is a PEIS covering the impact of alternatives for transuranic waste (TRUW) generated prior to 1970 to be produced, and could the cumulative impact in combination with that from treatment of wastes generated after 1970 impact the relative cumulative impacts and costs of treatment alternatives? The fact that TRUW generated prior to 1970 is being examined as part of the Environmental Restoration Program rather than the Waste Management Program suggests that the PEIS should have retained its original scope, environmental restoration and waste management.

The Final PEIS should include the results of efforts covering environmental restoration by academic groups, the National Academy of Science, and others. If the timetables for the environmental restoration and waste management efforts cannot be meshed, then a Draft Environmental Management (both environmental restoration and waste management) PEIS should be written when the data are available, and a schedule for this effort should be provided.

Response
The WM PEIS analyzes the potential environmental impacts from treatment and storage of current retrievably stored inventory of TRUW and TRUW that will be generated during the next 20 years.

As explained in Section 1.7.1 in Volume I, the scope of the WM PEIS does not include environmental restoration alternatives. Programmatic decisions regarding environmental restoration cannot be made because environmental restoration wastes have not been sufficiently characterized, and these decisions must reflect particular conditions at each site. Therefore, there are no current plans to prepare a programmatic EIS to address environmental restoration activities. The volumes of pre-1970 (buried) TRUW that might be generated by environmental restoration activities are identified for individual DOE sites in Volume III, Appendix B, of the WM PEIS. Appendix B also contains information on the planned disposition of environmental restoration wastes at individual sites. The data in Appendix B were revised using the 1996 Environmental Restoration Core Database, which was used for the 1996 Baseline Environmental Management Report as well. DOE has determined that, while environmental restoration waste for which responsibility may be transferred to the Waste Management Program could affect the scale of site treatment operations at specific sites, this transferred waste would not affect the basis for comparison of the WM PEIS alternatives.

As described in Volume I, Section 1.8.1 of the Final WM PEIS, DOE has prepared the WIPP SEIS-II to evaluate the potential impacts from disposal of TRUW at WIPP, including previously disposed of buried TRUW. Information from the WIPP SEIS-II will be used to inform DOE's decisions as whether

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to operate WIPP as a disposal facility and, if so, what TRUW should be disposed of there, as well as the minimum level of treatment needed to meet the waste acceptance criteria for disposal.

The cumulative impacts analysis in Chapter 11 of the WM PEIS includes the potential impacts of the preferred alternative discussed in the WIPP SEIS-II.

9.3 Environmental Restoration Waste and Its Effect on the WM PEIS

Comment (488)
If the WM PEIS does not include environmental restoration wastes, the 20-year projected waste inventory needs to be clarified.

Response
The WM PEIS analyzes waste management wastes directly and addresses environmental restoration wastes only in the context of how environmental restoration wastes might affect the basis for comparison of alternatives. DOE has clarified the waste volume tables in the Summary document, and Chapters 6, 7, and 8 in Volume I, to indicate that the volumes of waste are from waste management activities only.

The Draft WM PEIS was based on the best information available at the time for waste inventories in storage, plus 20 years of expected waste generation. These data have subsequently been revised. The new data are reported in Volume IV, Appendix I, and were used in selected analyses to determine whether the waste volume revisions would significantly change the analytical results in the WM PEIS.

Environmental restoration wastes for which responsibility will be transferred to the Waste Management Program are discussed in Appendix B in Volume III, and Sections 6.15, 7.15, and 8.15 in Volume I. The remaining environmental restoration waste would be managed by the Environmental Restoration Program.

Comment (517)
What is the status of the groundwater pump-and-treat activities at Test Area North injection wells and will they be included in waste management activities resulting from this PEIS?

Response
The SNF/INEL EIS describes the impacts of environmental remediation activities such as groundwater pump-and-treat at INEL. In addition, the annual INEL Site Environmental Reports, which are available to the public, describe the status of environmental monitoring and remediation activities.

Groundwater pump-and-treat activities are environmental restoration activities. Contaminated groundwater collected as part of a remedial action would be treated onsite, as necessary, and would not involve decisions at a programmatic level, or influence decisions to be made about the WM PEIS alternatives.

Comment (1100)
Several commentors questioned the basis for the transportation analysis in the WM PEIS with respect to how it dealt with environmental restoration wastes. In one case, the commentor asked that the waste volumes and increased rail and truck shipments associated with environmental restoration wastes be clearly identified. Another challenged the conclusion that because there will be less shipment of environmental restoration-generated low-level waste than waste management low-level waste, transportation risks and costs for the environmental restoration low-level waste are expected to be less than for waste management low-level waste. This perspective may not adequately account for potential cumulative effects.

Response
DOE revised those sections of the WM PEIS dealing with environmental restoration wastes based on updated estimates of waste. As part of this revision, DOE estimated the volume of environmental restoration waste for which responsibility would be transferred to the Waste Management Program and

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considered whether environmental restoration wastes would affect the alternatives evaluated in the WM PEIS (see Volume III, Appendix B). The analysis indicated that although the transferred environmental restoration waste could impact the waste management activities at some sites, it is not expected to affect the basis for comparison of the WM PEIS alternatives.

Based on the updated information on environmental restoration wastes used in the Final WM PEIS, the total volumes of environmental restoration transferred low-level waste are greater than the total volumes of waste management low-level waste. Therefore, the number of environmental restoration low-level waste shipments will not necessarily be less than the number for waste management low-level waste. Most DOE environmental restoration activities are not yet sufficiently characterized to determine precisely how much environmental restoration waste will be classified as waste that will need to be shipped and how much material (e.g., soil) will not be classified as waste.

Transportation risks and costs depend on the number of shipments. The number of shipments depends on the volume of waste requiring shipment. Moreover, as noted in Section B.9 in Appendix B (Volume III), because environmental restoration wastes transferred to waste management facilities would be shipped as generated during site clean-up, the volume that will be delivered to waste management facilities at any given time is uncertain.

DOE did not include transportation of environmental restoration waste in the cumulative impacts analysis because information on the volume of environmental restoration waste requiring shipment is not known for many sites.

Comment (1664)
Environmental restoration wastes are not included in the WM PEIS impacts and could result in much higher waste volumes for disposal at NTS. Draft PEIS Appendix B indicated that disposal volumes could be up to 60% higher based on the PEIS assumption that only 5% of the low-level waste from site restoration would be transported to an offsite location for disposal. The reasonableness of these results could not be determined since the shipping volume estimate is based on an unpublished draft of the Baseline Environmental Management Report. The impacts of increased low-level waste volumes were not estimated in Appendix B.

Response
The PEIS does not quantitatively evaluate the impacts of environmental restoration wastes at DOE sites. Volume III, Appendix B, of the WM PEIS does evaluate the potential effects of transferring responsibility for some environmental restoration waste to the Waste Management Program. The evaluation indicates that, although this environmental restoration transferred-waste could impact the treatment at specific sites, it is not expected to affect the comparison among waste management alternatives.

Appendix B was revised in the Final WM PEIS to include updated estimates of environmental restoration waste volumes at individual sites and the expected disposition of those wastes. The PEIS environmental restoration waste totals are based on data developed for the 1996 Baseline Environmental Management Report. The updated data presented in Table B.5-1 indicate that NTS estimates its environmental restoration waste volume to be approximately 1,101,200 cubic meters, with 1,100,000 cubic meters of that volume to be transferred to waste management facilities. However, the environmental restoration transferred low-level waste volumes presented in Appendix B are estimates only for volumes to be treated within the Waste Management Program. Although the Draft WM PEIS did present information on estimated volumes of environmental restoration waste for disposal, DOE subsequently determined that information regarding environmental restoration waste disposal volumes is too uncertain to allow a meaningful discussion of these waste volumes in the WM PEIS.

The impacts of environmental restoration activities was also considered in the cumulative impact analysis in Volume I, Chapter 11, where the information was available. WM PEIS technical reports were revised to include updated waste volumes, including those for environmental restoration wastes.

Comment (1689)
Dirty cleanup is not acceptable. The amount of waste generated from environmental restoration depends on the cleanup standards.

Response
The cleanup process is generally implemented through agreements among DOE, EPA, and frequently the host State. Cleanup standards are generally based on site-specific studies conducted pursuant to CERCLA- or RCRA-mandated cleanup actions. The studies consider a number of important factors, including the extent of contamination in relation to background concentrations, planned future use of the site, and the technical and economic feasibility of the proposed standards. The rulemaking process provides an opportunity for public participation and comment on cleanup standards mandated by regulations.

Planned future land use was estimated in Appendix B using the Baseline Environmental Management Report published by DOE in 1996. The Baseline Environmental Management Report looked at more than 10,000 contaminated sites and facilities and applied generic "base case" criteria, which included potential site land use and technical feasibility. The "base case" is detailed in the Summary document and Volume I of the Baseline Environmental Management Report.

Comment (1696)
The public is concerned about dust flying into neighboring communities. DOE should consider designing a tent to contain the particulates.

Response
The WM PEIS analyzed the potential impacts of emissions of criteria air pollutants from waste management construction activities, as discussed in Section 5.4.2 in Volume I. Estimates were made for each site under each alternative, and are discussed in each waste-type chapter.

DOE is committed to managing its waste materials and to constructing facilities in a manner that is protective of human health and the environment, including controlling emission of dust. DOE must comply with all applicable regulations pertaining to the control of fugitive dust emissions. Therefore, DOE does not anticipate any unacceptable emissions of dust from its environmental restoration or other activities.

Comment (2190)
DOE needs to consider contaminated groundwater as waste.

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Response

Contaminated groundwater is managed by DOE's Environmental Restoration Program. The estimates of wastes from the Environmental Restoration Program that are given in Appendix B of the WM PEIS, however, do not include contaminated groundwater because of the difficulties in calculating the total volume projected to be extracted over the duration of the pump-and-treat operations. Contaminated groundwater collected as part of a remedial action would be treated onsite, as necessary, and does not involve decisions at a programmatic level.

Comment (2427)

Volume I, Section 1.7.4, states that the extent to which a site is cleaned up will depend largely on assumptions regarding future land use and that for most sites, the process of determining future site use has just begun. Land-use decisions will determine cleanup levels, which largely determine the amount of environmental restoration waste generated, which, despite what this PEIS says, will have a great impact on waste management. Has DOE considered this?

Response

Appendix B in Volume III of the WM PEIS discusses the potential impacts on WM PEIS alternatives of managing environmental restoration waste for which responsibility will be transferred to the Waste Management Program. Appendix B was revised for the Final WM PEIS based on updated and additional information obtained from the data used to prepare the 1996 Baseline Environmental Management Report. Appendix B now provides updated estimated volumes of environmental restoration-generated waste, as well as the planned disposition of those wastes, at individual DOE sites. The planned disposition of a particular volume of waste (e.g., via treatment, access controls, *in-situ* containment) (see Section B.4) at a given site provides some indication of the clean-up level at a site. Moreover, DOE incorporated the land-use scenario provided in the 1996 Baseline Environmental Management Report, which also was based partly on this waste disposition information. However, DOE acknowledges in Section B.9 that the adoption of alternate land-use scenarios might alter the amounts of environmental restoration transferred waste. Section B.9 also states that adoption of the least restricted scenario is unlikely and that slightly more restricted land uses would result in only minor changes in environmental restoration waste volumes.

As noted in Section B.3 in Appendix B, environmental restoration remedies using *in-situ* technologies where the contaminated media remains in place are usually coupled with decisions that control or restrict site land use. At those sites where future land-use plans allow for more unrestricted public access, it is more likely that remediation will involve removal of contaminated materials.

Comment (2437)

Volume I, Page 6-111, Table 6.15-1; Page 7-109, Table 7.15-1; Volume III, Page B-8, Table B.5-1: "The blank (or *) boxes under ER waste volumes in these tables should be better explained or estimates should be found and inserted. For example, it is absolutely incredible that ER at Hanford, LANL, PGDP, and Pantex will generate neither any LLMW nor any LLW. The estimate of the impact of ER waste is distorted by these estimates being omitted."

Response

The Final WM PEIS discussions of environmental restoration waste volumes have been revised based on updated data used for the 1996 Baseline Environmental Management Report. The Draft WM PEIS contained 1994 or earlier data, which were the best estimates available at the time. Updated data concerning the current environmental restoration-generated low-level waste and low-level mixed waste volumes are summarized in Tables B.5-1 and B.5-2 in Appendix B. Appendix B and Sections 6.15 and 7.15 were revised to discuss the revised volumes of environmental restoration low-level mixed waste and low-level waste, respectively.

Table B.5-1 shows that the sites identified in the comment each plan to generate environmental restoration low-level waste. Table B.5-2 shows that each of these sites, with the exception of Pantex, plan to generate environmental restoration low-level mixed waste. Environmental restoration activities are not within the scope of the WM PEIS, primarily due to their site-specific nature. However, the WM PEIS discusses the potential influence on the comparison of WM PEIS alternatives of that portion of the environmental restoration waste for which responsibility could be transferred to the Waste Management Program.

Comment (2607)
Will the transuranic wastes generated from the Pit 9 project at INEL be considered environmental restoration wastes or pre-1970 waste?

Response
In the WM PEIS, DOE defines all pre-1970 transuranic waste (also known as buried transuranic waste) as environmental restoration waste, which will be managed in accordance with CERCLA. The waste generated from the Pit 9 project at INEL fits that definition and is included in the qualitative discussion on environmental restoration waste impacts in Appendix B, Volume III of the WM PEIS.

Comment (2629)
Volume III, Table B.5-1, provides projected environmental restoration waste volumes through 2033, estimated by the computer model ARAM. However, estimated waste volumes differ substantially from those given in *Waste Stream Projections for Environmental Restoration at the Idaho National Engineering Laboratory* (DOE/ID-10417, Revision 6, June 3, 1995). Where good estimates are available, the PEIS should use them. Please explain. The EIS also appears to ignore the hundreds of structures that will need to undergo decontamination and decommissioning.

Response
The quantities of environmental restoration waste used in the Draft WM PEIS analysis were based on 1994 or earlier data, which were the best data available at the time DOE prepared the Draft WM PEIS. Updated data concerning the current environmental restoration waste volumes are provided in Appendix B in Volume III of the Final WM PEIS.

Environmental restoration waste volumes presented in Appendix B of the Final WM PEIS have been updated using information that was provided by each site and incorporated into a computerized database called the Environmental Restoration Core Database. The 1996 Baseline Environmental Management Report incorporated volumes from this database as well. Individual DOE sites control the information in this database and, understandably, they continually update their waste inventory calculations as more information is gathered and remedies are selected. For the purposes of the Final WM PEIS, DOE "locked" in May 1996 data from the Core Datebase. DOE recognizes that when the Final WM PEIS is published the volumes given in Appendix B might not match quantities reported in site-specific documents containing newer information. Section B.4 in Volume III, identifies environmental restoration waste volumes at INEL, and the planned disposition of these wastes. These

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estimates reflect only those facilities within the current scope of the Environmental Restoration Program, and do not include other structures or facilities that might require decommissioning in the future but have not yet been transferred to the Environmental Restoration Program. More information on facilities to be decontaminated and decommissioned at INEL and other sites can be found in the 1996 Baseline Environmental Management Report.

The WM PEIS was not prepared to support decisions for the Environmental Restoration Program (which includes decontamination and decommissioning), but does consider the amount of environmental restoration waste for which responsibility is expected to be transferred to the Waste Management Program (see Appendix B). Although this analysis indicates that this environmental restoration transferred waste could affect the scale of waste management activities at specific sites, it is not expected to affect the basis for comparison of the WM PEIS alternatives.

Comment (2782)
The predominance of Environmental Restoration Program wastes over other kinds of wastes underscores all [commentor's] reservations regarding impacts to groundwater, surface waters, and ecological resources, etc., at BNL. BNL is a special case because of these factors, and that it is inappropriate not to consider the site-specific factors associated with BNL. Any hard look at these factors would lead to elimination of BNL as a possible disposal site.

Response
The WM PEIS analysis will not be used to make decisions regarding the Environmental Restoration Program. Although the WM PEIS does not consider environmental restoration alternatives, it does present the most recent projected volumes of environmental restoration waste at individual sites and discusses the potential affect of environmental restoration waste for which responsibility could be transferred to the Waste Management Program. BNL's estimated volumes of this environmental restoration transferred-waste are less than the corresponding volumes of waste management wastes (see Table B.6-1 in Volume III).

Evaluating BNL as a potential site for waste management activities does not mean that the site will be selected. However, there is no basis for rejecting the site without evaluation. NEPA requires evaluation of reasonable alternatives. The preferred alternatives for low-level mixed waste treatment and disposal are identified in Section 3.7 in Volume I of the WM PEIS. As necessary, DOE will analyze impacts on a sitewide or project-level basis in separate NEPA reviews. Those reviews will include the potential impacts from environmental restoration activities to the extent possible. Cumulative impacts of waste management actions combined with past, present, and reasonably foreseeable future environmental restoration actions were considered in the WM PEIS to the extent possible (see Chapter 11 in Volume I).

As shown in Section B.5, the projected volume of environmental restoration low-level mixed waste to be managed onsite at BNL is 3,200 cubic meters. However, the portion, if any, of that waste to be disposed of onsite is uncertain.

Comment (2809)
Several of the DOE sites have Comprehensive Environmental Response, Compensation, and Liability Act and/or Resource Conservation and Recovery Act cleanup actions that have a different decision process than the National Environmental Policy Act. It would be helpful to further classify the waste

types under these statutes. The cost effectiveness of treatment options is very dependent on waste volumes. Decisions on portions of the waste streams discussed in the WM PEIS might already be made under other statutory authority.

Response
The commentor is correct in that DOE is proceeding with its environmental restoration decisions on a site-specific basis under CERCLA or RCRA. Although environmental restoration activities are outside the scope of the WM PEIS, DOE does assess the potential impacts on the WM PEIS alternatives of those environmental restoration wastes for which responsibility could be transferred to the Waste Management Program (see Volume I, Sections 6.15, 7.15 and 8.15, and Volume III, Appendix B). DOE has determined that, while for specific sites the transfer of responsibility for some environmental restoration waste to the Waste Management Program could impact some sites, it is not expected to affect the basis for comparison of WM PEIS alternatives.

Comment (2814)
The last paragraph in Volume I, Section 1.5.3, states that the waste volumes from retrieval of pre-1970 transuranic waste (TRUW) might affect the conclusions in the WM PEIS. If this is the case, then wastes generated from all remediation at DOE sites for all waste types must also be analyzed in the same way to maintain consistency and to ensure that all wastes generated at DOE sites are accounted for.

Response
Prior to 1970, DOE disposed of TRUW by burial in shallow land disposal units. This waste is known as "pre-1970 TRUW" or "buried TRUW." After 1970, DOE "retrievably stored" all TRUW pending the development of a deep geologic repository for disposal of this TRUW.

DOE considers pre-1970 TRUW to be environmental restoration waste. The WM PEIS focuses on waste management facilities (those required to treat, store, or dispose of existing and future wastes). While this PEIS does not analyze environmental restoration alternatives, it does contain information on the anticipated environmental restoration waste volumes (for low-level mixed waste, low-level waste, and transuranic waste) and a qualitative discussion of the extent to which those waste volumes could affect waste management decisions. Appendix B provides an estimate of environmental restoration waste and how it could affect the portion of environmental restoration waste for which responsibility could be transferred to the Waste Management Program. Appendix B was extensively revised for the Final WM PEIS and now contains updated information on volumes of environmental restoration waste and the disposition of environmental restoration waste for individual DOE sites. This information is summarized in the individual waste-type chapters. DOE has determined that, while the portion of environmental restoration waste for which responsibility could be transferred to the Waste Management Program could affect the waste management activities at specific sites, this transferred waste would not affect the basis for comparison of WM PEIS alternatives.

Comment (2826)
In the discussion of disposal in Section 6.15.2, it is stated that increased disposal volumes of environmental restoration-generated low-level mixed waste require additional land, but may pose capacity problems at smaller facilities such as BNL. An option is mentioned regarding shipping overflow wastes to another offsite facility. As stated previously, BNL is highly environmentally-

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sensitive, lies over a sole-source aquifer, and is in an area of high population density. Therefore, *all* such wastes should be shipped offsite.

Response
The National Environmental Policy Act requires that reasonable alternatives be evaluated. As noted in Section 6.3.2 in Volume I, BNL has less than 200 cubic meters of waste management low-level mixed waste. BNL would manage only its own low-level mixed waste and dispose of such wastes only under the Decentralized Alternative. It would ship its wastes for disposal in all other alternatives. For the Decentralized Alternative, the relatively small amount of waste management low-level mixed waste at BNL indicates that impacts to human health and the environment at BNL may be considered low. Chapter 6 in Volume I of the PEIS provides more detail on potential low-level mixed waste impacts, and the preferred alternative for low-level mixed waste is identified in Section 3.7 in Volume I. Before actual waste management facilities are sited, DOE will conduct NEPA reviews on a sitewide or project-level basis. As shown in Section B.5 in Appendix B, Volume III, the projected volume of environmental restoration low-level mixed waste to be managed by the Environmental Restoration Program at BNL is 3,200 cubic meters. This waste will not be transferred to waste management for disposition. Disposition of this waste will be determined under the CERCLA decisionmaking at the site.

Comment (3011)
The large amount of environmental restoration wastes generated at BNL relative to the small amount of wastes requiring disposal is worthy of notice. There are two causes for such a situation. The first is past (and perhaps current?) operating practices were so poor as to create disproportionately large environmental problems. The second is that site specific environmental factors tend to magnify small releases into large cleanups. The Town of Brookhaven believes that both apply to BNL. This supports the commentor's position that BNL is not a suitable candidate site under any disposal option, and that the only consideration for wastes from BNL should be what is considered for the "excess wastes" described in this paragraph: offsite disposal.

If a disposal facility is created at BNL, the analysis must consider the possibility that all wastes appropriate for disposal at that facility will be disposed of there. It is unlikely that only a portion of a site's wastes will be treated and disposed at a site facility, for economic and practical considerations. The commentor takes strong exception to the suggestion that DOE will, in a matter of course fashion, automatically ship wastes from BNL if an on-site disposal facility is permitted and available. Although the scope of the WM PEIS was limited to exclude environmental restoration activities, BNL's particular situation requires such an analysis.

Response
Evaluation of disposal at BNL was conducted to determine the suitability of the site. The act of evaluating the site does not imply that the site will be selected. NEPA requires evaluation of reasonable alternatives. Moreover, DOE is not considering shipping wastes from other sites to BNL for disposal, and could not implement such a practice without having considered it in a NEPA analysis. BNL would dispose of low-level waste and low-level mixed waste only under the Decentralized Alternative, and only its own waste.

As shown in Tables B.5-1 and B.5-2, the volumes of environmental restoration low-level waste and low-level mixed waste to be managed onsite at BNL are relatively small. Current plans are for

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16,000 of 19,000 cubic meters of low-level mixed waste and more than 99% of low-level waste from environmental restoration activities to be shipped offsite for commercial disposal. DOE believes that decisions with regard to the disposition of environmental restoration-generated waste are site-specific in nature and, therefore, will be further evaluated in site-specific analyses.

Comment (3012)
Table 6.15-1 shows that over three orders of magnitude more waste will be generated at BNL from the environmental restoration activities than from "normal" site operations. BNL has a two orders of magnitude greater increase in wastes than any other site. This again shows BNL's unique position. BNL should not be considered with other DOE sites under this programmatic review. Please note that the footnote to the table compounds this difference.

Response
BNL was included in the WM PEIS because it generates waste management waste that will be managed according to the alternatives that will be selected based on the WM PEIS analysis. In the revised Appendix B, Table B.5-2 indicates that the total estimated volume of environmental restoration low-level mixed waste at BNL is 19,000 cubic meters, while Table B.6-1 indicates that the estimated volume of waste management low-level mixed waste is 190 cubic meters. These tables similarly indicate a relatively high volume of environmental restoration low-level mixed waste compared to waste management low-level mixed waste for PGDP and INEL, and also that none of the environmental restoration low-level mixed waste at these sites would be transferred to waste management facilities. Therefore, BNL does not appear to be "unique" in the sense referred to in the comment. Table 6-15.1 was deleted from the Final WM PEIS, as site-specific environmental restoration information is now contained in Appendix B.

The WM PEIS does not analyze environmental restoration alternatives, but provides a qualitative analysis of the potential impacts of environmental restoration waste for which responsibility could be transferred to Waste Management Program on the comparison of WM PEIS alternatives. Environmental restoration actions will be further evaluated in site-specific analyses. DOE does not believe that the environmental restoration transferred waste would affect the basis for comparison of WM PEIS alternatives, including the waste management activities at BNL.

Comment (3013)
Volume I, Section 7.15.2, states that environmental restoration low-level waste amounts are greater than "normal" activity low-level waste amounts for BNL. How was this computed, as nowhere has an estimate for low-level waste production at BNL been made? Furthermore, the conclusion in this section is contradictory to the approach used in Volume I, Chapter 6, where environmental restoration wastes were not to be used to expand a facility constructed for wastes generated in the course of regular activities. The WM PEIS has made some linkages between low-level waste and low-level mixed waste treatment and disposal strategies. Therefore, the assertion in this chapter that environmental restoration wastes could merely be added to the normally produced waste stream (which has never been quantified for BNL) is very disturbing.

Response
The Final WM PEIS was revised to include updated waste volumes for both environmental restoration (ER)- and waste management-generated wastes. Appendix B in Volume III of the WM PEIS shows a total of 120,000 cubic meters of ER low-level waste at BNL (see Table B.5-1), and 5,640 cubic meters

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of waste management low-level waste at BNL (see Table B.6-1). Table B.6-1 also indicates that responsibility for a comparatively small volume of 400 cubic meters of ER low-level waste will be transferred to waste management facilities. Disposition of environmental restoration low-level waste will be further evaluated in site-specific analyses. For both low-level waste and low-level mixed waste, DOE considered the effects of ER waste for which responsibility would be transferred to the Waste Management Program and determined that the transferred waste would not affect the basis for comparison of the WM PEIS alternatives. The transfer of some environmental restoration waste to the Waste Management Program could impact the treatment or disposal at specific sites.

The waste management low-level waste analysis in the Draft PEIS was based on inventory and projected waste volumes for each generating site as listed in the 1992 Integrated Data Base. Since then, new information for waste management low-level waste from the 1995 Integrated Data Base has become available. Appendix I of the PEIS discusses the newly updated waste management waste volumes. The 1995 Integrated Data Base indicated a sufficiently increased volume of low-level waste at BNL (5,640 cubic meters) to warrant a reevaluation of impacts at BNL using the BNL updated waste-volume data for the Final PEIS.

Section 7.15 in Volume I summarizes the information on ER low-level waste in Appendix B. Table 7.15-1 was deleted from the Final PEIS, as Appendix B now contains site-specific ER information. Section 7.15 no longer notes that ER low-level waste is greater than waste management waste from normal activities. At BNL, the ER transferred wastes that are currently estimated to be 400 cubic meters (waste management wastes are estimated at 5,640 cubic meters).

Comment (3019)
Section 6.15.2 indicates that each site would have sufficient capacity to treat environmental restoration waste only after the 10-year building phase and the 10-year treatment period. This is an unacceptable position to put many sites in, particularly those where restoration is the primary mission and cleanup is attainable in the near term.

Response
DOE did not intend to imply that wastes from the Environmental Restoration Program could only be brought into the Waste Management Program for treatment after a 10-year processing period for waste management wastes, i.e., sequentially rather than concurrently. Volume I, Section 6.15.2, of the Final PEIS has been clarified to indicate that environmental restoration waste could be transferred to waste management facilities whenever capacity is available.

Comment (3082)
The analysis does not adequately consider all the ramifications of the Hanford Tri-Party Agreement requirements for the Regionalized or Centralized Alternatives. For example, thermal treatment of Hanford wastes will require large units. Please evaluate Hanford-specific circumstances.

Response
The Hanford Tri-Party Agreement concerns cleanup actions at the Hanford Site that are environmental restoration activities. Environmental restoration alternatives are outside the scope of the WM PEIS, although the potential impact of environmental restoration waste for which responsibility could be transferred to the Waste Management Program is discussed in Appendix B (Volume III) and summarized in Sections 6.15, 7.15, and 8.15 (Volume I). Because the majority of the Hanford Site's

environmental restoration wastes would be managed in place or in the environmental restoration disposal facility. DOE estimated that relatively small percentages of the environmental restoration wastes generated at the site would be transferred to the Waste Management Program (see Table B.5-1, B.5-2, and B.5-3). Impacts from environmental restoration activities combined with waste management activities are considered in the WM PEIS cumulative impacts analysis (Chapter 11, Volume I) to the extent possible. Additional information on site-specific impacts is addressed in the Draft Hanford Remedial Action EIS, which was published in September 1996.

Comment (3096)
Section B.1 erroneously leads the reader to the conclusion that all environmental restoration wastes complex-wide, and their cumulative impacts, are analyzed to determine their impacts on DOE waste management decisions, although this analysis only looks at a small portion of environmental restoration wastes.

Response
Appendix B provides information on all non-liquid environmental restoration wastes. The WM PEIS qualitatively analyzes the portion of environmental restoration wastes that is expected to be transferred to waste management facilities, to determine the effect of these wastes on the basis for comparison of WM PEIS alternatives. This information is provided in Volume III, Section B. Appendix B has been updated with the most recent environmental restoration waste volumes. Most environmental restoration wastes would be managed in place, in facilities dedicated to environmental restoration, or by commercial vendors. Volume I, Chapter 11, discusses for each site the impacts of environmental restoration activities combined with waste management activities, where that information is available, as noted in Section 11.1.

Comment (3097)
Sections B.1, 2, and 3 are deficient because: (1) they include an inaccurate description of the CERCLA remediation process; (2) they do not reference RCRA; and (3) volume estimates are virtually useless in light of the caveats related to land-use determinations, DOE installations, and field offices.

Response
The environmental restoration waste volume estimates presented in the Draft WM PEIS were the best available data at the time of the analysis on the amount of environmental restoration waste that may potentially be managed by waste management facilities. Appendix B has been extensively revised in the Final WM PEIS, and includes environmental restoration waste volumes used to develop the 1996 Baseline Environmental Management Report. DOE recognizes, however, that waste-volume data will continually change as sites refine their estimates. The waste volumes calculations reflect the scenario that is described in the 1996 Baseline Environmental Management Report. The assumptions affiliated with this scenario are described in detail in the appendices to the Baseline Environmental Management Report.

Appendix B is not intended to give a detailed description of the CERCLA remediation process and has been revised to give only a simplified overview of how cleanup decisions are made. Section 1.4 in Volume I of the PEIS also identifies RCRA and CERCLA as key statutes applicable to hazardous waste management activities, and provides descriptions of these statutes as well.

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As noted in Volume III, Section B.3, environmental restoration remedies using in-situ technologies where the contaminated media remains in place are usually coupled with decisions that control or restrict site use. At those sites where plans for future uses of land allow for more unrestricted public access, it is more likely that remediation will involve removal of contaminated materials.

Comment (3098)
It is erroneous to assume [in Appendix B] that CERCLA actions, or treatment in place, produces no wastes requiring treatment and disposal.

Response
The WM PEIS does not assume that CERCLA actions do not produce waste. Appendix B has been extensively revised in the Final WM PEIS. It now provides more complete information about the wastes expected to be generated by the Environmental Restoration Program. Tables B.5-1, B.5-2, and B.5-3 identify the planned disposition of each segment of environmental restoration waste at each site, and each site's projected environmental restoration waste volumes. The response actions fall into four major groups: ex-situ actions (i.e., those requiring removal from the original location, followed by treatment, if needed, then disposal); in-place actions using treatment, containment, or both; access and institutional controls with no further action; and actions not yet determined. Appendix B also contains a discussion of the potential effects of environmental restoration transferred wastes on the basis for comparison of the WM PEIS alternatives.

Comment (3099)
DOE received comments noting that Appendix B does not include specific information on Hanford's environmental restoration wastes. One commentor felt it was hard to understand how DOE arrived at the numbers presented in Table B.5.1 and Section B.5, stating that there were no references cited. In addition, the commentor said it was hard to believe that Hanford has no environmental restoration wastes that might be appropriate for waste management treatment and disposal. Another commentor pointed out that Section B.4 states the volume estimates do not include areas of contamination that have been determined to be prohibitively expensive to clean up, but the term "prohibitively expensive" is not defined. Therefore, it is not clear how much of Hanford falls under this criterion, particularly when Table B.5-1 does not give any volumes for Hanford.

Response
The focus of the qualitative analysis in Volume III, Appendix B, of the WM PEIS discussed the effects that estimated volumes of environmental restoration waste for which responsibility may be transferred to waste management facilities could have on the comparison of WM PEIS alternatives. In the Draft PEIS, DOE estimated that none of the environmental restoration wastes generated at the Hanford Site would be managed in waste management facilities. Therefore, no volumes were given for environmental restoration waste at Hanford in the Draft WM PEIS.

Appendix B has been extensively revised in the Final WM PEIS. Updated waste volumes for the Hanford Environmental Restoration Program are now included in Tables B.5-1, B.5-2, and B.5-3, which now identify some Hanford environmental restoration waste to be transferred to waste management facilities. The waste volume estimates in the WM PEIS were provided by the sites and were used to develop the 1996 Baseline Environmental Management Report as well. Appendix B was revised to indicate all references used.

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Section B.3 notes that the Hanford Environmental Restoration Program is planning to place the majority of waste from site remediation projects and building decommissioning in its Environmental Restoration Disposal Facility. This facility will be operated by the Environmental Restoration Program, not the Waste Management Program. Consequently, there is relatively little waste currently slated for transfer to the Waste Management Program.

For Hanford, the projects that are not included in the Appendix B estimates are: (1) Columbia River, Hanford Reach, excluded because there is no feasible remediation approach available; and (2) groundwater, excluded because the current approach is to conduct limited "pump-and-treat" followed by natural attenuation and monitoring. No groundwater projects involving "pump-and-treat" have been included in the estimates in Appendix B.

Comment (3100)
Table B.4-2, third bullet. Disposal volumes are generally not estimated at one-to-one ratio. A 30% "fluff factor" has been used in the volume estimates in the 100 Areas. Last bullet. Generation of environmental restoration wastes is said to occur over a 30-year period from 2003 to 2033. This does not match the Hanford Tri-Party Agreement (2018) or DOE-Richland long range plan (2047).

Response
Appendix B was revised to state that *the majority* of the environmental restoration wastes will be produced between 2003 and 2033. Further, Section B.8 was revised to eliminate the assumption of a one-to-one ratio for waste treated and waste disposed. This assumption is no longer necessary because environmental restoration waste volumes are now being provided directly by the individual sites.

Comment (3185)
The PEIS must address whether the 50,000 cubic meters of low-level waste reported for PGDP in the PEIS is associated with environmental restoration or decommissioning and decontamination activities.

Response
The 50,000 cubic meters cited in the comment refers to the waste volumes used in Volume I, Chapter 7 of the Draft WM PEIS, which were current inventory and 20-year projections of waste management low-level waste at PGDP reported in the 1992 Integrated Data Base. The 1992 Integrated Data Base did not report any environmental restoration or decommissioning and decontamination wastes at PGDP. However, estimated volumes of environmental restoration low-level waste are discussed in the Final WM PEIS in Section 7.15 and presented for each site in Volume III, Appendix B, Table B.5-1.

New waste-volume information for waste management low-level waste from the 1995 Integrated Data Base has been incorporated in the Final PEIS and is reported in Volume III, Appendix I. Appendix B has been revised to incorporate updated environmental restoration volumes.

Comment (3244)
Managing transuranic wastes (TRUW) should also include wastes previously disposed of at Hanford. Recent DOE information presented at the Secretary's presentation on openness indicate that 1,522 kilograms of plutonium have been discarded into the ground or into tanks at the Hanford Site. The information also reports DOE cannot account for 1,266 kilograms of plutonium at the Hanford Site. This additional plutonium might be in tanks, waste sites, or facilities. These need to be included in the WM PEIS.

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Response
Plutonium contaminated TRUW that was previously disposed of is considered environmental restoration waste. Management of environmental restoration wastes is outside the scope of the WM PEIS. However, the PEIS does consider the effect of environmental restoration wastes for which responsibility could be transferred to the Waste Management Program (see Volume I, Section 8.15, and Volume III, Appendix B). As indicated in Table B.6-1, the Hanford Site has an inventory and projected 20-year generation of about 50,000 cubic meters of waste management TRUW, and 1,800 cubic meters of environmental restoration transferred TRUW. Table B.5-3 identifies approximately 84 cubic meters of environmental restoration TRUW for which disposition has not yet been determined. Environmental restoration wastes are also included to the extent possible in the cumulative impacts analysis in Volume I, Chapter 11. Site-specific conditions for the Hanford Site are analyzed in more detail in the Hanford Remedial Action EIS.

The disposition of surplus plutonium stored at Hanford is outside the scope of the WM PEIS, but is discussed in the Storage and Disposition of Weapons-Usable Fissile Materials PEIS. The scope of the Fissile Materials PEIS is described in Section 1.8.1 in Volume I of the WM PEIS.

Comment (3247)
Commentors stated that the Final WM PEIS should accurately characterize environmental restoration wastes. One commentor stated that DOE's environmental restoration waste generation estimates vary as much as 100 to 200% and, therefore, the risk assessments are suspect. One commentor stated that the assumption that environmental restoration waste volumes are insignificant compared to current inventories and projected waste from waste management operations should be reevaluated because of inconsistencies with Baseline Environmental Management Report estimates, which in many cases are higher than the WM PEIS estimates.

Response
The WM PEIS was not prepared to inform decisions on the Environmental Restoration Program. However, it does consider the effects of the portion of environmental restoration waste for which responsibility may be transferred to the Waste Management Program on the comparison of WM PEIS alternatives. Appendix B in Volume III, which has been extensively revised, discusses the factors in estimating the amount of environmental restoration waste that might be managed at waste management facilities. DOE used the 1996 Environmental Restoration Core Database (which was also used for the 1996 Baseline Environmental Management Report) to update its environmental restoration waste volumes for each site in Appendix B.

Appendix B also contains updated information on how DOE plans to manage contaminated media at each of its sites. In some cases, the media will be left in place, usually with controlled public and worker access. This type of response action generates little, if any, waste. In other cases, DOE plans to remove the contaminated media or structures, which often generates a substantial quantity of waste.

As shown in Appendix B, the updated information indicates that overall, the amount of environmental restoration low-level waste that will enter the waste management system is slightly greater than the amount of waste management low-level waste. Other environmental restoration waste types projected to enter the waste management system are estimated to be less than the waste management generated waste types. DOE expects the estimates provided in Appendix B will change as the environmental restoration and decontamination and decommissioning activities progress. Environmental restoration wastes that would be managed in place, in environmental restoration facilities, or by commercial vendors would not affect waste management facilities. Although this analysis indicates that environmental restoration waste transferred to waste management facilities could influence waste management activities at specific sites, it is not expected to affect the basis for comparison of the WM PEIS alternatives.

The human health risk results presented in the WM PEIS are for waste management activities only and do not include human health risks from managing environmental restoration wastes, because there is insufficient information on the constituents of all environmental restoration wastes. However, DOE believes that risks from physical hazards associated with operation of environmental restoration waste treatment and disposal facilities would tend to be the same or less than those for comparable volumes of waste management wastes.

Comment (3256)
The WM PEIS socioeconomics analysis should include an analysis of cleanup costs associated with the past, present, and future shallow land burial of radioactive wastes, since it appears that these impacts are appearing now and are certain to appear in the future.

Response
The comment pertains to the costs of environmental restoration activities. DOE does not evaluate environmental restoration alternatives in the WM PEIS because it determined that programmatic decisions cannot be made for environmental restoration (see Volume I, Section 1.7.1). These decisions should reflect the particular conditions at each site. Although the WM PEIS does not evaluate alternatives for the Environmental Restoration Program, it does consider the effects of the volume environmental restoration waste for which responsibility could be transferred to the Waste Management Program. The cost of managing the portion of environmental restoration transferred waste is not well known. DOE expects the Department-wide estimates provided in Appendix B to change as the environmental restoration and decontamination and decommissioning activities progress. Environmental restoration wastes that would be managed within the Environmental Restoration Program would be analyzed in site-specific reviews.

Comment (3282)
The WM PEIS considers only legacy waste and operations waste, but not environmental restoration waste. Although it appears that DOE has performed a sensitivity analysis to determine if the consideration of environmental restoration wastes would significantly change any impacts, it is unclear why restoration waste is not included directly in the analysis. The rationale given in the Draft WM PEIS for the segmentation of waste management from environmental restoration activities is that DOE has not yet acquired sufficient data from its contaminated facilities to adequately assess the impacts of its planned site remediation actions. The analysis claims that environmental restoration wastes are uncertain, depending on cleanup levels, which depend on future-use assumptions. However, if sufficient estimates were available to do the sensitivity analysis and produce the 1995 Baseline Environmental Management Report, and after 6 years of substantial environmental restoration budgets, it seems as though environmental restoration wastes should be fully considered along with waste management wastes in a single environmental review. One commentor specifically stated that the PEIS must estimate the volume of low-level mixed waste expected to be generated from environmental restoration activities and asked, "What are anticipated waste volumes?" Another commentor stated the WM PEIS should clarify its analysis of waste generated as a result of restoration activities and the

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assumption behind these estimates, and should clearly define the entire inventory of waste addressed in the document.

Response

The WM PEIS is a programmatic analysis that evaluates decentralized, regionalized, and centralized approaches for treatment, storage, and disposal of wastes generated by DOE operations. DOE recognized, after conducting preliminary analyses, that programmatic decisions regarding environmental restoration cannot be made because these decisions must reflect the particular conditions at each site, as well as the involvement of State regulators and local stakeholders. This is why DOE eliminated the environmental restoration activities from the scope of the WM PEIS. The site-specific nature of environmental restoration activities is due partly to their dependency on decisions regarding future-use plans and cleanup agreements. Such decisions involve input from State and local governments, as well as EPA, and were evolving at different rates during the WM PEIS process.

The term "anticipated waste volumes" is used in the WM PEIS to refer to projected volumes of waste management waste to be generated by DOE sites. While DOE has generated substantial data on environmental restoration waste volumes at some sites, it has much less at others. Appendix B in Volume III discusses the factors in estimating the amount of environmental restoration waste that might be managed at waste management facilities. DOE expects the Department-wide estimates provided in Appendix B would change as the environmental restoration and decontamination and decommissioning activities progress. However, the impacts of future environmental restoration activities at each of the major sites have been incorporated into the cumulative impact analysis where that information is available in existing NEPA documents or in CERCLA or RCRA program documents (see Volume I, Chapter 11).

DOE believes the elimination of the environmental restoration alternatives from the original scope of the PEIS did not compromise the programmatic decisions to be made based on the waste management analyses. The WM PEIS has been prepared in accordance with NEPA and CEQ implementing regulations, which recognize that NEPA reviews might be warranted for individual agency programs due to timing or the need for specificity or in-depth analysis.

Although the WM PEIS will not be used to inform decisions about DOE's Environmental Restoration Program, DOE's projection of the environmental restoration waste for which responsibility could be transferred to the Waste Management Program was considered in the WM PEIS to determine whether it could affect the decisions to be made based on the WM PEIS. The Final WM PEIS provides updated information on environmental restoration waste volumes and their disposition. DOE has determined that, while the transfer of responsibility for some environmental restoration waste to the Waste Management Program could affect waste management activities at specific sites, it is not expected to affect the basis for comparison of the WM PEIS alternatives.

Environmental restoration activities at DOE sites consist mainly of CERCLA actions. Pursuant to the 1994 DOE Secretarial NEPA Policy, DOE will rely on the CERCLA process for environmental review of actions to be taken under CERCLA, and will address NEPA values and public involvement procedures in its CERCLA processes to the extent possible. However, NEPA reviews are undertaken for siting, construction, and operation of treatment, storage, and disposal facilities that, in addition to supporting CERCLA actions, also serve as waste management facilities. DOE might also, after consultation with stakeholders and as matter of policy, integrate the NEPA and CERCLA processes for other specific proposed actions. DOE will conduct NEPA reviews of non-CERCLA related, site-specific environmental restoration activities, where appropriate.

During each stage of environmental restoration from characterization of contaminated media to final remediation, waste might be generated. The projected volumes of waste that reasonably might be generated by environmental restoration were analyzed by each DOE site during development of the BEMR. These analyses included consideration of treatment, storage, and disposal capabilities, specific restoration requirements, and negotiations with State and Federal regulatory agencies in order to estimate how much of the contaminated media would need to be managed as waste. Estimates and descriptions of total quantities of the contaminated media to be managed, and the wastes that will be generated during environmental restoration, are contained in Volume III, Appendix B. Although most wastes that are generated as a result of DOE's environmental restoration activities would be managed outside of the alternatives evaluated in the WM PEIS, a subset of the wastes generated by environmental restoration could be transferred for management in facilities evaluated in the WM PEIS. However, given the incomplete information about the final volumes and contaminant composition of the transferred wastes, it was not practical to analyze the potential impacts of managing these wastes in the WM PEIS.

Comment (3422)

A number of commentors stated that the WM PEIS is totally inadequate if it fails to disclose the quantities of and consider the impacts of environmental restoration waste that might be shipped to Hanford for treatment or disposal. One commentor added that the waste and materials that have been present at Hanford for years still are not properly vitrified or stored. Another commentor noted that Hanford has "a minuscule portion of known waste from all the nuclear weapons sites in this PEIS" and is concerned that decisions from the PEIS will set precedent without having considered environmental restoration waste.

Response

Environmental restoration alternatives were included in the original scope of the analysis for the PEIS, but DOE subsequently determined that cleanup activities are primarily site specific and cannot appropriately be addressed at the programmatic level. Accordingly, consideration of programmatic environmental restoration cleanup strategies were removed from the PEIS in February 1995. Volume I, Section 1.7.1 discusses this modification in scope regarding environmental restoration activities.

As presently modified, the WM PEIS analyzes alternative configurations for waste management sites (those required to treat, store, or dispose of inventory wastes and wastes that will be generated in the future as a result of DOE operations). While this document does not analyze environmental restoration alternatives, it does contain information on the anticipated waste volumes generated as a result of environmental restoration activities. Updated estimates on management approach for environmental restoration are given in Volume III, Appendix B of the PEIS, and are used to qualitatively ascertain the extent to which environmental restoration wastes that are transferred into the Waste Management Program could affect programmatic waste management alternatives. Specifically, for each major site, including the Hanford Site, there is information given about the projected environmental restoration actions and resultant waste volumes that would be generated at the site. Sections 6.15, 7.15, and 8.15 summarize these data as well. The transfer of environmental restoration waste is not expected to affect the basis for comparison of WM PEIS alternatives.

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The volumes presented in Appendix B are based on current planning assumptions and, in many cases, decisions on final disposal locations are yet to be made using the CERCLA and/or RCRA processes underway at each site.

Volume I, Chapter 11, presents the cumulative impacts by site from many different programs. Environmental restoration activities have been considered to the extent possible, including the potential impacts of the preferred alternatives in the Hanford Remedial Action Draft EIS and the Final Tank Waste Remediation System EIS.

Comment (3655)
It is difficult to believe the assumption that impacts relating to capacity and processing rates with regard to the environmental restoration (ER) waste treated after the 10-year period for the waste management transuranic waste (TRUW) loads would be "less than those anticipated for waste management TRUW," (WM PEIS p. 8-80) especially in light of the following:

- That less than one-fourth of the environmental restoration release sites have been fully characterized; therefore the extent and type of contamination is largely unknown. (WM PEIS p. 8-77);

- DOE projects that only RFETS, SRS, and ORR will have environmental restoration TRUW requiring treatment at waste management facilities when transuranic materials were used at the majority of DOE sites prior to 1970;

- and that, historically, DOE waste management practices have not been particularly environmentally sensitive.

Response
More recent data on projected ER waste volumes have been received since publication of the Draft WM PEIS. These updated data are contained in the revised Appendix B. The discussions in Volume I, Sections 6.15, 7.15, and 8.15 of the effects of projected ER waste volumes have been updated accordingly. Only SRS would have higher volumes of ER TRUW than waste management TRUW. The updated data also indicate that, of the major sites analyzed in the WM PEIS; ANL-E, the Hanford Site, INEL, ORR, RFETS, and SRS would transfer ER TRUW to waste management facilities. This information is contained in the revised Appendix B.

As indicated in Table B.5-3, Appendix B, in Volume III of the WM PEIS, most of the total volume of ER TRUW will be transferred to waste management facilities. The total volume of ER TRUW is expected to be less than the total waste management TRUW volume.

Section 8.15 in Volume I of the WM PEIS states that in order to analyze the effect of ER wastes on TRUW decisions, DOE compared (1) the most current projection of ER wastes for which responsibility would be transferred to the Waste Management Program for treatment to (2) the volume of waste management wastes used in the WM PEIS analyses. Because radiological activities and chemical concentrations of ER transferred waste are, in general, expected to be lower than those of comparable waste management waste, risks from additional ER transferred wastes are expected to be lower than the risks resulting from the treatment of equivalent volumes of waste management wastes.

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Comment (3729)
The WM PEIS fails to disclose that Hanford's "clean" environmental restoration wastes will require the sacrifice of 1,791 football fields worth of land and habitat for landfills.

Response
Environmental restoration activities are beyond the scope of the WM PEIS. These activities are addressed in detail in the Draft Hanford Remedial Action EIS, published September 1996, as well as through cleanup actions taken under CERCLA. However, Appendix B in Volume III of the WM PEIS presents the total estimated volumes of environmental restoration waste at the Hanford Site, as well as the expected disposition of these volumes (see Tables B.5-1, B.5-2, and B.5-3).

Cumulative impacts of land-use requirements at the Hanford Site are presented in Volume I, Section 11.6. This includes cumulative impacts of current activities and reasonably foreseeable future activities. Environmental restoration activities are considered to the extent possible.

Comment (3930)
The WM PEIS should consider buried transuranic waste (TRUW) because buried TRUW constitutes the most urgent and serious of TRUW problems.

Response
The WM PEIS evaluation of TRUW included analysis of material placed in "retrievable" storage since 1970. Pre-1970 TRUW, known as "buried TRUW," was not included in the analysis. This buried waste is considered environmental restoration waste and will be managed in accordance with CERCLA and RCRA. Section 8.15 in Volume I and Appendix B in Volume III of the WM PEIS contain information regarding TRUW generated as a result of environmental restoration activities (including retrieval of pre-1970 TRUW) and the extent to which these waste volumes could affect the basis for comparison of the WM PEIS alternatives.

Comment (3969)
Commentors questioned apparent discrepancies between environmental restoration low-level waste volumes in the WM PEIS and other sources. One commentor asked DOE to explain the variance (14,518,000 cubic meters) between the environmental restoration low-level waste volumes reported in the 1995 Baseline Environmental Management Report and the environmental restoration waste volumes reported in the WM PEIS, and provide the documentation to support the numbers derived from Baseline Environmental Management Report that correspond with the WM PEIS. Commentors questioned the estimated 87,000 cubic meters of environmental restoration low-level waste at FEMP. One commentor stated that the WM PEIS estimates 87,000 cubic meters of FEMP environmental restoration low-level waste for disposal, which conflicts with the Fernald Citizens Task Force 1995 report estimates of 2,352,796.5 cubic meters of waste. What is the source of the WM PEIS estimate? Another commentor inquired whether the 87,000 cubic meters of environmental restoration low-level waste was the number used in the dose calculations and Appendix E, Transportation, and if so, how or when would these calculations be recalculated to include the actual volumes of waste at FEMP?

Response
At the time the Draft WM PEIS was prepared, scant data were available on the expected amounts of environmental restoration wastes that would be managed in waste management facilities. For Appendix B of the Draft WM PEIS, the volumes of environmental restoration wastes were estimated by

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using the Baseline Environmental Management Report database and internal working documents developed for the Baseline Environmental Management Report. DOE substantially revised the WM PEIS to include updated information from the data used for the 1996 Baseline Environmental Management Report.

This updated information identifies a total of 2,500,000 cubic meters of environmental restoration low-level waste at FEMP, with 180,000 cubic meters of the total to be transferred to waste management facilities (see Table B.5-1 in Appendix B).

Only waste generated from waste management activities was analyzed in the WM PEIS. As a result, the volume of environmental restoration low-level waste at FEMP for which responsibility will remain in the Environmental Restoration Program was not considered in the dose calculations and transportation estimates.

Comment (3976)
At what point will the volume of waste at FEMP that meets the waste acceptance criteria (1,804,150.2 cubic meters) for disposal onsite in the engineered disposal cell be considered to fall under the Waste Management Program, given that DOE will be responsible for this disposal cell for perpetuity?

Response
As presently envisioned, the Environmental Restoration Program will retain responsibility for the onsite engineered disposal cell at FEMP--it will not fall under the Waste Management Program.

Comment (3978)
FEMP Operating Unit 1 contains approximately 480,321.72 cubic meters of low-level waste to be transported by rail and disposed of at a commercial facility located in Utah. This is a major transportation undertaking, yet it does not appear to be included in the WM PEIS.

Response
All of FEMP's estimated low-level waste volume is generated from environmental restoration activities. Waste from environmental restoration activities was included in the original scope of the WM PEIS, but DOE subsequently determined that cleanup activities were primarily site-specific and were not appropriate for decisions at the programmatic level. Accordingly, the consideration of programmatic environmental restoration strategies was removed from the WM PEIS in January 1995. Section 1.7.1, in Volume I of the PEIS discusses the modification of the scope of the WM PEIS.

The decision to ship waste from FEMP Operating Unit 1, the Waste Storage Area, to a commercial disposal facility was made in March 1995 under the CERCLA process. The transportation impacts were analyzed in the associated CERCLA documents that were made available to the public and remain in the FEMP Administrative Record.

Volume I, Chapter 11, presents cumulative impacts by site from many different programs. To the extent possible, environmental restoration and existing operations have been considered.

Comment (3994)
In Tables 7.15-1, 7.15-2, and 7.15-3, disposal alternatives are listed by chart comparisons for 16 disposal sites, 6 disposal sites, and 1 disposal site. Waste management treatment at Portsmouth is

constant for the three alternatives--97,000 cubic meters to be treated at this site. I am confused that under Table 7.15-1, all sites treat; 16 dispose. Portsmouth is listed for disposal of 290,000 cubic meters of environmental restoration waste, and disposal of 200,000 cubic meters of waste management low-level waste. How can "all sites treat and 16 dispose" result in such an increase in the amount of low-level waste scheduled for disposal at the Portsmouth Plant? The "6 sites dispose" and "1 site disposes" alternatives list no environmental restoration waste at Portsmouth. Could DOE please provide detailed information on how these figures were calculated?

Response

Environmental restoration waste volumes have been updated in the Final WM PEIS. Section 7.3.2 in Volume I shows that under the Decentralized Alternative, Portsmouth would dispose of wastes from 5 of the 27 offsite generators; Bettis, Knolls Atomic Power Laboratory, Princeton Plasma Physics Laboratory, Mound, and RMI Titanium Company. These sites contribute more than half of the volume of waste management wastes for management at the Portsmouth Plant. Table B.7-1 in Volume III shows that under the Decentralized Alternative, the Portsmouth Plant would manage 97,000 cubic meters of waste management low-level waste, and 190 cubic meters of environmental restoration low-level waste. The Portsmouth Plant itself will generate 730,000 cubic meters of environmental restoration low-level waste (see Table B.5-1). The majority of this waste will be managed within the Environmental Restoration Program.

10. Compliance with Laws and Established Agreements and Plans

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(No comments were received for this section)

10.1 Regulatory Compliance

Comment (221)
What is the regulatory relationship between DOE and NRC; are they cooperating agencies? Which agency regulates reactors? What are the criteria for regulating nuclear reactors?

Response
For purposes of the WM PEIS, NRC and DOE are not cooperating agencies. In general, NRC and DOE regulatory powers regarding radiological and nuclear safety are independent of each other. NRC regulates commercial use of atomic energy and radioactivity, including power reactors and non-DOE research reactors; DOE regulates its own use of atomic energy and radioactivity, including the nuclear reactors on its sites. There are a few DOE activities that, by statute, are regulated by NRC. For example, pursuant to the Nuclear Waste Policy Act of 1982, NRC will license the geological repository where DOE will dispose of high-level radioactive waste. This PEIS is concerned with waste management and regulation of nuclear reactors is outside its scope.

The regulation of nuclear reactors by DOE and NRC has the same objective--to help ensure that nuclear reactors operate safely and do not pose undue radiological risks to the public or to onsite workers. NRC regulates non-DOE reactors. The regulation of nuclear reactors by NRC is in accordance with the rules found in 10 CFR Part 50. One of the means used to regulate nuclear reactors is to impose criteria governing their design. NRC's 64 general design criteria are found in Appendix A to 10 CFR Part 50. These design criteria fall into six main categories: (1) overall requirements; (2) protection by multiple fission product barriers; (3) protection and reactivity control systems; (4) fluid systems; (5) reactor containment; (6) fuel and radioactivity control. DOE has similar design criteria for its reactors, which are documented in DOE Order 5480.3.

Comment (222)
Does anyone in the nuclear community monitor small radiation sources or is it left only to the Town Zoning Board?

Response
NRC has regulatory jurisdiction over small commercial radiation sources, although some States have agreements with NRC to assume this regulatory responsibility (Agreement States). To possess such sources, NRC and Agreement States require owners of such sources to have licenses that include conditions to help ensure that the public is not endangered by the sources, and that the sources are properly disposed. NRC or the Agreement State will terminate the license if the licensee does not comply with the terms of a license. DOE has regulatory authority for DOE sites. DOE Order 5400.5 and regulations found in 10 CFR Part 835 provide the standards for radiation protection at DOE sites.

Comment (392)
Disposal decisions should go through the NRC siting process because DOE cannot credibly act as its own regulator in siting nuclear and hazardous waste disposal facilities. Actions that DOE takes must comply with Federal and State laws and must be subject to oversight by the State. Self-regulation by DOE has not worked and we will not allow it to continue.

Response
The WM PEIS is DOE's national strategy for the safe and efficient management of its radioactive and hazardous waste. While the WM PEIS identifies waste management options, it does not actually site waste management facilities.

10.1 Regulatory Compliance

Hazardous, radioactive, and mixed waste management have differing requirements established by State and Federal laws. DOE's hazardous and mixed waste management (treatment, storage, and disposal) facilities are subject to the same Federal and State laws as private waste management facilities. Management of hazardous waste and the hazardous portion of mixed waste are regulated by the Resource Conservation and Recovery Act (RCRA) and corresponding State acts. The EPA and corresponding State regulatory agencies closely regulate DOE's waste management facilities.

Both NRC and EPA regulate radioactive waste disposal; their requirements are very similar. Any DOE radioactive waste disposal facilities will be sited and operated in accordance with all applicable requirements. DOE does not operate hazardous waste disposal facilities at this time, nor does the WM PEIS suggest that it will.

In January 1996, the Secretary of Energy's Advisory Committee on External Regulation of Department of Energy Nuclear Safety issued a report. *Improving Regulation of Safety at DOE Nuclear Facilities,* recommended external regulation of DOE facilities and operations. The Secretary created a Workgroup, including representatives of other Federal agencies, to review the Advisory Committee recommendations and provide recommendations for implementing external regulation of DOE nuclear safety.

Comment (1146)
The Draft WM PEIS uses existing regulatory standards and does not consider the effects of a different waste classification system based on hazard. The Draft WM PEIS also does not consider the effects of a different regulatory regime, even though you have appointed an advisory committee to make such recommendations. As a result, the Draft WM PEIS does not include all reasonable alternatives, as required by NEPA.

Response
The evaluation of the effects of a different waste classification system based on hazard rather than existing statutory definitions would be highly speculative and impossible to meaningfully analyze. The effects of a waste classification system based on hazard would depend on the features of that system and how they differ from the existing regulatory standards. It is outside the scope of the WM PEIS to analyze a change in the waste classification system. Without a proposed change in the classification system, it would be highly speculative to assess the impact of an abstract waste classification based on hazard.

The DOE advisory committee on external regulation has recommended external regulation of DOE facilities, but has not recommended whether the NRC or the Defense Nuclear Facilities Safety Board should be the regulatory agency.

Sections 1.7.3 and 3.5 in Volume 1 address the definition of alternatives. The sites identified in each alternative configuration were chosen for evaluation based on the volume of waste they had in inventory, the amount of waste they were expected to generate in the future, the waste origin and characteristics, and the waste facilities at each site.

10.1 Regulatory Compliance

Comment (1509)
The WM PEIS did not adequately address the impact of making Lawrence Livermore National Laboratory's (LLNL's) Site 300 a disposal facility on its Superfund cleanup status. The PEIS should discuss the impacts on cleanup, and on risk levels of putting a dump there that would accept new waste.

Response
If DOE selects LLNL as a waste management site as a result of the WM PEIS analysis, DOE would need to conduct a site-specific NEPA study that would examine where to site specific facilities. If a new waste management facility was to be selected at Site 300, this would not affect the site's listing as a National Priorities List site. Any new facility would be designed and located such that existing operations and areas of contamination would not be affected.

DOE expects that health risks from new disposal facilities would not add to health risks associated with existing contamination because (a) waste management workers employed at a new disposal facility would be different workers than those who work at remediation activities; (b) waste management facilities would be geographically separated from environmental restoration sites; and (c) environmental restoration sites are being contained and remediated and should not result in a substantial long-term health risk.

Chapter 11 in Volume I of the WM PEIS addresses cumulative impacts. To the extent that impacts from environmental restoration areas are known, they have been identified, along with identified impacts from other programs. Cumulative impacts are a consideration for DOE in making waste management decisions.

Comment (1673)
Rail transportation could reduce concerns about the environmental management activities in Nevada. Currently, truck shipments travel primarily through the largest cities in Nevada and then to the Nevada Test Site (NTS) due to routing restrictions imposed by U.S. Department of Transportation regulations. Rail shipments could allow greater DOE discretion in the development of alternative routes that could avoid these areas, because currently there are no rail routing regulations.

Response
The commentor's preference for rail shipments over truck is noted. Although rail shipments appear to result in a lower number of estimated fatalities in comparison to truck shipments, analyses presented in Volume IV, Sections E.7 and E.17, indicate that the risk of transportation operations generally are small for both modes. A discussion of uncertainties involved when comparing the truck and rail transportation impacts is presented in Appendix E, Section E.8.5. Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process described in Section 4.3.10, in Volume I of the WM PEIS. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses. DOE will continue to work with States, regional entities, and carriers during large shipping campaigns to ensure that safe routing alternatives and safe havens are utilized.

Comment (1816)
DOE has developed waste acceptance criteria for the Nevada Test Site (NTS), but these criteria are not based on a completed performance assessment clearly delineating the type and character of the wastes that can be disposed of at either the Area 3 or the Area 5 radioactive waste management sites. This

means that DOE is not only out of compliance with the requirements of NEPA, but is also in violation of its own waste management order (5820.2A, Chapter III, a and b).

Response
On September 8, 1994, the Defense Nuclear Facilities Safety Board issued Recommendation 94-2, which concluded that the DOE's low-level waste (LLW) program had not kept pace with the evolution of commercial practices, and that no DOE LLW disposal facilities had completed the radiological performance assessments that are required by DOE Order 5820.2A. In its response to the Defense Board recommendations, DOE submitted to the Defense Board a revised Implementation Plan in May 1996. The objective of the plan is to improve the LLW management system so that performance assessments are written and are approved, demonstrating that DOE LLW disposal facilities meet DOE Order 5820.2A objectives. In addition, the performance assessments will assure that all appropriate LLW is included in the evaluation and that LLW is disposed of with a margin of safety adequate to protect workers, the public, and the environment.

As part of the implementation of Defense Board Recommendation 94-2, DOE has a schedule for completing performance assessments at all sites. Under this schedule, the performance assessment (including the composite analyses for interacting source terms) for NTS Areas 3 and 5 would be completed by March 1998 and September 1999, respectively. The performance assessment for Area 5, without the composite analysis, has already been reviewed by DOE Headquarters. It should be noted that the performance assessments will be updated periodically through the performance assessment maintenance program, and all additional wastes disposed of since the last update are considered.

Neither the basis for DOE's waste acceptance criteria nor the status of the performance assessments affect DOE's compliance with NEPA.

Comment (1821)
All solid and hazardous waste must be managed in accordance with all applicable Federal, State and local environmental regulations. The Norfolk Naval Shipyard currently holds a permit to operate as a hazardous waste storage facility. If change in the type or quantity of hazardous waste is anticipated, the current permit might have to be modified, or an additional permit might have to be obtained.

Response
DOE is not responsible for the management of hazardous waste at Navy facilities, such as the Norfolk Naval Shipyard. This is in contrast to radioactive waste, for which DOE has management responsibilities. The 11 sites analyzed in the WM PEIS accounted for more than 90% of DOE's hazardous waste generated in 1992. Although only 11 sites were analyzed, the decisions for hazardous waste related to the WM PEIS apply to all DOE sites.

Comment (2061)
Facilities managing hazardous waste and low-level mixed waste must comply with air emission standards of the Clean Air Act and RCRA. As of December 6, 1995, all facilities managing hazardous waste and low-level mixed waste in containers, tanks, surface impoundments, and miscellaneous units must comply with 40 CFR 264, Subparts AA, BB, and CC. The WM PEIS should reflect this.

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Response

DOE revised Section 6.5 in Volume I and Section C.4.2.1.1 in Volume III of the WM PEIS to describe the additional RCRA and Clean Air Act emissions standards contained in 40 CFR Part 264, Subpart AA (air emissions from process vents), Subpart BB (air emissions from process leaks), and Subpart CC (air emissions of volatile organic compounds from tanks, surface impoundments, and containers).

Comment (2063)

Some sites might manage their own as well as other sites' low-level waste and low-level mixed waste. The Final PEIS should clarify that such alternatives will not interfere with the sites' Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) activities, both geographically and programmatically.

Response

DOE revised the environmental restoration sections in the Summary document and in Section 1.8.2 in Volume I of the WM PEIS to include a statement that the decisions made based on the WM PEIS should not interfere with remediation activities at individual sites. The Final WM PEIS reflects DOE's intent to vigorously pursue environmental restoration plans independent of the Waste Management Program, and notes that excess waste management capacity would be available for treating certain environmental restoration wastes.

Comment (2287)

We are afraid that Congress will exempt DOE and the contractors who work at Hanford from any kind of accountability for compliance with environmental regulations and other laws.

Response

DOE and its contractors must comply with all applicable laws and regulations. Section 1.4 in Volume I of the WM PEIS provides a description of consultations, laws, and requirements that apply to DOE's Waste Management Program. DOE encourages the public to stay informed about environmental laws and regulations, and to report incidents of noncompliance with the law to the appropriate authorities.

Comment (2297)

Any facility or process DOE chooses to store, treat, process, or dispose of waste must comply with all existing Federal, State, and local laws. DOE should not wait for laws to be changed by the new Congress. DOE must also honor Tribal rights guaranteed by treaty.

Response

DOE must comply with all applicable treaties, Federal, State, and local laws and regulations related to the WM PEIS waste management decisions. The WM PEIS considers the legal requirements as they now exist; projecting possible changes to the law would be speculative. Section 1.4 in Volume I of the WM PEIS, Consultations, Laws, and Requirements, provides a more detailed description of the Federal laws with which DOE must comply. In addition to the Federal laws, DOE must also comply with applicable State and local laws and ordinances. DOE has revised Section 1.4 to more clearly acknowledge DOE's obligation to honor Tribal rights. Local governments generally have the greatest control over real property, zoning, emergency response, and other local matters. Some of the local requirements are not applicable to DOE's operations; however, this determination must be made on a case-by-case basis.

DOE agrees that it is inappropriate to delay needed programmatic waste management decisions based on speculation concerning future legislation.

Comment (2331)
It is not clear what authority issues the permits (Tennessee, NRC, EPA, etc.), on what basis permits are approved, and what independent oversight of performance is in place at Oak Ridge National Laboratory (ORNL).

Response
The WM PEIS, which is intended to help DOE make broad programmatic waste management decisions, does not analyze the jurisdictions and functions of each authority that administers environmental laws or that issues permits. Any permit for ORNL would be approved based on the applicable regulations for that site.

DOE is aware that Tennessee is an "Agreement State" for purposes of accepting delegations of authority from NRC under the Atomic Energy Act. Tennessee is also an "Authorized State," meaning it has authority to administer its hazardous waste laws, which are at least as stringent as the Federal regulations. Both NRC and EPA retain some regulatory oversight authorities over Tennessee's enforcement of the Atomic Energy Act and RCRA.

These delegations authorize Tennessee to issue various permits and take other actions that would otherwise be the responsibility of Federal agencies. The authority of NRC over activities of the DOE and its contractors is limited in scope (and, thus, authority delegated from NRC to Tennessee under the Atomic Energy Act is similarly limited). In general, NRC's authority to regulate DOE activities is limited to express statutory grants such as licensing high-level waste repositories under authority of the Nuclear Waste Policy Act, which is not relevant to Tennessee. DOE, under the Atomic Energy Act, is the authorized agency for radioactive material management at DOE facilities. DOE Orders are the means to implement this authority.

The State of Tennessee has broad RCRA authority from EPA over hazardous waste matters. Tennessee has issued permits for treatment, storage, and disposal to DOE for its hazardous and mixed waste management activities at its facilities near the City of Oak Ridge--Y-12, K-25, and ORNL.

In Tennessee, State and local permitting agencies have authority to issue air emission permits pursuant to the Clean Air Act. The State of Tennessee is authorized to issue water discharge permits according to the Clean Water Act. Toxic Substances Control Act authority resides exclusively in EPA.

In addition to licensing and permitting activities of the State government, independent oversight of DOE facilities in Tennessee was facilitated through an agreement in principle that provides funding for that State's oversight of DOE's waste management. Also, a State of Tennessee/DOE Monitoring and Oversight Agreement was signed May 13, 1991, for operations in the ORNL area. This agreement is intended to assure Tennessee citizens that their health, safety, and environment are being protected in ongoing cleanup activities and emergency response efforts, and the agreement is available to the public at the DOE Information Resource Center in Oak Ridge.

The agreements assist DOE in complying with all applicable laws, regulations, and Orders. The State's roles according to the agreements are to (a) establish programs for environmental monitoring,

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emergency response, and project oversight; and (b) promote a better understanding by the public and local governments of past and present operations at the DOE facilities and their impacts on human health and the environment.

Comment (2438)
In 1993, the State of Idaho, Idaho National Engineering Laboratory (INEL) Oversight Program reviewed DOE low-level waste (LLW) disposal practices at INEL against NRC requirements in 10 CFR 61. While INEL operations were largely in accord with the requirements of DOE Order 5820.2A, those requirements are less stringent than NRC requirements. Plans to upgrade LLW disposal practices at INEL and through the revision of DOE Order 5820.2A have been placed on hold pending DOE's response to Defense Nuclear Facilities Safety Board Recommendation 94-2, which also seeks to upgrade DOE LLW management. This is unacceptable. DOE must begin work immediately to upgrade its disposal of LLW to civilian and international standards at both existing and planned facilities.

Response
Appendix H of the Savannah River Site Waste Management Final EIS (1995) contains a comparison of LLW requirements of DOE Order 5820.2A and NRC regulations in 10 CFR 61. This appendix states that apart from the licensing procedural elements of NRC regulations, the most substantial distinctions between the requirements of NRC and DOE affecting the disposal of low-level radioactive waste are in the specificity of NRC regulations in 10 CFR 61, which are not reflected in DOE Order 5820.2A. To a considerable extent, that is the result of the formal regulatory process prescribed for NRC and its licensees. Additionally, the more general nature of the DOE Order reflects the greater flexibility required to manage the diversity of waste materials and forms which are produced by the wide variety of missions and activities carried out by and for DOE, as well as the broad range of existing DOE site characteristics that are not reflected at likely licensed disposal sites.

Despite these distinctions, the performance objectives specified for the protection of the public and workers from the operation of low-level radioactive waste disposal facilities are essentially identical, and the means specified for demonstrating compliance (i.e., performance assessments) are also essentially identical in approach. Accordingly, there are no substantive differences in the degree of protection afforded public health and safety inherent in the different agency regulations.

DOE is required by existing law (Atomic Energy Act) to regulate its low-level radioactive waste disposal activities. A change in regulatory authority for these activities would constitute a major change in approach, including changes in legislation. Such considerations are beyond the scope of this PEIS.

DOE has established a task force to address Defense Nuclear Facilities Safety Board Recommendation 94-2 and a workgroup to address associated disposal issues, including updating DOE Order 5820.2A. This comment has been forwarded to them for their considerations. As described in Section 1.8.2 in Volume I of the WM PEIS as part of Defense Nuclear Facilities Safety Board Recommendation 94-2, DOE has undertaken a Department-wide review of its LLW management system. The review report and site-specific assessment reports serve as the basis for identifying corrective actions to address safe disposition of past, present, and future volumes of LLW. Each site is responsible for identifying and developing the corrective actions necessary to address the site-specific vulnerabilities identified in their respective site-specific assessment reports. Additionally, the Department-wide vulnerabilities identified in the Department-wide review report require DOE to identify and develop corrective actions. While the report might include recommendations, the corrective actions will be addressed by DOE management as followup to the review. The final Department-wide review report, available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS, was published April 30, 1996, and will be used in conjunction with the WM PEIS in making decisions about the configuration of waste management activities.

Comment (2548)
Volume II, Page 15, Paragraphs 2 and 3. The last sentence of Paragraph 2 states that an entity exceeding the General Conformity Rule Limits in a nonattainment area must first obtain a permit. That is not true. For the State of Idaho, IDAPA 16.01.01.204 discusses the permit-to-construct requirements for major facilities or major modifications in nonattainment areas. The first sentence of Paragraph 3 states that only new sources are regulated. That is also not true. All sources operating in the State of Idaho are regulated by the State rules and Federal regulations. This statement is also made in Volume I, Page 6-67, Paragraph 2.

Response
DOE has revised Section 1.4 in Volume II of the WM PEIS to indicate that a Federal entity that seeks to engage in an activity that will result in emissions equal to or greater than those limits in a nonattainment area, in addition to obtaining a New Source Review permit, must also conduct a formal conformity determination.

DOE also has revised Section 1.4 in Volume II and Section 6.5 in Volume I of the WM PEIS to clarify that all stationary sources in attainment areas that are emitting pollutants at levels above the regulatory limits are subject to prevention of significant deterioration regulation. In nonattainment areas, new stationary and mobile (e.g., construction equipment) sources are regulated under the General Conformity Rule. Those entities that would exceed emissions limits under the General Conformity Rule must obtain a permit.

Comment (2584)
Draft WM PEIS Summary document, Section 7.2.5. How is centralization at West Valley Demonstration Project (WVDP) inconsistent with the West Valley Demonstration Project Act?

Response
The West Valley Demonstration Project Act (Public Law 96-368), enacted in 1980, authorizes DOE to demonstrate that solidification can be used to prepare high-level waste for disposal at the Western New York Nuclear Service Center near West Valley, New York.

The WM PEIS high-level waste Centralized Alternative involves storage of all high-level waste canisters at a single location. The activities that are allowed at the WVDP are defined in Section 2(a) of the WVDP Act. These activities involve demonstrating solidification techniques that can be used for preparing high-level radioactive waste for disposal. As defined in Section 4(b) of the Act, "high-level radioactive waste" is limited to high-level radioactive waste produced by the reprocessing at WVDP of spent nuclear fuel. Thus, the solidified high-level waste produced at INEL, the Hanford Site, and the Savannah River Site (SRS) would not be high-level radioactive waste within the definition of the WVDP Act because it was not produced by reprocessing of spent nuclear fuel at WVDP. The WVDP Act does not authorize any activities, including storage, of waste from other sites.

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Comment (2652)
Volume IV, Section E.12.4. Reliance on EPA reference concentration values and U.S. Department of Transportation poison inhalation hazards designations as the *sole* criteria for the selection of chemicals of concern is not a sound practice.

Response
The transportation accident analysis for wastes containing hazardous chemicals evaluated both the potential acute and chronic toxic effects resulting from the releases of these materials. Potentially acutely toxic compounds were assumed to be gases and liquids identified by the U.S. Department of Transportation as poison inhalation hazards and those identified by EPA as inhalation toxicants. Gases and low-boiling point liquids have the greatest potential dispersion following an accident. In addition, chemicals selected for analysis must be characterized for potential toxicity. The chemicals identified by the U.S. Department of Transportation and EPA satisfy these criteria and include most of the compounds of interest for the hazardous and mixed wastes evaluated in the WM PEIS.

Comment (2795)
DOE states that it must obtain permits for disposal facilities either from EPA or from States delegated the authority under RCRA by EPA. The State of New York is in the process of receiving that authority. Therefore, the WM PEIS should be subject to the State of New York expression of RCRA.

Response
DOE must comply with applicable laws. Facility permitting would be subject to the appropriate RCRA permitting authority at the time DOE seeks to locate new facilities. The State of New York has been given full RCRA authority.

Comment (2796)
Prohibitions regarding disposal of hazardous waste and radioactive waste in 6 NYCRR Parts 373 and 374 and 6 NYCRR Parts 382 and 383, respectively, also appear to restrict disposal of radioactive and hazardous wastes at BNL.

Even if DOE was exempt from New York State statutes and regulations pursuant to NY ECL 27-0704 regarding radioactive or hazardous wastes, the Long Island Landfill Law would still preclude disposal of these materials at BNL and BNL would be prohibited from disposing of low-level waste and low-level mixed waste onsite.

Response
NEPA requires Federal agencies to analyze reasonable alternatives to a proposed action, even alternatives that might not comply with all regulatory requirements. DOE will comply with applicable laws in its management of low-level waste and low-level mixed waste at BNL, or any site.

As stated in Section 2.15.2.2 of the WM PEIS Affected Environment Technical Report, BNL has been identified as being over a deep recharge zone for the lower aquifer system. About two-fifths of the recharge from rainfall moves into the deeper aquifers. If DOE were to select BNL to host new waste management facilities, site-specific NEPA reviews would consider this and other issues. While the State of New York does prohibit siting of radioactive disposal sites over the Long Island Aquifer per 6 NYCRR Part 382.22(b)(2), DOE and its contractors are exempt from this regulation, in accordance with 6 NYCRR Part 380-1.2(e) and (f). BNL is not being considered for hazardous waste disposal, and does not infringe on the requirements of 6 NYCRR Parts 373 and 374.

Comment (2797)
In 1993, New York State, pursuant to ECL Article 57-0101 *et seq.*, created the Long Island Pine Barrens Reserve on Long Island. ECL 57 preserves and protects undeveloped regions of the Deep Recharge zones in order to maintain water quality on Long Island. BNL is located completely within the New York State Central Pine Barrens. In fact, much of BNL is located within the Core Preservation Area of the Central Pine Barrens, in which generally complete preservation is required. New disposal and treatment activities at BNL would be incompatible with the spirit and intent of this law.

Response
BNL is located within an area designated by the Pine Barren Protection Act as "Compatible Growth Area" and "Core Preservation Area." A Compatible Growth Area is that portion of the pine barrens that has been designated to be compatible for limited development. The Core Preservation Area is the area designated to receive greater protection from development.

BNL considers impacts to the pine barrens in all project-level NEPA reviews. Additionally, the Central Pine Barrens Planning Commission is consulted with for many activities at BNL and is given the opportunity to comment on environmental assessments prepared under NEPA. Also, NYSDEC considers the pine barrens during various permit actions. This type of open communication between DOE, BNL, NYSDEC, and the Central Pine Barrens Planning Commission will continue.

Comment (2923)
In the WM PEIS descriptions of low-level wastes ("These wastes are subject to provisions of the Atomic Energy Act"), add the phrase "which allows DOE an exemption from external regulation of these wastes."

Response
DOE has not made the suggested change because the WM PEIS does not specifically identify low-level waste as being subject to the Atomic Energy Act. Rather, it states that DOE must comply with the Atomic Energy Act in managing all of its radioactive waste. The EPA and corresponding State regulatory agencies closely regulate DOE's waste management facilities. Both NRC and EPA regulate radioactive waste disposal; their requirements are very similar. Any DOE radioactive waste disposal facilities will be sited and operated in accordance with all applicable requirements.

In January 1996, the Secretary of Energy's Advisory Committee on External Regulation of Department of Energy Nuclear Safety issued a report, *Improving Regulation of Safety at DOE Nuclear Facilities*, recommending external regulation of DOE facilities and operations. The Secretary created a workgroup, including representatives of other Federal agencies, to review the Advisory Committee recommendations and provide recommendations for implementing external regulation of DOE nuclear safety.

Comment (3152)
The WM PEIS does not provide information needed to meet the legal requirements of the Waste Isolation Pilot Plant (WIPP) Land Withdrawal Act because it fails to describe and analyze various

10.1 Regulatory Compliance

alternatives for the disposal of all transuranic waste (TRUW) by (1) excluding pre-1970 TRUW, which amounts to 141,100 cubic meters; and (2) not discussing in another NEPA document its proposal for disposal of all TRUW.

Response
The WM PEIS analyzes alternatives for treating and storing post-1970 defense transuranic waste generated after 1970 preparatory to disposal in a geologic repository. These alternatives are not subject to the WIPP Land Withdrawal Act, which is a regulatory framework for TRUW disposal at WIPP. The WM PEIS does not analyze the repository itself nor alternatives for managing environmental restoration waste, which are covered by other programs.

As described in Section 1.8.1 in Volume I of the WM PEIS, which discusses a number of NEPA documents related to this WM PEIS, DOE has already examined alternatives to geologic disposal at WIPP in other NEPA documents. Moreover, the disposal impacts from operating WIPP as a TRUW repository are analyzed in the WIPP SEIS-II.

The WIPP SEIS-II analyzes the potential impacts from disposal of all TRUW, including pre-1970 buried TRUW, which is considered environmental restoration waste. As described in Section 1.7.1 in Volume I of the WM PEIS, alternatives for the management of environmental restoration waste are outside the scope of the WM PEIS. However, the pre-1970 buried TRUW volume is discussed in the revised Appendix B in Volume III of the WM PEIS with regard to whether those environmental restoration waste volumes, for which responsibility could be transferred to the Waste Management Program, could affect the comparison among waste management alternatives. The revised Appendix B contains the most recent updates on TRUW volumes. Appendix B identifies approximately 80,000 cubic meters of environmental restoration TRUW. DOE has revised the discussion of impacts in both Appendix B and Chapter 8 in Volume I of the WM PEIS to reflect the potential effects on WM PEIS alternatives of environmental restoration transferred waste based on the updated environmental restoration volumes. DOE believes that the revised Appendix B addresses the commentor's concern within the constraints of the scope of the WM PEIS.

Comment (3187)
Commercial disposal of low-level mixed waste should be subject to licensure and regulation by the NRC.

Response
By law, commercial disposal of low-level mixed waste must comply with NRC regulations for its radioactive components and with EPA regulations for its hazardous waste components. Under certain circumstances, both NRC and EPA delegate their authority for issuing necessary permits and licenses for waste disposal to the States.

Comment (3694)
The WM PEIS should list U.S. Department of Transportation and NRC transport regulations as part of the list of laws governing implementation of the WM PEIS.

Response
DOE added Section 1.4.4 to Volume I of the WM PEIS to provide a description of hazardous and radioactive materials transportation regulations. As stated in Section 1.4.4, U.S. Department of

Transportation, NRC, and EPA regulations may be found in 49 CFR 171-178, 49 CFR Parts 383-397, 10 CFR Part 71, and 40 CFR Part 262, respectively. The PEIS transportation analysis identifies the governing regulations in various sections of the PEIS; for example, Section 6.2.4 in Volume I and Sections E.3.1 and E.4.1 in Volume IV.

Comment (3784)
DOE needs to review the Illinois-Kentucky Waste Management Compact Act, which states that it is illegal to site an aboveground facility.

Response
In Title II of the *Omnibus Low-Level Radioactive Interstate Compact Consent Act* of Public Law 99-240, Congress gave its consent to the Central Midwest Interstate Low-Level Radioactive Waste Compact entered into by the State of Illinois and the Commonwealth of Kentucky. Article 1 of the Compact states that it is the policy of the party States to enter into the Compact for the purpose of "...(7) ensuring the ecological and economical management of low-level radioactive waste, including the prohibition of shallow land burial of waste; and (8) promoting the use of aboveground facilities and other disposal technologies providing greater and safer confinement than shallow land burial." Thus, it appears that Central Midwest Compact encourages, rather than prohibits, the development of aboveground disposal facilities.

10.2 Site-Specific Agreements and Plans

Comment (1485)
Commentors support the Federal Facility Compliance Act (FFCAct) strategy of identifying separate waste streams and separate treatment by specific expertise. The WM PEIS should recognize the Site Treatment Plans (STPs) as driving the decisions that will be made about low-level mixed waste treatment. The reason given in WM PEIS, Volume I, Section 3.7, for selecting the preferred alternatives for low-level mixed waste treatment is that they closely approximate the STPs. The STP for LLNL, for example, left the door open for taking waste from offsite. Given the relationship between waste management preferred alternatives and STPs, commentors want DOE to know they oppose moving the LLNL Site Treatment Plan forward without adequate public review. Another commentor stated that DOE ignored the Hanford Advisory Board advice, the State FFCAct principles, and the report of the Hanford Future Site Uses Working Group.

Response
As discussed in Section 1.4.1 in Volume I of the WM PEIS, the FFCAct directs DOE to address the treatment of unused waste that DOE generates or stores by preparing STPs. DOE's commitment to the FFCAct is described in Section 1.8.2 in Volume I of the WM PEIS. The Act, which amended RCRA, requires DOE to prepare STPs for the development of capacity and technologies for treating mixed waste to meet RCRA land disposal restrictions and to submit them to the States or EPA for approval. A plan is required for each facility at which DOE stores or generates mixed waste.

DOE followed a three-phased approach for developing the STPs. In October 1993, DOE sites submitted Conceptual Plans to their State/Federal regulating agencies, which identified a broad range of options for treating DOE's mixed waste. Draft plans, submitted in August 1994, presented the individual sites' proposed treatment options for mixed waste. Proposed Plans were submitted in April 1995 to the appropriate regulatory agency for approval, approval with modification, or disapproval, as required by the FFCAct.

DOE worked closely with the regulatory agencies and the public throughout the process. The National Governors' Association coordinated representatives from 20 States and EPA to assist DOE in evaluating candidate treatment options and developing mixed waste treatment plans. The conceptual, draft, and proposed plans were also made available to the public, with additional opportunities provided for information and input on the plans at the site and national levels.

These plans, taken together, establish a Department-wide treatment configuration, including schedules for bringing new treatment facilities into operation.

The approved plans contain the treatment configuration that resulted from discussions among States, EPA, Tribal Governments, and the public, and from DOE's evaluation of its treatment needs. However, the evaluation will continue as the plans are implemented to streamline and improve the configuration. For example, individual sites continue to pursue commercial and privatized treatment options for some waste streams. The Compliance Orders that govern implementation of the STPs all provide for modification and changes as new technical and cost information becomes available. Any changes to the configuration or to schedules will be made through formalized modification processes.

The unused waste treatment alternatives described in the Draft WM PEIS are broad enough to envelop the potential environmental impacts that result from the FFCAct process. The WM PEIS and the FFCAct STPs were developed in parallel to ensure consistency and integration. The preferred alternative for low-level mixed waste is discussed in Section 3.7 in Volume I of the Final WM PEIS. The WM PEIS provides the NEPA basis for the low-level mixed waste treatment configuration, while the FFCAct STPs detail the low-level mixed waste treatment program.

DOE has not ignored the advice of the Hanford Advisory Board, nor other (sometimes countervailing) recommendations of stakeholders or sources of information identified in the comment. The WM PEIS analysis will not be the only basis for making waste management decisions. Actual programmatic waste management decisions, which will be announced in Records of Decision to be published in the *Federal Register*, will be based on a number of factors and criteria, including this WM PEIS, regulatory compliance, and compliance agreements, including STPs.

Comment (1817)
DOE has yet to clarify existing legal constraints that directly conflict with DOE's self-imposed mission for making the NTS a primary low-level waste disposal site. Specifically, the NTS land withdrawal orders restrict the use of the site to atomic testing activities only.

State officials contend that to legally implement disposal decisions for low-level, low-level mixed, and high-level waste, including spent nuclear fuel, DOE must obtain exclusive jurisdiction over the lands comprising the disposal facilities in Nevada. Of particular interest to Nevada is the requirement that DOE obtain the consent of the Nevada Legislature in order to acquire exclusive jurisdiction.

Response
Disputes regarding possible legal constraints on DOE's ability to site a low-level waste facility at NTS are outside the scope of the WM PEIS EIS. These concerns and positions have been addressed in the NTS Sitewide EIS.

Issues related to land withdrawal for the high-level waste repository are also outside the scope of this PEIS and will be addressed in the Yucca Mountain Repository EIS. DOE spent nuclear fuel decisions are outside the scope of this WM PEIS; they were addressed in the SNF/INEL PEIS.

Comment (1999)
Several commentors commented on the relationship between low-level mixed waste disposal alternatives and Federal Facility Compliance Act (FFCAct) Site Treatment Plans (STPs). One commentor asked DOE to state that the selection of low-level mixed waste disposal alternatives is not determined by FFCAct STPs. Another commentor asked for more detail on the relationship between the FFCAct Workgroup's analysis on low-level mixed waste and the PEIS methodology for selecting and identifying alternatives. Another commentor pointed out that it is important for the Final WM PEIS to recognize that, although there was no requirement for discussion of mixed waste post-treatment disposal in the STPs, many of the Plans did address post-treatment disposal. Post-treatment disposal is a significant issue for the States in which the DOE sites are located. Regionalized disposal was not favored by all States involved. In finalizing the PEIS, DOE should address the disposal agreements resulting from the STPs, associated State consultation requirements, and any related agreements resulting from the FFCAct Mixed Waste STP process. Another commentor indicated that the Mixed Waste STPs were not finalized at the time of PEIS publication. The approved versions should be taken into account, as there are some conflicts between the STPs and the PEIS. Another commentors asked that the PEIS explain the impact of approval of the WM PEIS on current permits and permit applications, and suggested that DOE is not guaranteed the needed permits simply because

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an alternative is selected. Another commentor stated that in selecting preferred alternatives and in preparing the content of the subsequent Records of Decision for establishing a national configuration for disposal facilities for low-level mixed waste and low-level waste, DOE must give careful consideration to the findings and recommendations under development by the FFCAct Disposal Workgroup.

Response
The studies conducted by the Disposal Workgroup and the results of performance assessments, as well as any site-specific analyses, will be considered by the Waste Management Program. Section 1.8.2 in Volume I of the WM PEIS discusses the relationship between the WM PEIS and the FFCAct process, including disposal issues. The WM PEIS alternatives and the FFCAct-required STPs were developed in parallel and were closely coordinated. One of the factors considered in formulating a decision on the future configuration of low-level mixed waste and low-level waste disposal facilities will be the FFCAct recommendations resulting from this process.

As a result of the negotiations with the States on the STPs developed in response to the FFCAct, DOE created the FFCAct Disposal Workgroup to evaluate disposal considerations. Although not specifically addressed as part of the FFCAct, disposal was identified by the States and DOE as an important issue.

The Workgroup consists of DOE representatives and State regulators to evaluate low-level mixed waste disposal issues. Its purpose is to identify, from among the sites currently storing or expected to generate mixed waste, those sites that could be suitable for further evaluation of their disposal capability. This evaluation includes conducting performance assessments involving a detailed technical investigation to better understand a site's potential for disposal and to better identify what types of disposal activities are suitable at a given site.

DOE has identified its preferred waste management alternatives and the reasons they are preferred in Section 3.7 in Volume I of the WM PEIS. Actual programmatic decisions, which will be announced in Records of Decision, will be based on a number of factors and criteria, including this WM PEIS, regulatory requirements, and compliance agreements (including STPs), and the Disposal Workgroup's evaluations.

One factor DOE currently believes it will need to evaluate closely in its disposal decisionmaking is the necessity of limiting the volume and type of radioactive components in wastes disposed of to minimize the potential risks of releases from disposal units.

Section 1.4 in Volume I of the Final WM PEIS includes a description of the relationship between the decisions DOE makes regarding its wastes, and regulatory and permitting requirements and agreements. DOE anticipates that wherever new waste management facilities are sited, after sitewide or project-level NEPA reviews are completed, existing permits would need to be amended or new permits would be required.

Comment (2184)
You ignored the Hanford Advisory Board advice, the State Federal Facility Compliance Act (FFCAct) principles, and the report of the Future Site Use Working Group for Hanford. The Hanford Advisory Board advised that DOE must fully disclose all projected wastes types and quantities that might be shipped to Hanford prior to any consideration by Washington State of treatment, storage, and disposal

permits for mixed waste generated at other facilities. The Advisory Board advice makes it clear that we are not going to accept long-term storage, post- or pre-treatment of other regions' wastes. The Future Site Use Working Group report stated that we are open to the idea of you sending wastes from other sites to Hanford solely for treatment, where it makes sense, but you failed to integrate and disclose the nature of the Site Treatment Plans (STPs) of other DOE sites, and we are going to stop you.

Response
DOE has considered the advice of the Hanford Advisory Board, as well as other (sometimes countervailing) recommendations of stakeholders or sources of information identified in the comment. The WM PEIS analysis will not be the only basis for making waste management decisions; budgets, schedules, stakeholder concerns, national priorities, as well as other DOE studies and recommendations, such as STPs, will be considered in developing the Records of Decision. Preparation of the PEIS was accomplished in parallel with the STP development process. As stated in Section 1.8.2, the Final PEIS preferred alternative for treatment of low-level mixed waste is consistent with the configuration established through the FFCAct process. In addition, DOE has continued discussions with site-specific advisory boards and DOE stakeholders, including State and Tribal Governments.

In addition to the data and analyses contained in the PEIS and other studies and recommendations, DOE will consider both local values and national goals and values as part of the waste management decisionmaking process. The PEIS itself, however, is not the appropriate means for the examination of such values, except as they affect environmental resources, which has been done in the document.

Comment (2426)
Volume I, Section 1.7.3 states that DOE is planning to begin treating the tank-stored high-level waste at the INEL in 2014. According to the recently signed settlement agreement between DOE and the State of Idaho, all high-level waste tank wastes are to be calcined by 2012. The assumptions and schedules that went into this PEIS will need to be reviewed for other possible changes resulting from this agreement.

Response
The WM PEIS assumptions and schedules were evaluated based on the agreement with the State of Idaho. However, 2014 is the date to begin the further treatment of high-level waste that has already been at INEL to obtain a form suitable for disposal in a geologic repository. Therefore, the 2012 calcination date in the 1995 agreement did not necessitate a change in the 2014 treatment date contained in the WM PEIS.

Comment (2634)
Commentors addressed "agreements" regarding the Hanford Site. One commentor pointed out that DOE must fully comply with the Hanford cleanup agreements to protect the communities from radiation exposure. Another commentor stated that the Federal Government is displaying a complete disregard for previous agreements between the Federal Government and Washington State regarding Hanford.

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Response
DOE will comply with applicable laws under which site agreements have been made, and fully intends to continue to comply with Hanford cleanup agreements. DOE appreciates the concern that is shown by those who have commented on various aspects of this WM PEIS. DOE takes its commitments to the States and to other regulators very seriously. Site-specific agreements will be addressed in project-level documents.

Comment (2842)
In the discussion of Site Treatment Plans (STPs) in Volume I, Section 1.7.4, a list of proposed STPs should be provided, together with summaries of DOE's proposed treatment options for each site, so that the STPs can be compared to WM PEIS alternatives to ensure there are no conflicts.

Response
Section 1.8.2 in Volume I of the Final WM PEIS contains a discussion of the relationship of STPs to the WM PEIS and was revised to include a more comprehensive description of the STP process. Individual STPs, as well as a summary of the STPs, may be obtained from DOE's Center for Environmental Management Information and local site reading rooms.

STPs for the various sites are regularly updated. Therefore, no individual WM PEIS alternative identically matches the STPs taken together. DOE would select a hybrid low-level mixed waste alternative that more closely reflects the STPs. This concept is discussed in Volume I, Section 3.4, of the PEIS. Alternatively, there is a possibility that some STPs might be renegotiated based on the evaluations presented in the WM PEIS.

Comment (3195)
The WM PEIS should properly identify how it relates to the Federal Facility Compliance Act (FFCAct) Site Treatment Plans (STPs) and to the performance evaluation of DOE sites for low-level mixed waste disposal.

Response
Section 1.8.2 in Volume I of the WM PEIS describes the relationship of other DOE actions and programs to the WM PEIS, including the FFCAct STPs and the DOE Disposal Workgroup process. Both the FFCAct and Disposal Workgroup processes will be considered along with information contained in the WM PEIS during the development of a low-level mixed waste Record of Decision. Section 6.3.5 in Volume I of the WM PEIS describes the criteria for low-level mixed waste treatment and disposal site selection.

Comment (4058)
Several commentors commented on the relationship between the WM PEIS and the Federal Facility Compliance Act (FFCAct) Site Treatment Plans (STPs). One commentor asked why the Summary document does not list agreements (such as the INEL STP) as posing legal obstacles for the various alternatives. The California Department of Toxic Substances Control finds that regional treatment alternatives (DOE's preference for low-level mixed waste treatment) are inconsistent with treatment alternatives set forth in the STPs. For example, if DOE decides to use LLNL as an offsite regional treatment center, DOE will have to seek and obtain approval from the California Department of Toxic Substances Control for revisions to all approved STPs. Another commentor characterized the FFCAct

as being in great danger and asked that DOE assure the public that it is committed to cleanup and supports its previous commitments.

Response
The WM PEIS Summary document provides an overview and highlights the basic content of the WM PEIS. More detailed information is contained in the main document. Section 1.4 in Volume I of the WM PEIS identifies and summarizes major laws that might apply to the programmatic alternatives, including the FFCAct.

NEPA requires Federal agencies to evaluate reasonable alternatives, even those that are inconsistent with the STPs. DOE believes the WM PEIS does provide a sufficiently adequate basis on which to make informed programmatic decisions. The WM PEIS and the FFCAct STPs were developed in parallel. However, to achieve consistency and integration, some STPs might require modification (with State approval) and hybrid alternatives (see Volume I, Section 3.3) might need to be selected. There are still disagreements between State regulators and DOE regarding three STPs, including LLNL's. Accordingly, Section 2.3, in the Summary document and Section 1.8.2 in Volume I note that negotiations are underway with a few regulatory authorities regarding DOE's proposed STPs, and that the DOE preference for low-level mixed waste treatment could be affected by these negotiations.

As discussed in Section 1.8.2 in Volume I of the WM PEIS, the FFCAct directs DOE to address the treatment of mixed wastes that DOE generates or stores by requiring the development and submission of STPs to the appropriate Federal and/or State environmental regulatory agency. DOE worked closely with the regulatory agencies in the development of the STPs. Public meetings were held on the STPs. The STPs have all been submitted to the appropriate State authorities, and reflect DOE's commitment to properly managing its low-level mixed waste.

However, the WM PEIS considered other non-FFCAct aspects of the actions that would be required to implement treatment of low-level mixed waste. These aspects include the risks of transporting and handling these wastes, and the likely impacts of ultimate disposal of treated low-level mixed waste. NEPA requires that DOE consider a broad range of alternatives and to analyze the likely environmental impacts associated with those alternatives.

DOE identifies its preferred alternatives and the reasons they are preferred in Section 3.7 in Volume I of the WM PEIS. Actual programmatic waste management decisions, which will be announced in Records of Decision, will be based on a number of factors and criteria, including this WM PEIS, regulatory compliance, and compliance agreements including the STPs.

Comment (4466)
The pertinent details of Site Treatment Plans published in 1995 for hazardous waste and mixed waste should be incorporated into the No Action Alternative for hazardous waste in the WM PEIS. Other alternatives could include contracts with specific transporters and treatment, storage, and disposal facilities, environmental auditing of such contractors for large waste volumes, and the use of brokers for small waste quantities.

Response
The WM PEIS and the FFCAct Site Treatment Plans were developed in parallel and were coordinated. Under the WM PEIS No Action Alternative, hazardous waste that is currently being treated onsite at

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DOE facilities would continue to be treated onsite, and other hazardous waste would continue to be treated and disposed of offsite at commercial facilities.

DOE will not make decisions on the use of brokers from the analyses in the WM PEIS. DOE will make implementation decisions on contract specifications, inspection and enforcement procedures, or the use of brokers for small waste quantities, as suggested by the commentor, following the issuance of WM PEIS Records of Decision.

10.3 Tribal Treaties and Trusts

Comment (1643)
Some commentors expressed objections to nuclear testing, potential waste disposal, and other related activities being proposed or undertaken by DOE in Nevada, citing (1) the Western Shoshone National Council resolution designating their territory as a nuclear-free zone, and (2) the Ruby Valley litigation. DOE's activities are viewed as being contrary to the principles and interests of the Western Shoshone Government and in violation of the conditions of existing treaties.

Response
NEPA requires Federal agencies to analyze reasonable alternatives, even those that may not comply with existing requirements.

DOE understands that the Western Shoshone have disputed the U.S. Government's ownership of lands at NTS and Yucca Mountain. In 1863, the Ruby Valley Treaty was concluded between the United States and the Western Bands of the Shoshone Indians. In effect, the treaty ceded the NTS and surrounding area to the U.S. Government. In 1951, the Shoshone sought compensation and were awarded $26 million by the Indian Claims Commission, under the Indian Claims Commission Act. The money was deposited for the Tribe in an interest-bearing account in the U.S. Treasury.

The Ruby Valley Treaty has been subject to court actions on several occasions, but the U.S. Supreme Court has upheld the Treaty. The U.S. Government (here, DOE) must abide by the current Supreme Court ruling on this issue and will consider potential environmental impacts in the area in making its decisions. DOE is aware that there is significant disagreement with the rulings, especially by the Western Shoshone, and that there are likely to be additional challenges and appeals. DOE will abide by any new rulings made on this subject.

DOE seeks input from native peoples through the NEPA process and has instituted and follows the DOE American Indian Policy, as well as regulations under the American Indian Religious Freedom Act, the National Historic Preservation Act, the Native American Graves Protection and Repatriation Act, and Executive Order 13007 regarding sacred sites. For the WM PEIS, scoping meetings were held for stakeholders to discuss and influence the course of the project prior to document preparation. Prior to document preparation, a Notice of Intent was published in the *Federal Register*. All Federally recognized Tribes were sent a copy of the Notice of Intent, a notification of the scoping meetings, and a copy of the Implementation Plan. After the Draft PEIS was issued, public hearings were held, and Federally recognized Tribes received advance notice of these hearings.

Comment (3315)
We call your attention to some specific issues that your government must become responsible for and involved in correcting:

- Nation to Nation relations, sovereignty and treaty violations;
- Political, civil, social, economic, cultural issues of minimization, degradation and devastation;
- Cooperative processes and understandings;
- Cumulative radiological risk to identify exposure from past, present activities;
- Health and well-being issues;
- Analysis of cumulative radiological impacts at NTS;
- Global radioactive risks of U.S. nuclear activities at NTS;
- Radiation doses to our citizens and travelers enroute;

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- Obstruction and complications resulting from the illegal application of U.S. legislation in our country;
- Environmental restoration and waste management;
- Historical and prehistoric archaeological sites;
- Air, water, and land quality concerns and impacts and effects;
- Monitoring and measurement plans, compensation and mitigation for victims and illnesses;
- Socioeconomic effects of employment, procurement, economy, tourism, property values;
- Risk perception and stigma;
- Sociocultural effects including political controversy, quality of life and risk perception;
- Transportation related to all aspects of environmental restoration and waste management;
- Costs related to all of the aforementioned issues.

Response
DOE recognizes that consultation requirements with Tribal Governments under NEPA and other Federal statutes exist, and that a unique government-to-government relationship exists between the U.S. Government and Tribal Governments. This relationship is detailed in DOE's American Indian Policy. DOE added Section 1.4.5 to Volume I of the WM PEIS to identify and discuss DOE's consultation obligations with other agencies and Native American Tribes.

The WM PEIS analysis focuses mainly on alternatives to address national-level waste management issues. Site-specific NEPA reviews will more fully explore implementation proposals at specific sites. During such analyses, local DOE offices will continue to work with Tribal representatives, as well as other agencies and members of the public, to identify and address issues of concern.

DOE offices have agreements in place with Tribal Governments about a range of environmental issues. The sites' Tribal contacts will assist in the consultation process for site-specific and transportation issues related to implementing programmatic waste management decisions, as they do now on other similar programs.

Other issues such as political, civil and social issues, cooperative processes, (non-waste) nuclear activities at NTS, application of U.S. legislation, risk perception and stigma, controversy, and quality of life, which are not direct or indirect effects of waste management on the environment are outside the scope and, therefore, not analyzed in the WM PEIS. Site-specific issues such as historical and prehistoric archaeological sites and monitoring and mitigation of site-specific or facility-specific impacts will be analyzed for sitewide and project-level proposals that result from WM PEIS decisions.

Comment (4009)
Although considerations of population density, arid land, and the ready availability of Federal lands appear to have been determining factors in siting DOE facilities, and appear to be benign, they also work to discriminate against Indian Reservation communities because, as a result of the historic U.S. policies toward Indian Tribes, reservations are almost always located in these areas. The Hanford and INEL facilities are sited adjacent to Indian Reservations because of the Tribes' lack of political clout.

Response
DOE policy recognizes the sovereignty of Native American Tribal Governments, and the unique government-to-government relationship with the Tribal Governments as defined by history, treaties, statutes, court decisions, and the U.S. Constitution. DOE recognizes that it must consider the treaty

rights of Native American Tribal Governments and the Federal Government's trust responsibility toward them when making decisions.

DOE policy requires the agency to consult with Tribal Governments to assure that Tribal rights and interests are considered; that the potential impacts of proposed DOE actions on cultural or religious resources are disclosed; and that any unnecessary interference with traditional religious practices is avoided. DOE is committed to incorporating this policy into its ongoing and long-term planning and management processes, including the NEPA process, and has worked through its site representatives to notify the Tribes of the WM PEIS scope and availability for comment. The Final WM PEIS has been revised to include a general discussion of the relationship of the PEIS to these Tribal agreements and regulations.

The WM PEIS analysis focuses on alternatives addressing national waste management issues. The individual character of Native American cultures at DOE sites, and the specialized nature of each Tribe's concerns in site activities, while considered in the WM PEIS at the programmatic level, is more productive as part of a site-level analysis.

For example, the WM PEIS classifies Native Americans as minority populations for numerical purposes only to describe the demographic characteristics of the regions surrounding the DOE sites. This is not intended to undermine the unique government-to-government relationship or the Federal Government trust responsibility. Site-specific NEPA reviews will more fully explore specific concerns related to Native American issues, such as the protection of sacred lands, cultural properties, and Tribal and religious practices. During these reviews, local DOE officials will continue to work with Tribal representatives to hear their concerns regarding the need for and location of any necessary facilities and related activities, such as transportation requirements, and to consider specific Tribal values, potential environmental impacts, and appropriate mitigative measures. Some DOE Operations Offices (e.g., Richland, Idaho, and Albuquerque) have cooperative agreements in place with Tribal Governments about a range of environmental issues, and the sites' Tribal contacts will assist in the consultation process for site-specific and transportation issues related to implementing WM PEIS decisions.

11. WM PEIS

Comment (24)
Commentors state that errors and omissions in the Draft WM PEIS distort the "waste picture" and might distort the analysis of alternatives. [These commentors did not identify errors and omissions.]

Response
DOE evaluated all comments concerning errors and omissions and revised the WM PEIS as appropriate.

Comment (531)
Some commentors expressed approval of the WM PEIS. One commentor commended DOE for producing the WM PEIS, and stated that it is technically sufficient and consistent to make programmatic and site-specific decisions. Another commentor thanked DOE for a very comprehensive PEIS and for including operating and maintenance costs, and stated that this demonstrates continuing commitment to this project.

Response
DOE's intent was to make this document the best study possible and appreciates support from the public in this process. DOE believes the WM PEIS is technically sufficient to make programmatic waste management decisions. Site-specific decisions would be made based on site-specific NEPA reviews and other studies.

Comment (1113)
The WM PEIS does not meet the requirements of the NEPA for an adequate EIS because it does not fully consider all wastes and impacts to sites and regions, including cumulative impacts, such as those at Fernald Environmental Management Project (FEMP) and other sites. The WM PEIS should be driven by environmental impacts and not just by political decisions on types of materials.

Response
The WM PEIS is a national study that provides environmental input into broad Department-wide management decisions to be made by DOE. The PEIS analyzes on a broad, programmatic level, potential human health risks, and air quality, water resources, ecological resources, economic, social, environmental justice, land use, infrastructure, cultural resources, and cost impacts. The analysis methodology is presented in Chapter 5 in Volume I of the WM PEIS, and the waste-type analyses are provided in Chapters 6 through 10 in Volume I. In addition, Chapter 11 in Volume I of the WM PEIS contains information on cumulative impacts at each of the 17 "major" sites, and Volume II of the WM PEIS presents Site Data Tables for a variety of impact parameters.

Because of its programmatic character, the WM PEIS does not evaluate detailed site- or project-level impacts for particular sites such as FEMP. The WM PEIS does not identify locations for waste management facilities on sites or select technologies for use at the sites. Sitewide and project-level NEPA reviews would analyze specific locations of waste management facilities and technologies. DOE programmatic decisions will be based, in part, on the environmental impacts identified in the WM PEIS and on other criteria such as cost and equity (see Volume I, Section 1.8, for a complete discussion of these criteria).

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Comment (1114)
The WM PEIS should include the complete impacts of carrying out all the alternatives, including No Action.

Response
When there is a very large number of potential alternatives, a reasonable number of alternatives covering the full spectrum of alternatives may be analyzed and compared in an EIS. DOE believes that the alternatives analyzed in the WM PEIS provide a reasonable number of examples of treatment, storage, and disposal configurations to cover the full spectrum of alternatives for making programmatic selections of sites to manage the five types of waste considered in the PEIS. Chapters 6, 7, 8, 9, and 10 in Volume I of the WM PEIS evaluate environmental, human health, and socioeconomic impacts at the programmatic level for all the alternatives, including the No Action Alternative, for managing low-level mixed, low-level, transuranic, high-level, and hazardous wastes, respectively. Chapter 11 in Volume I of the WM PEIS provides the cumulative impacts analysis.

Comment (1773)
The WM PEIS is too generic for States to be able to evaluate proposed alternatives as they relate to their individual programs.

Response
DOE believes that this PEIS is an important tool for making decisions on the future configuration of its waste management activities. The implementation of alternatives analyzed in this document will be based, in part, on site-specific NEPA reviews that identify precise locations, capacities, and facility designs at DOE sites. Each of these studies will address applicable State regulations and offer opportunities for public participation and comment.

Further, this WM PEIS addresses such impact parameters as human health risks, air quality, water resources, ecological resources, and population at each site. DOE believes, therefore, that the PEIS is technically sufficient to serve as the basis for its programmatic waste management decisions and to link to sitewide and project-level NEPA analyses.

Because it is a programmatic study that will not provide direct input to decisions on the locations of facilities at the sites, the PEIS does not evaluate some site-specific environmental impacts. In addition, DOE will not use the PEIS to select final waste management technologies for the sites. Again, DOE will base such decisions on more specific studies.

Comment (2127)
A commentor concerned about Brookhaven National Laboratory (BNL) believes Table 1.3-1 and page 8 of the WM PEIS Summary document should read "and/or host disposal facilities sites" in lieu of defining "major" candidate sites as those that will receive waste generated from offsite, because such lack of definitional clarity could cloud the issues, get people upset, and open the door for accepting wastes.

Volume I, Section 4.2.1, of the Draft WM PEIS states that major sites are those which "...are candidates to receive wastes generated offsite, to host major disposal facilities or manage high-level waste." At an Interactive Video Teleconference sponsored by DOE at BNL on November 21, 1995, the DOE representative present stated emphatically that BNL would not receive any offsite waste and that the preferred alternative for BNL entailed transporting BNL-generated waste off the BNL site. Therefore, the statement noted above is misleading because it contradicts what was stated by DOE at the teleconference, i.e., that BNL would not receive any offsite waste and would not become a major disposal facility.

Response
DOE has made the requested changes in fulfillment of a commitment made at the BNL public hearing on November 21, 1995. Footnote "a" of Table 1.4-1 (formerly Table 1.3-1) of the WM PEIS Summary document provides a clarified definition of "major" sites and footnote "c" has been added to Table 1.4-1 to state that although this site is designated as a major site, none of the alternatives would result in wastes being received from offsite for treatment or disposal. BNL is one of the sites to which this footnote applies. Accordingly, under the WM PEIS analysis, BNL would manage only its own low-level mixed waste and low-level waste. BNL would dispose of such wastes only under the Decentralized Alternative. It would not dispose of any wastes from other sites.

Comment (2206)
The WM PEIS is confusing. It was not written very thoroughly, and there are so many loopholes in it, I am not sure it is legal.

Response
DOE believes that the WM PEIS meets the requirements of NEPA and the CEQ implementing regulations. Section 1.7.1 in Volume I describes the changes DOE made to the Draft PEIS in its preparation of the final document. Because of the complexity of the waste management decisions and the degree of public interest during the scoping activities, DOE believes the detailed impacts evaluation and discussion in the PEIS are warranted, and that the PEIS is sufficient to serve as the basis for its programmatic waste management decisions. The WM PEIS attempts to reach a range of readers with different levels of review interest and technical knowledge. The Summary document is intended for readers interested in a quick and concise overview of the essential content of the document. The necessary details of the PEIS analysis are presented in Volume I of the PEIS with Volumes II, III, and IV presenting technical data and appendices supporting Volume I. Additional details are included in supporting technical reports that are available in the DOE public reading rooms listed in Section 1.9 in Volume I.

Comment (2222)
Why did DOE prepare this PEIS? Might it have been influenced by litigation brought against DOE?

Response
On June 27, 1989, the Natural Resources Defense Council and 21 other citizens groups filed suit to compel DOE to prepare a programmatic environmental impact statement on proposals for the cleanup and modernization of the nuclear weapons complex. As a consequence, on January 12, 1990, the Secretary of Energy decided to prepare two programmatic EISs, one on the modernization of the nuclear weapons complex and the other on environmental restoration and waste management. This PEIS is the latter. See Volume I, Section 1.7.1, for an explanation of the subsequent change in the scope of the WM PEIS.

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Comment (2288)
The PEIS is based on assumptions, for example, that vitrification is going to be a wonderful solution to things, even though vitrification has never been tried in this country successfully. Thus, the PEIS has no basis in reality.

Response
DOE has begun to vitrify high-level waste at two DOE sites. The Defense Waste Processing Facility at the Savannah River Site (SRS) began full-scale operations on March 12, 1996, after an extensive review and operational readiness process. This facility uses a proven vitrification process to immobilize high-level radioactive materials within a glass-like matrix that is then encased in stainless-steel canisters, which are placed in interim storage at SRS. The West Valley Demonstration Project (WVDP) began vitrifying high-level waste on July 2, 1996.

DOE has based its analyses in the WM PEIS on accepted and proven scientific and technical methodologies. The assumptions made for the WM PEIS analysis are described throughout the document. DOE believes these assumptions were necessary to compare impacts consistently across all of the DOE sites considered in the PEIS. The WM PEIS analytical methods and assumptions selected for high-level waste are described in Sections 9.1.1 and 9.2 in Volume I of the WM PEIS.

Comment (3023)
The WM PEIS assumption that new facilities will be built appears overly optimistic in light of current funding. DOE is in the process of transitioning older facilities that could prove useful, but that currently have no foreseen mission. The WM PEIS should be revised to reflect present budgetary constraints on site infrastructure and present options for using existing facilities. DOE needs to develop a 5- to 10-year rolling strategic plan to make more efficient use of existing facilities and new construction.

Response
As described in Sections 6.1.3, 7.1.3, 8.1.3, and 9.1.3 in Volume I of the WM PEIS, DOE identified existing capacities for the treatment and disposal of specific waste types at major sites to establish a baseline and to help determine under which WM PEIS alternatives new or expanded facilities are needed. Some facilities that are not currently operating were considered, for the analysis, to be in existence based on the assumption that they could become operational if required. Planned facilities include only those facilities for which a conceptual design has been completed. Analysis in the WM PEIS assumes use of existing and planned waste management facilities until their capacities are met. If additional capacity is needed under certain alternatives, use of new facilities is assumed.

DOE would attempt to minimize cost and schedule impacts of new construction by redeploying existing non-waste management facilities for necessary waste management functions. Such redeployments, while not practical to consider in programmatic documents like the WM PEIS, will be considered in site-level planning documents. Assuming that new facilities would be required ensures that the impacts analysis is conservative (by overestimating impacts from, for example, construction) and would include the impacts from implementation of the alternative. Section C.3.2 in Volume III of the WM PEIS describes the cost estimating approach that tied the cost of facilities and transportation to waste quantities. Section C.3.2.2.3 in Volume III describes the existing facilities assessment cost estimating process used where existing capacities were identified. Where facilities exist, their capacities were taken into account, and the total required capacity was reduced by that amount so only the minimum necessary new facility construction was costed.

As stated in Section 1.2 in the Summary document and Section 1.8.2 in Volume I of the WM PEIS, DOE is moving forward with the Ten Year Plan vision. This strategy would result in addressing most of DOE's cleanup and waste management challenges on accelerated schedules and within existing budgets. The Ten Year Plan will be used when considering the budget decisions, sequencing of projects, and actions taken to meet program objectives. DOE will implement this vision in collaboration with regulators and the public. Costs under the Ten Year Plan would be less than the costs reported in the WM PEIS because use of existing infrastructure and commercial vendors would need to be optimized to meet accelerated schedules.

Comment (3035)
The WM PEIS is not adequate to support the "assignment of sites for the coordinated implementation of each strategy" (Volume I, Section 1.8).

Response
DOE believes that the WM PEIS meets the requirements of NEPA and the CEQ implementing regulations for a programmatic EIS. DOE recognizes that other information, in addition to the WM PEIS, would be used to make programmatic decisions, which will be published in Records of Decision. In addition to the environmental analyses and the preferred alternatives identified in the Final PEIS, DOE will consider budgets, schedules, national priorities, and other factors in reaching its decisions.

Comment (3228)
What will happen with the radioactive waste throughout the DOE nuclear weapons complex is a serious matter that affects the Rocky Flats Environmental Technology Site (RFETS) and the citizens of Colorado. National agreement and local actions will be needed to achieve needed solutions to this problem. The WM PEIS does not provide the framework needed to solve this problem.

Response
The WM PEIS is a national decisionmaking tool to assist DOE in its strategy to address actions related to its waste management activities, including wastes from nuclear weapons activities at RFETS. The PEIS analyzes alternative configurations for the management of its radioactive and hazardous wastes. DOE believes this PEIS will help with long-term planning efforts and be the basis for future decisions concerning the configuration of DOE's waste treatment, storage, and disposal activities. No single analysis can provide a complete solution for this large and complex problem.

Public participation is an important component of DOE's effort to obtain national agreement and local action to achieve solutions to waste management problems. DOE currently has a variety of public outreach programs in place to facilitate public participation at both the national and local levels. Specifically in conjunction with the WM PEIS, DOE held 23 scoping meetings, 6 regional workshops on the PEIS Implementation Plan, and 2 public workshops on the risk assessment methodology; published 3 newsletters and 20 fact sheets; produced 2 videos; provided periodic briefings for the Environmental Management Advisory Board and several site-specific advisory boards; and most recently, conducted 13 public hearings and provided a 150-day public comment period for the Draft PEIS. These and other outreach activities are described in Volume I, Section 1.7.2, of the Final PEIS.

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DOE plans to use the input it received during the public comment period on the Draft WM PEIS in developing its final decisions.

Public input will also be solicited during the preparation of sitewide or project-level NEPA reviews that will be prepared to implement the selected waste management alternatives.

Comment (3336)
The document is a vague overview that does not address site-specific issues.

Response
The purpose of the WM PEIS is to develop broad programmatic alternatives for the safe and efficient management of DOE's radioactive and hazardous waste. Although DOE intends to identify a configuration, that is, select sites for waste management activities, it will take a closer look (including site-specific design, locations of waste, operating parameters for new facilities, and site-specific impacts) in site-specific NEPA reviews. In other words, DOE will look at the big picture first and then take a closer look at specific details. The relationship of different levels of NEPA reviews to the WM PEIS is described in Section 1.8.1 in Volume I of the WM PEIS.

Certain environmental impacts caused by particular types of actions are inherently specific to a location, that is, the effects of an action such as construction of a waste treatment facility on a particular aspect of the environment could be significant when the action occurs at one location, but could diminish rapidly at a distance and might be readily mitigated or eliminated if the action is relocated. These effects include impacts on geology and soils, noise and aesthetic, and cultural resources impacts, impacts on sensitive species and habitats, environmental justice, and impacts on offsite land use. Because the specific locations of the waste management facilities on sites are not being proposed at this time, these impacts cannot be assessed fully in this programmatic analysis. Although a number of these site-specific impacts are identified and discussed in this PEIS in Chapters 6 through 10, they can be analyzed fully only in sitewide or project-level NEPA reviews. DOE anticipates that, in most cases, any potentially significant impacts can be reduced or eliminated by alteration of a proposed facility location or other mitigation measures.

Comment (3341)
The WM PEIS is inadequate because it does not analyze long-term costs or risks. The realities of nuclear waste extend many generations into the future, not just 70 years.

Response
The WM PEIS uses different time frames depending on the subject of analysis. For action alternatives, the costs evaluated were life-cycle costs of facilities plus transportation costs. Facility costs include the cost of planning, design, construction, operations and maintenance, and decontamination and decommissioning. The total costs of each alternative include the sum of treatment, storage, disposal, and transportation costs, and in some instances, any special costs. For purposes of analysis, the following assumptions were made regarding the construction and operation of the waste management facilities: The facilities were assumed to be built over a 10-year period and operate over a 10-year period to treat and/or dispose of wastes generated within a total 20-year period.

The No Action Alternatives addressed costs associated with a full 20-year operations (i.e., storage) phase (i.e., within a total construction phase not applicable). The site-specific operational periods for high-level waste storage facilities addressed costs associated with various lengths of storage, which are discussed in Chapter 9 in Volume I of the WM PEIS. In both instances, costs would substantially increase if DOE decides to store the waste indefinitely.

In the human health risk analysis, for example, different populations and individuals at risk were analyzed. Risks to the offsite and onsite populations were estimated for 70 years (the lifetime of a person living during the period when treatment and storage activities occur). A hypothetical intruder scenario analyzes two different time frames (100 and 300 years after closure of the disposal facility) and a hypothetical farm family analysis evaluates 143 lifetimes, each assumed to be of 70 years duration, thus covering a period of 10,000 years. Further details are provided in Chapter 5 in Volume I and Appendix D in Volume III of the WM PEIS.

Comment (3661)
Regarding population impacts, DOE has disregarded the full impacts of its activities on Native Peoples and has falsely minimized the impacts of DOE sites on poor communities who cannot leave due to financial hardships.

Response
DOE's site and waste management strategies are being developed to minimize the health and environmental effects from potential releases across the complex. The WM PEIS compares waste management alternatives on the basis of added risk from proposed waste management operations. The exposure pathways that were examined used conservative assumptions that include the potential for ingestion of radioactivity.

In developing the WM PEIS strategies, potential environmental justice concerns were identified and analyzed. For the WM PEIS, DOE mapped the minority, low-income, and Native American communities within an 80-kilometer (50-mile) radius of each of the 17 sites that were evaluated for waste management activities. These maps are located in Appendix C in Volume III of the WM PEIS. Section 5.4.7.2.1 in Volume I of the WM PEIS and Appendix C also contain information on the mapping and minority population identification procedures. The results of the environmental justice analysis are presented in Sections 6.10.1, 7.10.1, 8.10.1, 9.10.1, and 10.10.1 in Volume I of the WM PEIS.

DOE is aware of the impacts, including those on Native American cultures, that DOE's activities have made on the surrounding environment. DOE also recognizes that it must not only consider the interests of Native American groups and their Tribal lands, but also of individual Native Americans who are minority members of the community surrounding DOE sites. The results of the WM PEIS assessment indicate that DOE should have sufficient flexibility in locating proposed facilities on sites to avoid disproportionately affecting minority or Native American interests near the sites. For any of the waste management alternatives to be implemented, sitewide or project-level NEPA reviews will analyze any potential impacts on Native American Tribal cultures at the site-specific level.

DOE is committed to continuing to address the concerns and interests of stakeholders at the DOE sites in all its decisionmaking. DOE seeks input from native peoples through the NEPA process and has instituted and follows the DOE American Indian Policy, the American Indian Religious Freedom Act, the National Historic Preservation Act, the Native American Graves Protection and Repatriation Act, and Executive Order 13007 regarding sacred sites, as well as any separate agreements that have been

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made with particular Native American Tribes. For the WM PEIS, extensive scoping meetings were held for stakeholders to discuss and influence the course of the project prior to document preparation. All Native American Tribes were sent a copy of the Notice of Intent to prepare the PEIS and a notification of the scoping meetings. After the Draft PEIS was issued, another extensive series of public hearings was held, and Native American Tribes received invitations to comment. DOE Field Offices routinely consult with interested Tribal Governments on DOE activities and plans. These consultations have included briefings on the development of the WM PEIS.

Comment (3677)
Section 9.1 is completely inadequate. DOE's evaluation of the management of high-level waste must be completely re-done.

Response
DOE believes that Section 9.1 in Volume I of the WM PEIS provides useful background information relating to high-level waste management. The WM PEIS analyzes only the impacts of storing vitrified high-level waste. It does not evaluate alternatives for treatment or disposal of high-level waste. DOE must decide where to store vitrified high-level waste canisters prior to the availability of a geologic repository, since the decision to immobilize the high-level waste before transporting it was made in the early 1980s. The evaluation of high-level waste storage alternatives contained in the WM PEIS is adequate and appropriate for a programmatic EIS. In response to public comments, DOE has made some changes and corrections to the high-level waste analysis. These changes are reflected in the Final WM PEIS.

Comment (4032)
DOE's effort to develop a programmatic waste management EIS has cost taxpayers $56 million. However, the PEIS does not consider many major foreseeable impacts. DOE should reissue a PEIS that fully addresses all foreseeable impacts. DOE should place a moratorium on privatization until a credible EIS is issued and adequate time is provided for public comment and agency response.

Response
In addition to this WM PEIS, DOE funded a number of long-term planning efforts necessary to evaluate and improve DOE's Waste Management Program. The cost of these ancillary efforts (e.g., development of cost-estimating models and the Baseline Environmental Management Report to Congress have created misunderstandings about the actual cost of preparing the WM PEIS. The total cost for preparing the WM PEIS--from project initiation in 1990 to publication of the Final PEIS--was approximately $31 million. DOE firmly believes that the development of this WM PEIS is the necessary first step in the development of its comprehensive waste management strategy and that the benefits of the study warrant the expense.

DOE does not agree that it is necessary to revise and reissue the PEIS as a draft. DOE believes that the WM PEIS includes the major foreseeable impacts of the programmatic alternatives. The WM PEIS analysis evaluates human health risks, impacts to air quality, water resources, ecological resources, economic, social, environmental justice, land use, infrastructure, cultural resources, and cost impacts. Chapter 5 in Volume I of the WM PEIS describes the analysis methodologies. Chapters 6 through 10 in Volume I contain the analyses for the five waste types, and Chapter 11 in Volume I describes cumulative impacts.

Section 1.7.4 in Volume I has been added to discuss the issue of waste management privatization at DOE sites. The new language describes the potential for privatization of waste management activities, as long as they comply with applicable laws and other requirements, and qualitatively addresses the potential costs and environmental impacts of privatization. DOE does not believe a moratorium on privatization is necessary.

Comment (4052)
The Draft WM PEIS does not reflect DOE's apparently serious effort to formulate a national priority-setting policy through various panels and committees.

Response
The purpose of NEPA evaluations is to analyze impacts of proposed actions and alternatives, not to set priorities. The WM PEIS does reflect DOE's efforts to formulate national policies through various panels, committees, and study groups. Section 1.4.5 in Volume I of the WM PEIS describes consultations with other agencies, organizations, and Native American Tribes. This includes a description of consultations with the Environmental Management Advisory Board and Site-Specific Advisory Boards. In addition, Section 1.8.2 in Volume I describes related DOE actions and programs including the low-level mixed waste management DOE Disposal Workgroup, the nuclear material and waste dialogue team, and future-use project.

DOE will also consider budgets, schedules, national priorities, other studies, and the recommendations of advisory bodies such as the Environmental Management Advisory Board. DOE intends to integrate these various decision tools, including the WM PEIS, in the Record of Decision process. The various panels and committees have had the opportunity to comment on the Draft PEIS. Discussions with these panels and committees will also occur after publication of the Final PEIS.

Comment (4410)
There is no evidence of interagency consultation and cooperation in drafting the WM PEIS. In particular, because of its regulatory role at all DOE sites, EPA's early involvement is essential. The WM PEIS is not and will not be a credible document unless interagency consultation and cooperation is achieved early in the process.

Response
EPA and other agencies were involved in the early stages of drafting the WM PEIS. The WM PEIS Implementation Plan describes the WM PEIS scoping and the extent of EPA involvement in that process. Chapter 5 of the Implementation Plan states that at DOE's invitation, the U.S. Department of Health and Human Services agreed to be a cooperating agency on the PEIS within the scope of the agreement between DOE and the Agency for Toxic Substances and Disease Registry. NRC agreed to participate as a cooperating agency in a limited sense and directed its staff to monitor development of the PEIS technical information base and policy implications. EPA and DOE agreed on roles and responsibilities for technical coordination on issues of mutual concern. EPA helped DOE to define issues and concerns to address in the PEIS and provided information in areas in which EPA has regulatory authority or technical expertise. EPA reviewed the preliminary Draft PEIS, and participated in meetings involving review of the human health risk methodology. A list of consultations with other agencies and individuals is provided in Section 1.4.5 in Volume I of the WM PEIS. The Implementation Plan is available for review in the DOE public reading rooms listed in the Section 1.9 in Volume I.

11.1 Adequacy and Compliance with NEPA

Comment (3654)
The lack of analysis of the transuranic waste No Action Alternative, Regionalized Alternative 1, and Centralized Alternative for environmental restoration transuranic waste is unacceptable and does not meet the requirements of NEPA.

Response
DOE believes that the analysis of impacts for the various transuranic waste alternatives meets the NEPA requirements and CEQ implementing regulations and will provide support on where DOE should treat transuranic waste management. While the analysis of environmental restoration wastes is not within the scope of the WM PEIS, the PEIS does discuss how environmental restoration waste volumes for which responsibility transferred to the Waste Management Program could influence the comparison among waste management alternatives. Appendix B in Volume III of the WM PEIS discusses the potential influence of this transferred environmental restoration transuranic waste on the WM PEIS alternatives.

Comment (4408)
The WM PEIS violates required NEPA alternatives analysis by basing the entire PEIS transuranic waste (TRUW) discussion on the assumption that the future interim storage and/or permanent repository for TRUW will be the Waste Isolation Pilot Plant (WIPP) in New Mexico, despite the fact that WIPP is geologically unfeasible due to water intrusion, in addition to many other licensing problems. As a result, the WM PEIS does not provide a back-up plan if the site does not open, putting human and environmental safety at risk. DOE considered Monitored Retrievable Storage facilities other than WIPP in the Implementation Plan for the EIS for a Multi-Purpose Canister System for Management of Civilian and Naval Spent Nuclear Fuel. Shifting of funding and responsibility for the Multi-Purpose System to the Nuclear Navy does not relieve DOE of the responsibility to consider alternatives and significant impacts it can clearly foresee as alternatives to WIPP.

Response
DOE does not agree with the commentor. DOE believes the WM PEIS meets all NEPA and CEQ requirements. Section 1.5.3 in Volume I states that DOE is currently proposing to dispose of retrievably stored and newly generated TRUW at WIPP. The environmental impacts of developing WIPP were assessed in previous environmental impact statements. The impacts of disposal at WIPP are evaluated in the Draft WIPP SEIS-II, which was released in November 1996. The WM PEIS No Action Alternative evaluates the impacts of the first 20 years of long-term storage of TRUW if the opening of WIPP is delayed. The impacts of storage beyond 20 years are analyzed as part of the No Action Alternatives in the WIPP SEIS-II.

Section 2.2.3 in Volume I states that since 1970, DOE has stored all of its TRUW, including TRUW containing hazardous components that are subject to the Resource Conservation and Recovery Act (RCRA). DOE plans to dispose this retrievably stored TRUW at WIPP if acceptable performance can be demonstrated and regulatory requirements can be met. Several studies are underway to characterize and more fully understand the potential long-term behavior of the disposal of TRUW at WIPP. Based on the results of these studies and independent of the WM PEIS, DOE will determine whether to dispose of TRUW at WIPP and the extent to which TRUW must be treated before disposal. And, regardless of whether WIPP becomes a repository, DOE needs to identify the sites where TRUW would be treated and stored based on the WM PEIS analysis.

11.1 Adequacy and Compliance with NEPA

The former Multi-Purpose Canister IP and its successor document, the Evaluating Container Systems for the Management of Naval Spent Nuclear Fuel EIS, considered container systems and potential monitored retrievable storage facilities for the storage of spent nuclear fuel, not for TRUW.

Comment (4421)
Commentors stated that the WM PEIS is inadequate, and should be revised and reissued in draft for additional public comment. One commentor stated that the Draft WM PEIS misrepresents the impacts of DOE sites and actions, is incomplete, and could put people at risk if DOE were to use it to determine its waste management siting strategies. Another commentor stated that the WM PEIS needs another review due to numerous errors [example cited].

Response
DOE does not agree that the Draft WM PEIS misrepresented environmental impacts or was incomplete. Rather, DOE believes that the Draft WM PEIS met the requirements of NEPA and the CEQ regulations to support DOE waste management programmatic decisions. Therefore, it is not necessary to revise and reissue the Draft WM PEIS for public comment. DOE has made changes to the WM PEIS to correct errors and omissions identified by members of the public, DOE personnel, and contractor personnel. These changes are reflected in this Final WM PEIS. Section 1.7.2 in Volume I of the WM PEIS discusses the major changes made to the document.

The PEIS is one tool that DOE will use to decide how and where it will manage its radioactive and hazardous wastes in the future. Along with documents such as the Baseline Environmental Management Report, Site Treatment Plans, and other EISs (e.g., the WIPP SEIS-II), the PEIS provides decisionmakers with a national perspective to evaluate the potential impacts of various strategies. The PEIS identifies potential costs and environmental impacts of alternative configurations for waste management that DOE could implement for each type of waste. After deciding the overall strategy, which will identify sites for treatment, storage, and disposal facilities, DOE will perform site-specific NEPA reviews as appropriate.

Comment (4437)
Based on Site Environmental Reports and sources, exposure estimates at some DOE sites are hundreds of times higher than those presented in the Draft WM PEIS, and DOE and contractor management responsible for preparing the WM PEIS deliberately changed information as part of a premeditated cover-up. These activities affect DOE credibility and should be investigated.

Some of the most significant information that should have been included in the affected environment and/or cumulative impacts sections of the WM PEIS include:

- Radon exposure from FEMP and Argonne National Laboratory-East (ANL-E) (not covered in National Emission Standards for Hazard Air Pollutants);
- The high potential dose in game caught at the Savannah River Site (SRS) and Idaho National Engineering Laboratory (INEL), and fish affected by the West Valley Demonstration Project (WVDP) and SRS;
- Plutonium exposure detected by monitoring at Rocky Flats Environmental Technology Site (RFETS);

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- Exposure to contaminated sediment, food, and direct radiation at Paducah;
- Exposure near the target of an accelerator at Los Alamos National Laboratory (LANL) and Lawrence Berkeley Laboratory (LBL);
- Multimedia exposure at Oak Ridge Reservation (ORR);
- Impacts from high-level waste treatment at WVDP;
- Presenting cumulative impact predicted fatalities over the alternative duration rather than an annual average.

Response
In addition to DOE's own investigation, EPA conducted an independent investigation of these allegations against DOE and its contractors (including META and Louis Berger and Associates, Inc.), and determined that there was no evidence of a cover-up or intentional misrepresentation of data.

The existing site contamination and multimedia maximally exposed individual exposure estimates described in the comment are presented in the WM PEIS Affected Environment Technical Report, which is available in the DOE public reading rooms listed in Volume I, Section 1.9, of the Final PEIS. Many of the exposure routes cited by the commentor were investigated during site-specific NEPA and CERCLA reviews, or might be investigated during future reviews.

DOE did not include this information in the applicable sections of Chapter 4, which discusses the affected environment, and Chapter 11, the cumulative impacts analysis in Volume I of the WM PEIS, because these pathways are not as relevant for the offsite public as airborne pathways, which are the most important routes of exposure for most members of the offsite populations living in the vicinity of the sites. The consumption of contaminated wildlife and other multimedia exposure scenarios are worst-case bounding estimates, which DOE can best address in site-specific analyses. These pathways would be relevant only for certain specialized populations (e.g., subsistence hunters and fishermen), and would require additional information or assumptions about the dietary habits of those populations. In addition, wildlife contamination data vary widely from year to year in site monitoring reports. DOE would maintain institutional control of the sites during the assumed 10-year waste treatment period. As a consequence, the offsite population should not be able to come in contact with hot-spots of contamination inside the site boundary.

11.2 Presentation

Comment (1)
Why does the Draft PEIS Summary document contain only 9 chapters when the Reader's Guide in the front of the Summary lists 12 chapters for Volume I?

Response
There is no direct correlation between chapter numbers in the Summary document and chapter numbers in Volume I. The Summary document is a separate document that highlights the most significant aspects and provides a broad overview of the WM PEIS. DOE added this explanation to the Final WM PEIS Summary document. Volume I, Section 1.3, describes the contents of Volumes I through V of the WM PEIS.

Comment (2)
Commentors suggested the following ways to make the WM PEIS more reader friendly:

- In the Summary document, define acronyms the first time they are used;
- Spell out acronyms in the margins every time they are used;
- Include a complete glossary of abbreviations in the Summary document;
- Remember who the audience is and write on a layperson level;
- Use plain English and avoid jargon.

Response
DOE made every effort to present complex technical information in a way that could be easily understood by the layperson. Technical terms are explained in the text and defined in the Glossary (see Volume I). Acronyms and abbreviations are spelled out when they are first used and listed in Volume I. DOE added a list of acronyms and abbreviations to the Final WM PEIS Summary document. DOE believes these features provide sufficient resources to readers of the Final WM PEIS and elected not to define terms in the margin every time they are used.

Comment (3)
Define "treatment" of wastes and "disposal" of radioactive wastes in the Summary document. Define "fines" at first use in the Summary document.

Response
The Summary document is intended to provide a broad overview of the WM PEIS. Definitions of terms (including those mentioned in the comment) are contained in the Glossary in Chapter 14 in Volume I.

Comment (6)
Compare a representative waste volume to something recognizable (for example, football fields).

Response
Section 1.4.1 of the Summary document includes a commonplace example of a representative volume of waste (100,000 cubic meters of waste would fill a seven-story building the size of a football field).

Comment (168)
The whole analysis section is fuzzy.

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Response
In preparing the Final WM PEIS, DOE made every effort to improve the clarity of the document, including the analysis.

Comment (519)
Will a separate WM PEIS User's Guide be available to the public?

Response
Although the subject of the WM PEIS is complex, the organization of the document is not. DOE does not believe that a separate User's Guide would be helpful. A short Reader's Guide is provided in the front of Volume I.

Comment (1687)
In Volume I, Section 1.5.2, the inset that details the quantities of waste has a small typed footnote that states, "Volumes do not include environmental restoration waste." Given the significance and magnitude of that small footnote, all similar references throughout the text should be printed in bold type to increase readers' awareness that a significant portion of waste generated over the next 20 years is not considered in this PEIS.

Response
In several places, the WM PEIS explicitly states that environmental restoration wastes are not included in the analysis. Therefore, DOE does not believe it is necessary to highlight the footnote. Volume I, Section 1.7.1, explains why environmental restoration wastes are not included in the PEIS analysis in detail.

Comment (1716)
Commentors identified typographical errors in the Draft WM PEIS.

Response
DOE corrected typographical errors identified by commentors.

Comment (1719)
There is not enough information in Section 4.4.13 about treatment technologies.

Response
Sections 4.4.1 through 4.4.17 in Volume I of the WM PEIS provide summary information about the affected environment at each of the 17 WM PEIS sites. Additional information about treatment technologies is in Sections 5.2.2, 6.2.2, 7.2.2, 8.2.2, and 10.2.2 in Volume I of the WM PEIS. Appendix H in Volume IV provides information on technology development.

Comment (2055)
Using the metric system to specify volumes is an internationally accepted practice. However, the WM PEIS would be more user friendly and comprehensible if the total volumes in summaries and chapter highlights were provided in equivalent gallons, as well as in cubic meters.

11.2 Presentation

Response
The Final WM PEIS includes a table for converting waste volumes to both cubic feet and gallons. See the Summary document (Section 1.4.1) and Volume I (Section 1.5.1).

Comment (2347)
In Volume I, Section 10.8, of the Draft PEIS, last paragraph, first sentence, should the word affect actually be effect?

Response
Affect is used correctly.

Comment (2354)
A commentor commended DOE for its presentation of such a large study in only four volumes. The commentor stated that listing referenced technical reports and documents used for each chapter in Volume I was very helpful and that the pull-out chart at the end of each chapter presents clearly the alternatives and their relationships to the chapter topic and site involved. The commentor added that placing extensive background material (site data tables, methodologies, and future goals of DOE) in separate volumes enabled the reader to focus on the task.

Response
Thank you for commenting.

Comment (2410)
The Final WM PEIS should provide the names and addresses of the project leaders of site-specific EISs so that interested citizens can access drafts of them as they become available.

Response
Volume I, Section 1.9, of the Final WM PEIS contains a list of DOE public reading rooms where copies of some draft EISs can be found. Section 1.9 also provides phone numbers to call for additional information.

Comment (2543)
In Volume I, Table 9.4-7, use the word "Public" instead of "Normal Operations Population" to improve clarity. The footnotes for the table are incorrect; the asterisks are not correctly located in the table.

Response
DOE replaced *Normal Operations Population* with *Routing Operations Public* and corrected the errors in Volume I, Table 9.4-7, identified in this comment.

Comment (2545)
A commentor identified a sentence in Chapter 11 of the Draft WM PEIS and suggested that the sentence be edited to clarify its meaning.

Response
The sentence referred to in the comment appears in Section 11.2 of the Final WM PEIS. It is intended to explain how DOE selected information from other EISs for use in the WM PEIS cumulative impacts

11.2 Presentation

analysis. DOE edited the sentence to clarify its meaning. It now reads "Where decisions have not been made regarding the preferred alternatives for a reasonably foreseeable action, the cumulative impacts analysis considers the range of impacts of those alternatives. Otherwise, only the impacts of the preferred alternative are included in the cumulative impacts analysis."

Comment (2551)
Provide a specific discussion of the significance of the tables in Volume II, Section 6.0.

Response
Section 1.1 in Volume II states that the tables list the impacts for each of the 17 major sites as a complement to the impact discussions in Chapters 6 through 10 in Volume I (see Table II-1.1). Section II.6 contains the INEL tables, which list the volume of each waste type in separate sections for low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste. These tables list the impacts of managing radioactive and hazardous waste at INEL. Section 1.0 in Volume II specifically describes each table. The significance of the tables in Section II.6 is that they list impacts of managing radioactive and hazardous waste at INEL in a separate format.

Comment (2569)
The Summary document states that "Alpha radiation can be stopped by a sheet of paper and will not penetrate skin, but it is harmful if ingested or inhaled." This should be modified by substituting "material that emits alpha radiation" for "it."

Response
The sentence in the Summary document, Section 1.4.3, has been changed and now reads, "Alpha particles can be stopped by a sheet of paper and will not penetrate skin, but material that emits alpha particles is harmful if ingested or inhaled."

Comment (2620)
Volume I, Section 10.4.3. Insert the words "worst case" in the sentence: "Note that ... facility accidents were analyzed..."

Response
DOE did not make the requested change because the facility accident impact analyses cited in the comment are maximum consequence rather than worst case analyses. Section 10.4.3 in Volume I summarizes the accident scenarios with the estimated maximum consequences from among the range of accident scenarios analyzed. Appendices D (Volume III) and F (Volume IV) provide additional details about all of the hazardous waste facility accident scenarios evaluated in the WM PEIS. Sections 10.4.3.1 and 10.4.3.2 in Volume I have been revised to clarify that maximum consequence accidents, rather than worst-case accidents, were summarized in Section 10.4.3.

Comment (2665)
In Volume IV, Section E.16.1, it would be helpful to refer to where in the text the PLC, PAEC, and ICRC values are derived/explained.

Response
Section E.16.1 explains the use of PLC (potentially life-threatening concentration), PAEC (potentially adverse effects concentrations), and ICRC (increased cancer incidence effects) values in the WM PEIS

hazardous waste transportation analysis. Sections E.16.5.1, E.16.5.2, and E.16.5.3 describe the derivation of PLC, PAEC, and ICR values, respectively. In addition, the acronyms were added to the list of acronyms in Appendix E in Volume III of the WM PEIS and to the PEIS Glossary (Chapter 14, Volume I).

Comment (2682)
In Volume IV, Section F.2.2.1, please define the word "strongly" in the parenthetical statement, "(process chemical accidents that could not be *strongly* correlated with waste inventories or throughputs were not analyzed)." What impact does this restriction have on the development of source terms? Please define the words "sufficient" and "distinct" in the same paragraph, and the word "selected" in the following paragraph.

Response
DOE has deleted "strongly" from the referenced statement.

The word "sufficient" indicates that DOE did not develop accident source terms for sites with waste volumes so low that DOE would not construct fixed facilities for their treatment. The WM PEIS projects that DOE will treat small volumes of waste with portable treatment units, which could consist of one or more trailer-mounted treatment modules that would treat minimal quantities of waste (limit of 30 cubic meters per year per unit). Such units would be most suitable for the treatment of waste streams that were not generated on a regular basis. In this case, DOE did not perform an accident analysis due to the low inventory of material and the episodic operation of the treatment module. DOE based the source terms for the accident analysis on release classes, which take into account the waste type, treatment category, and accident stress. These release classes are "distinct" from each other, and this is what the term means.

The statement, "only selected waste management operations and treatment technologies were analyzed for source term development," refers to the review undertaken during the WM PEIS accident analysis to establish the technologies that might contribute significantly to the overall risk of waste treatment. For example, DOE chose incineration as a risk-dominant technology for options rather than a low-level mixed waste non-thermal option due to incineration extreme operating conditions (high temperature and pressure) and high dispersibility characteristics of the resulting radioactive ash product. Preliminary calculations indicated that the risks from accidents related to relatively benign technologies such as packaging and compaction would be lower than those for high-energy processes such as incineration and organic destruction.

Comment (2840)
In Volume I, Chapter 5, the WM PEIS cites "DOE 1991," but no such reference appears in the Chapter 5 list of references.

Response
DOE corrected the citation identified in the comment to "DOE, 1990."

Comment (2845)
Tables in Volume I, Section 3.4, and throughout the waste-type chapters, should define blank spaces.

11.2 Presentation

Response
DOE has added footnotes to the tables in Volume I, Section 3.4, to explain that the blank spaces indicate that DOE is not contemplating any waste management activity. Further, DOE has added footnotes to explain any blank spaces in the tables in the waste-type chapters.

Comment (2846)
The footnotes to Table 3.4-1 in Volume I should define "Number of Sites," "CH Non-Alpha Treat," and "Dispose."

Response
DOE believes Table 3.4-1 in Volume I of the WM PEIS is understandable as presented in the Draft PEIS and has not made the requested changes.

- The "Number of Sites" is determined by counting across the row the number of treatment or disposal sites.

- Low-level mixed waste is categorized as alpha or non-alpha waste, depending on whether the waste contains concentrations of alpha particles at or above 10 nanocuries per gram. As stated in the footnote to Table 3.4-1, there are typically two categories of low-level mixed waste: contact-handled (CH) and remote-handled (RH). The difference is the concentration of radioactive material in each category. RH waste typically requires additional shielding and containment. "CH" and "RH" are introduced and defined in Section 1.5 and the terms are listed and defined in the Glossary in Volume I. DOE added to the footnotes for Table 3.4-1 a description the two different kinds of CH low-level mixed waste (alpha and non-alpha).

- "Disposal" is defined in the Glossary.

Comment (2849)
In Volume I, Table 3.4-1, the "S" or the term Storage should be defined. Will material be stored at the site under which the "S" designation appears or elsewhere?

Response
The WM PEIS Glossary, which is in Volume I of the WM PEIS, defines "storage" as the collection and containment of waste or spent nuclear fuel (in such a manner as not to constitute disposal of the waste or spent nuclear fuel) for the purposes of awaiting treatment or disposal capacity (i.e., not short-term accumulation). The "S" in Table 3.4-1 in Volume I of the WM PEIS denotes indefinite onsite storage at that site under the No Action Alternative.

Comment (2852)
Under the Decentralized Alternative for BNL, the designation "TD" (for "Treatment to meet land disposal restrictions" and "Disposal") appears. However, it is not at all clear what is meant by these terms. Will treatment for land disposal occur on the BNL site or off the site? Will land disposal occur on the site or off the site? Will disposal occur on the site or off the site? The answers to these questions should be clearly stated in the PEIS.

Response
When the "TD" designation appears for a site, such as BNL, it means that the site is a candidate for these activities under that alternative. Wherever the PEIS identifies a site as a potential location for waste management activities, it refers to analysis of waste for onsite activities. Commercial treatment offsite is not precluded by this evaluation of onsite activities, but decisions to utilize commercial facilities would be made at the site level. Thus, the designation of "TD" for BNL under the low-level mixed waste Decentralized Alternative indicates that BNL is a candidate site for onsite treatment and disposal of its own low-level mixed waste. The WM PEIS Glossary, which is in Volume I, further amplifies this response. It defines "treatment" as "any method, technique, or process designed to change the physical or chemical character of the waste to render it less hazardous, safer to transport, store or dispose of, or reduced in volume." The Glossary defines "disposal" as "emplacement of waste in a manner that ensures protection of human health and the environment within prescribed limits for the foreseeable future with no intent of retrieval and that requires deliberate action to regain access to the waste." With regard to land disposal restrictions, the Resource Conservation and Recovery Act requires EPA to issue land disposal restrictions that require the use of the best demonstrated available technologies to treat certain hazardous waste and other waste containing certain hazardous components. The land disposal restrictions also prohibit the storage of waste that requires treatment, except to facilitate proper recovery, treatment, or disposal. DOE has revised the Glossary to include a definition of land disposal restrictions.

Comment (2872)
Volume III, Section B.3.3. The DOE-developed model, Automated Remedial Action Methodology is described in three sentences. No information is provided regarding data input to the model, mathematical solutions employed by the model, or where such information can be obtained to independently verify the model's output. Given that the Draft WM PEIS states DOE's intent to use this output to make "conclusions" regarding potential environmental restoration waste impacts (see Section B.3, Page B-3), a much more thorough description of how the model predicts waste volumes is warranted. It is not clear why DOE Headquarters estimates of INEL environmental restoration waste volumes were even necessary. It would seem that the field office should have more intimate knowledge of environmental restoration and decontamination and decommissioning sites at INEL and could provide a more detailed estimate of projected waste volumes.

Response
No information from, or reference to, Automated Remedial Action Methodology is contained in the Final WM PEIS. The model was not used because better information was available from the Baseline Environmental Management Report, as identified in Section B.5.

Comment (2903)
Figure 4-3 in Volume I should be drawn to scale.

Response
As noted in Figure 4-3, the map is not drawn to scale, nor are any of the maps in Section 4.4. DOE included these maps in Section 4.4 in Volume I of the WM PEIS to provide a general idea of the layout of each site. Therefore, DOE did not believe it was necessary to draw the maps to scale.

11.2 Presentation

Comment (2919)
To address the questions of centralized, regionalized, and local [decentralized] treatment, it would be helpful to have a table that lists the volume of each class of waste at each site, with an indication of the existence at each site of suitable treatment facilities, suitable permanent disposal facilities, and suitable offsite transport. This information should be included in Table 1.3-1 of the Summary document. A table of interstate shipping distances would also be useful.

Response
The WM PEIS Summary document is intended to give a general and broad overview of the basic content of the WM PEIS. The amount of information about waste volumes and site-specific suitability for treatment, disposal, and transportation could not readily be added to Table 1.3-1 without interfering with the clarity of the table. The information is, therefore, given in Sections 6.1, 7.1, 8.1, 9.1, and 10.1 in Volume I of the WM PEIS for each waste type.

Tables of intersite shipping distances are provided in Volume IV, Table E-2 for truck routes and Table E-3 for rail routes. However, these tables would be too long (4 pages) for inclusion in the WM PEIS Summary document.

Comment (2964)
In Volume I, Table 6.1-2, a footnote states that BNL does not have onsite wastewater or wastewater treatment. BNL has inadequate onsite wastewater treatment. The table should be modified to reflect this.

Response
Table 6.1-2 lists the capacities of existing and planned low-level mixed waste facilities at major sites considered in the WM PEIS analysis. Wastewater treatment is the most prevalent treatment capability for low-level mixed waste. The footnote indicates that BNL has no planned or current low-level mixed waste wastewater treatment capacity. The footnote is not referring to the infrastructure of BNL. As described in Section 2.15.6 in Volume II of the WM PEIS Affected Environment Technical Report, BNL has a 1-million-gallon per-day wastewater sewage treatment plant. The technical report is available in DOE public reading rooms listed in Volume I, Section 1.9, of the WM PEIS.

Comment (2967)
Volume I, Section 6.3.2, should make it clear that BNL is not proposed to receive any offsite waste for treatment or disposal.

Response
Table 6.3-2 shows that under the Decentralized Alternative, BNL would not receive any offsite low-level mixed waste for treatment or disposal.

Comment (2972)
Volume I, Section 6.3.3, should make it clear that BNL is shipping its low-level mixed waste to an offsite facility. Furthermore, it should be reemphasized that this is DOE's preferred alternative.

Response
Tables 6.3-3, 6.3-4, 6.3-5, and 6.3-6 show that, under all four Regionalized Alternatives, BNL low-level mixed waste would be shipped offsite. The preferred alternatives and the reasons they are

preferred are identified in Volume I, Section 3.7, of the Final WM PEIS. They are highlighted in the site profile for BNL that appears in the Summary document.

Comment (2991)
Several figures and tables in Chapter 7 list 16 disposal sites under the Decentralized Alternative. This contradicts Tables 7.4-4, 7.4-5, and 7.4-13, all of which show 15 sites.

Response
Under the Decentralized Alternative, disposal would occur at 16 sites. Although the 1992 Integrated Data Base, which was used for the Draft PEIS, does not report low-level waste data for BNL, BNL was considered a potential low-level waste management site for purposes of analysis. DOE has revised Tables 7.4-4, 7.4-5, and 7.4-13 to indicate 16 disposal sites. More recent data taken from the 1995 Integrated Data Base was used for the Final WM PEIS and confirms that there is low-level waste at BNL (see Table 7.1-1 in Volume I).

Comment (2993)
Table 7.4-1 shows no workers at BNL under the Decentralized Alternative. Other tables show that BNL will either dispose of low-level waste (e.g., Tables 3.4-2 and 7.3-2, Figure 7.3-2) or treat and dispose of low-level waste (e.g., Table 3.6-2). Also, Tables 7.4-7 and 7.4-9 indicate that none of the actions are applicable to BNL for any alternative. Please explain what this means.

Response
In the Draft WM PEIS, BNL did not have low-level waste based on the 1992 Integrated Data Base. Therefore, Table 7.4-1 did not show any estimates of BNL waste treatment worker populations.

In the Final WM PEIS, Chapter 7 (Volume I) was revised to incorporate low-level waste volumes from the 1995 Integrated Data Base, including BNL low-level waste (see Table 7.1-1). In addition, estimates of waste treatment worker populations at the site were added to Table 7.4-1. Consideration of updated low-level waste volumes for BNL also are included in Appendix I (Volume IV) in the Final WM PEIS, which addresses the issue of how updated waste projections affect WM PEIS conclusions.

Comment (3015)
Volume I, Section 5.2.1, indicates that DOE adjusted low-level mixed waste data for three sites; only two sites are identified. The third site should be identified and the adjustment noted in Table 4-2.

Response
DOE corrected Section 5.2.1 to indicate that low-level mixed waste data were adjusted for two sites.

Comment (3042)
Table 4-7 in Volume I is not described in the text of Section 4.3.7 in the Draft WM PEIS.

Response
Section 4.3.7 in Volume I of the WM PEIS was revised to add a reference to Table 4-7. Table 4.3-3 summarizes minority and low-income population data for the 50-mile zone of impact that surrounds each site.

11.2 Presentation

Comment (3057)
In Section 4.4.4, the Yakima Firing Range should be referred to as the Yakima Training Center.

Response
DOE made this correction.

Comment (3058)
The WM PEIS Affected Environment Technical Report, which is loosely cited in the WM PEIS, was not in the Lacey, Washington, DOE reading room.

Response
The citation in the Chapter 4 reference section was incorrect. The citation is correct in the Final WM PEIS. All technical reports were supplied to the DOE public reading rooms as announced in the *Federal Register* notice declaring the availability of the Draft WM PEIS. All technical reports have been reissued to the DOE public reading rooms, listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (3062)
The acronym ALOHA should not be used for a computer programmer's poison gas model. The use of this sacred Hawaiian greeting is akin to Shalom in Judeo-Christian culture.

Response
The computer model ALOHA (Aerial Locations of Hazardous Atmospheres) was not developed by DOE and DOE has no control over the model's name or the resulting acronym.

Comment (3285)
NTS is located in Nye County, not Las Vegas, as indicated in Section 4.4.8.

Response
The titles of Sections 4.4.1 through 4.4.17 in Volume I include the site and the closest large city, not the county in which the site is located. Some sites are located in more than one county. The text in Volume I, Section 4.4.8, notes that NTS is 65 miles northwest of Las Vegas. Also, the general public is more likely to recognize the name of a large city than the name of a county.

Comment (3368)
Volume III, Section D.2.6.1. The terms RfDs, RfCs, HEAST, and IRIS should be briefly explained here (as they are in Volume IV, Section E.16.5.2.1), or at least included in the list of abbreviations at the beginning of Appendix D.

Response
DOE added the terms RfD, and RfC to the abbreviation list, and HEAST, and IRIS to the acronym list for Appendix D.

Comment (3386)
Volume III, Section D.3.3.8.1, last paragraph, should include a reference to where in the text the source term is characterized.

Response
The reference for the source term is identified in Appendix F in Volume IV and accompanying technical reports.

Comment (3408)
Volume III, page A-4, paragraph 4; and page A-5, paragraph 2: A reference is not provided for the Baseline Environmental Management Report or for the Risk Report.

Response
The Final WM PEIS includes references for the Baseline Environmental Management Report and the report *Risks and The Risk Debate: Searching for Common Ground, the First Step* in Appendix A.

Comment (3409)
Volume IV, Section E.5.1.2.1, last paragraph, states that the accident risk assessment uses site-specific and waste type-specific radiological and physical wastes. Site-specific is not appropriate for this assessment, because the actual population density was not used. The occurrence of the three population density zones might be route-specific, but they are not site-specific.

Response
The term "site-specific" in the text cited in the comment does not refer to the population density used in the analysis. The term is used to describe the characteristics of waste at a particular site (i.e., the radiological and physical waste characteristics of a particular waste at a particular site). Moreover, the next sentence states "the assessment uses route-specific information" for the transportation calculations.

Comment (3410)
In Volume IV, Section E.7.1.4, last paragraph, please change the word "unfavorable" to "stable."

Response
DOE made this change.

Comment (3527)
Although the Reader's Guide states otherwise, review of the appendices or technical reports should be considered necessary for a full understanding of the issues. For example, Appendix B in Volume III of the WM PEIS contains numerous assumptions limiting the scope of the WM PEIS to environmental effects for which economically practical and technically reasonable solutions are at hand (see Volume I, Section B.4-1, Table B.4-1), although such an approach contradicts the intentions of Congress for NEPA.

Response
Due to its programmatic nature, the WM PEIS is a complex study. It is organized to be useful to a broad range of interested parties. The Summary document serves readers who are interested in a broad overview of the WM PEIS. Volume I contains the main text of the document. The Site Data Tables (Volume II), appendices (Volumes III and IV), and technical reports support Volume I and assist readers who are interested in more detail. Thus, the WM PEIS attempts to accommodate readers with different levels of review knowledge and interest.

11.2 Presentation

Regarding the specific example noted, Appendix B in Volume III contains a discussion of environmental restoration wastes. Environmental restoration is not within the scope of this programmatic study primarily because of its site-specific nature (see Section 1.7.1). Therefore, Appendix B of the document contains a qualitative discussion of the extent to which those environmental restoration waste volumes, for which responsibility could be transferred to the Waste Management Program, might affect the comparison among waste management alternatives. The approach used for the qualitative discussion of environmental restoration activities is not a full-fledged quantitative analysis.

DOE believes the alternatives analyzed meet NEPA requirements as discussed in Volume I, Chapter 3. The WM PEIS evaluates four broad categories of alternatives in order to make informed comparisons of programmatic management options: No Action Alternatives, under which the status quo would be maintained; Decentralized Alternatives under which waste would be managed at a large number of sites; Centralized Alternatives under which waste would be managed at one or two sites; and Regionalized Alternatives under which waste would be managed at an intermediate number of sites. DOE believes that the alternatives analyzed in this PEIS encompass a reasonable range of alternatives under NEPA, and that the potential impacts predicted of these alternatives provide a basis to select a waste management configuration from among the alternatives.

Comment (3538)
The series of maps at the end of Volume IV is overly simplified; waterways, small roads, and small villages that surround the DOE facilities should be included by making use of popular local maps, county maps, and satellite images.

Response
The maps provided in Appendix I in Volume IV of the Draft WM PEIS are now included in Section C.4.7.2.3 (Volume III). These are demographic maps prepared from 1990 census data. They are not road maps, but rather illustrate the distributions of minority and low-income populations in the census tracts around DOE sites. The detail suggested by the commentor was neither necessary nor appropriate in this context.

Comment (3550)
The document is too long. CEQ regulations state that an EIS should be no longer than 150 pages.

Response
NEPA and CEQ implementing regulations do not impose page limits in NEPA documents. Because of the complexity of programmatic waste management decisions and the degree of public interest during the scoping activities, DOE believes the detailed impacts evaluation and discussion in the PEIS and thus, its length, are warranted.

Comment (3610)
What is the meaning of the numbers (1000 to 5000) used in Volume I, Figure 8.2-3?

Response
The numbers in Figure 8.2-3 of the Draft WM PEIS indicated the categories of physical forms for the wastes. To avoid confusion, Figure 8.2-3 was changed in response to this comment. Words are now used in place of the numbers to identify the appropriate treatment train.

11.2 Presentation

Comment (3638)
With respect to Section 8.4.1, we do not understand the reasoning of population impacts and individual impacts.

Response
Population impacts are based on estimated exposures to all persons living within 80 kilometers (50 miles) of each site center or, for the larger sites, within 50 miles of an existing waste management facility on the site, who might be exposed to emissions from waste management activities according to wind patterns at each site. Individual impacts are based on the highest estimated exposures to a person located in the prevailing downwind direction from the activities.

Comment (3641)
Table 8.4-4 identifies the estimated number of cancer incidences and genetic effects program-wide for transuranic waste treatment. The discussion indicates that the mitigation of these emissions (americium-241 and plutonium-238) from thermal treatment of these radionuclides would be accomplished by exploring alternative treatment concepts or enhancing off-gas treatment systems. What is the meaning of "exploring" and how does it meet NEPA requirements.

Response
The wording in Section 8.4.1.2 has been changed to indicate that mitigation of emissions from thermal treatment of these radionuclides would be accomplished through application of alternative treatment methods when they become available.

Comment (3767)
The fact sheet for ANL-E has an inconsistency regarding the low-level waste decentralized and centralized options.

Response
Table 1 of the fact sheet for ANL-E indicated that the Decentralized Alternative for low-level waste would require 450 shipments of offsite waste to be transported to ANL-E for treatment and disposal, and that this would add 2% to the onsite volume of low-level waste that would be disposed of at ANL-E. This is consistent with the low-level waste Centralized Alternatives presented in the table, which state that 1,050 shipments would be required to ship *all* of ANL-E's low-level waste offsite for treatment and disposal. These shipments are further discussed in Volume IV, Appendix E.

Under the Decentralized Alternative, all ANL-E low-level waste (6,700 cubic meters) would be managed onsite (not shipped), and 450 shipments of low-level waste would be received from Ames (110 cubic meters) and Fermi (1,500 cubic meters) for treatment and disposal at ANL-E. Under the Centralized Alternatives all ANL-E low-level waste would be shipped offsite (1,050 shipments) to another DOE site for treatment and disposal, with no waste shipped to ANL-E from offsite. Therefore, although the Decentralized Alternative would result in more onsite impacts than the Centralized Alternatives, due to onsite waste treatment and disposal, offsite impacts would be larger under the Centralized Alternatives, due to the larger numbers of waste shipments for these alternatives. Note that impacts from low-level waste transport at ANL-E are predicted to be low for all alternatives.

Comment (3822)
The public needs to have more information on potential negative impacts.

11.2 Presentation

Response
The information presented in this PEIS is thought to be most relevant to decisions regarding management of wastes. Volume I of the WM PEIS summarizes the potential negative and positive impacts of the WM PEIS alternatives, and the WM PEIS appendices and technical reports on the impacts analysis and affected environment provide detailed information on potential negative impacts. When specific waste management facilities are proposed for specific locations, additional information on the potential impacts would be provided in site-specific NEPA reviews as necessary. In the PEIS process, DOE considered both positive and negative impacts from alternatives for waste management.

Comment (3875)
DOE needs to better educate the public about the use of the word "small." What is "extremely small"?

Response
DOE summarized the results of the WM PEIS analysis using general terminology concerning the level of human health risks or environmental impacts. In some cases the phrase "extremely small" was used to indicate a negligible level of risk or a minimal impact.

Comment (3917)
DOE needs to put radiation exposure into perspective and help the public to understand that everyone has radioactive material in them. Use analogies to everyday life.

Response
Section 4.3.1 in Volume I explains that all members of the public are exposed to background radiation, both natural and man-made, and that the PEIS analyzes the total effective dose equivalent above background radiation levels for site workers and for the maximally exposed individual members of the public. This discussion provides common examples of background radiation sources and describes the extent of this exposure.

Volume I, Section 5.4.1.4, of the Final WM PEIS includes an improved explanation of natural and man-made radioactive material and its presence in the human body and surrounding environment.

Comment (4463)
With regard to Section 7.1 and Table 7.1 in the Draft WM PEIS Summary document, there is no good scientific justification for reporting values such as the expected number of high-level waste canisters to five significant figures.

Response
For the Final WM PEIS, DOE rounded the high-level waste canister number estimates to the nearest 100 canisters.

Comment (4546)
Referencing population risks with an asterisk (*) on Table 6.4-5 in the Draft WM PEIS and stating in the footnote that impacts are greater than 0 and less than 0.5 is inadequate; at a minimum, the order of magnitude should be quantified.

Information on the order of magnitude of the uncertainties in the population risk numbers provided should also be provided in the Summary document. These risks should be quantified because they impact the relative impacts of alternatives compared to each other and in terms of uncertainties in absolute risks.

Tables should specifically delineate the risks of trains versus trucks used for transportation, and risks from transportation separately for workers versus members of the general public.

Response
Health risks are presented for both populations of receptors and for maximally exposed individuals. The population risk tables list risk impacts as numbers of incidences of adverse health effects or potential fatalities in the population. For example, Table 6.4-5 lists the estimated *numbers* of cancer incidences and genetic effects for various receptor groups. For the offsite population, the analyses estimated less than one radiation cancer incidence for Regionalized Alternatives 2 through 4 and the Centralized Alternative. These values are *not* probabilities. The values all range from greater than zero to less than 0.5, so the order of magnitude is zero.

11.3 Scope

Comment (237)
DOE must conduct serious studies of the health, safety, environmental, and economic impacts of waste treatment, storage, and disposal activities.

Response
This WM PEIS is a serious study that examines the environmental impacts of managing DOE's radioactive and hazardous wastes across the nuclear weapons complex, including the impacts identified by the commentors. In the PEIS, DOE examines a range of broad waste management alternatives that could affect various environmental resources throughout the United States. The WM PEIS presents an approach for characterizing the affected resources at all potentially affected sites. The document also includes general and cumulative information on the affected environment that applies to all or some subset of the sites analyzed. This allows quantitative and qualitative comparisons of alternatives and DOE sites, which will help DOE decide on an overall waste management strategy. This programmatic study will be supplemented by detailed sitewide or project-level NEPA analyses, as necessary.

The evaluations in the WM PEIS will not be the only bases for decisions on waste management. Regulatory compliance, budgets, schedules, compliance with site agreements with States, and national priorities, as well as other DOE studies would be considered in reaching these decisions.

Comment (397)
The WM PEIS should include all wastes currently at Hanford (K-Basin spent fuel rods, environmental restoration wastes, Navy wastes such as the reactor cores), as well as all waste management wastes proposed to be brought to Hanford.

Response
The WM PEIS addresses all waste management wastes generated at the Hanford Site and those waste management wastes generated at other sites that might be sent to Hanford for treatment, storage, or disposal.

Section 1.8.1 in Volume I describes the WM PEIS's relationship to other NEPA documents and decisions. The K-Basin spent nuclear fuel is covered by a separate EIS, which was issued in March 1996. Spent fuel and naval wastes are addressed in the SNF/INEL EIS. DOE selected a regionalized approach for spent nuclear fuel storage and decided that Hanford production reactor fuel will remain at the Hanford Site (see the SNF/INEL EIS Record of Decision).

Environmental restoration waste that would be transferred to the Waste Management Program is included in the WM PEIS, and Appendix B provides a discussion of the extent to which it could affect the comparison among waste management alternatives. Cleanup activities generally deal with site-specific issues not appropriate for analysis in programmatic documents like the WM PEIS. Therefore, as previously stated, the WM PEIS considers environmental restoration wastes only in the context of how those wastes could affect the comparison among waste management alternatives. (See Appendix B in Volume III.) Site-specific analysis under RCRA or CERCLA cleanup actions will address impacts from environmental restoration at Hanford.

Naval Submarine reactor compartments are disposed of with the cores (spent fuel) removed. As already discussed, spent fuel is addressed in the SNF/INEL EIS. The remainder of the reactor compartments are not included in the WM PEIS, because their disposal is covered by the SNF/INEL EIS.

Comment (398)
The WM PEIS does not clearly explain why a number of waste types are not considered in the document. Examples are environmental restoration wastes, spent nuclear fuel, and plutonium stored at the Hanford Site. In addition, DOE needs to explain if the spent nuclear fuel being transported to INEL by the Navy is addressed in the document.

Response
Volume I, Section 1.5.6, identifies waste types not considered in the WM PEIS and explains why they were not considered. Section 1.7.1 explains the WM PEIS scope change, which resulted in exclusion of environmental restoration wastes from the analysis. Spent nuclear fuel managed by the Navy and at the Hanford Site is addressed in the SNF/INEL EIS; plutonium stored at the Hanford Site is addressed in DOE studies including the Storage and Disposition of Fissile Materials PEIS, Stockpile Stewardship and Management PEIS, and Hanford Plutonium Finishing Plant Complex EIS. Spent nuclear fuel and plutonium are not considered wastes.

Comment (1109)
DOE should explain how the PEIS addresses high-level wastes and spent nuclear fuel from commercial and foreign sources.

Response
The WM PEIS does not evaluate high-level waste and spent nuclear fuel from commercial or foreign sources. DOE evaluated the spent nuclear fuel from foreign research reactors in the Foreign Spent Nuclear Fuel EIS, and will evaluate commercial spent fuel in the Yucca Mountain Repository EIS. As stated in Volume I, Section 1.7.3, this WM PEIS does analyze the environmental impacts of longer term storage of treated DOE high-level waste in the event there is a delay in the construction and operation of a geologic repository.

Comment (1112)
DOE should clarify if the PEIS looks only at DOE wastes or if it considers wastes from outside DOE.

Response
The WM PEIS analysis of programmatic waste management alternatives does not include commercially generated wastes. See Volume I, Section 1.1, for a description of the wastes analyzed in the WM PEIS. Section 1.1 in the Summary document and Section 1.5.6 in Volume I were revised to indicate that DOE generally is not responsible for the management of commercially generated radioactive wastes and that, therefore, the WM PEIS does not analyze management of such wastes. DOE is responsible for commercially generated greater-than-Class-C low-level waste and is in the process of developing strategies for doing so. Once formulated, they will be addressed in separate NEPA reviews.

DOE is also responsible for some wastes from outside DOE, such as low-level mixed waste and low-level waste from the Navy nuclear propulsion program. These include wastes generated at Bettis Atomic Power Laboratory, Charleston Naval Shipyard, Knolls Atomic Power Laboratory, Mare Island Naval Shipyard, Norfolk Naval Shipyard, Pearl Harbor Naval Shipyard, Portsmouth Naval Shipyard,

11.3 Scope

and Puget Sound Naval Shipyard. These wastes are included in the waste volumes listed in Sections 6.1.2 and 7.1.2 in Volume I of the WM PEIS.

Comment (1116)
DOE should explain what special nuclear materials (SNM) are in the SNM inventory, and if they are included in the decisions of the WM PEIS.

Response
The impacts of storage and disposition of SNM, which are not considered waste, are not within the scope of the WM PEIS, except where those impacts are cumulative with impacts from waste management activities (see Chapter 11). The WM PEIS was changed to provide a definition of SNM (see Glossary) and describe why SNM is not within the scope of the WM PEIS (see Section 1.5.6).

The impacts of the management of some DOE SNM are evaluated in the Storage and Disposition of Weapons Usable Fissile Materials PEIS and the Disposition of Surplus Highly Enriched Uranium EIS.

Comment (1527)
DOE is proceeding with the mixed waste management facility at LLNL before completion of the WM PEIS and without the benefit of a NEPA-required facility-specific EIS. DOE is moving forward with the project on the basis of an environmental assessment backed by unjustified data concluding that no significant environmental impacts would result from the mixed waste management facility which is moving forward exempt from RCRA permitting requirements and in the absence of public review or an environmental impact report under the California Environmental Quality Act.

Response
Based on the Final Environmental Assessment for the Mixed Waste Management Facility (MWMF) at LLNL, DOE issued a Finding of No Significant Impact on September 21, 1995, for the construction and operation of the MWMF. Bench scale testing was performed for developing and evaluating treatment technologies, not for treating waste. Subsequent to the bench scale testing, the MWMF project was canceled.

Comment (1529)
It is unclear if, under the WM PEIS, Site 300 and LLNL will ultimately accept civilian radioactive waste.

Response
Civilian radioactive wastes are outside the scope of this PEIS. Therefore, the management of this waste is not analyzed in the WM PEIS and decisions on this type of waste will not be made on the basis of the WM PEIS. However, waste disposal compacts are being developed, which address commercial radioactive waste disposal.

Comment (1755)
WIPP should have been evaluated in the PEIS.

Response
As described in Volume I, Section 1.1, of the WM PEIS, DOE intends to identify sites for treatment and storage for transuranic waste. For purposes of this analysis, DOE assumes that WIPP will operate

as a transuranic waste disposal facility. As described in Section 1.5.3, the WM PEIS does not evaluate transuranic waste disposal impacts. Potential long-term impacts of transuranic waste disposal at WIPP are addressed in the WIPP SEIS-II, which will be used to inform DOE's decision on whether to dispose of transuranic waste at WIPP. The WM PEIS does analyze transuranic waste treatment impacts at WIPP under the Centralized Alternative. Volume I, Chapter 8, details the associated potential impacts from this alternative.

Comment (1864)
The Draft WM PEIS is technically flawed because it fails to fully address property value issues.

Response
DOE believes that it would be too speculative to analyze the economic impacts of potential negative perceptions. In general, the environmental impacts, including changes in economic conditions, associated with waste management under all alternatives considered in the WM PEIS would be small. Thus, there is no reason to believe that waste management activities at any candidate site would have a negative effect on long-term housing demand or property values.

Comment (2164)
The PEIS is required by law to disclose and consider in one document (1) all waste and nuclear materials that might come to the Hanford Site or any other site; (2) all wastes and nuclear material on the site that require treatment, storage, and disposal; (3) storage, treatment and disposal alternatives for all the waste that comes to or might be at Hanford and their interrelated or cumulative impacts; (4) cumulative transportation and site-related impacts if all potential wastes and materials that might be sent to Hanford were shipped through the region, as in the case of spent nuclear fuel from foreign research reactors; and (5) all decontamination and decommissioning, and environmental restoration wastes at Hanford.

Response
NEPA does not require DOE to consolidate the analyses of all its programs into a single NEPA document. Some nuclear materials, such as spent nuclear fuel and special nuclear material, are not wastes and, therefore, are outside the scope of the WM PEIS. The impacts of spent nuclear fuel management are analyzed in the SNF/INEL EIS and the Foreign Research Reactor Spent Nuclear Fuel EIS. As described in Appendix B in Volume III, wastes generated by environmental restoration and decontamination and decommissioning activities are outside the scope of the WM PEIS because remediation decisions are site-specific in nature and must reflect site-specific conditions. However, the WM PEIS cumulative impacts analysis (see Chapter 11 in Volume I) considers the impacts of the preferred alternatives identified in the SNF/INEL EIS and the Foreign Research Reactor Spent Nuclear Fuel EIS, as well as other DOE EISs and programs, including transportation and other activities. Section 11.6 discusses the combined and cumulative impacts specific to Hanford. In addition, the Hanford Remedial Action EIS covers the impacts of all environmental restoration activities at Hanford.

The WM PEIS includes a reasonable siting and management alternatives for DOE's radioactive and hazardous wastes Department-wide, including Hanford. Hanford waste volumes are included in the WM PEIS.

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Comment (2174)
A commentor stated that the following waste types are left out of the WM PEIS: "SNF, transuranic if you don't open WIPP, HLW if you don't open Yucca Mountain...; hazardous waste, plutonium, plutonium residues, and scraps and solutions are left out."

Response
DOE has not left these materials out, but rather has discussed them thoroughly in this or other NEPA documents, as follows:

The treatment and storage of transuranic waste, storage of treated high-level waste, and the treatment hazardous waste are analyzed in the WM PEIS.

Spent nuclear fuel is not considered a waste. The SNF/INEL EIS evaluates DOE spent fuel management at the programmatic level, just as this PEIS evaluates the DOE Waste Management Program. In addition, the Foreign Research Reactor Spent Nuclear Fuel EIS, evaluates alternatives for the management of reactor fuel irradiated in foreign reactors.

For all action alternatives, DOE assumes that WIPP would become operational for disposal of transuranic waste. Under the No Action Alternative, the impacts of continued storage of transuranic waste at the generator sites without disposal at WIPP are analyzed. Further, as described in Volume I, Section 1.8.1, of the Final WM PEIS, DOE has prepared the WIPP SEIS-II to evaluate environmental impacts from transuranic waste disposal at WIPP. As part of the WIPP SEIS-II, the No Action Alternatives evaluate the continued management of transuranic waste at generator sites and the decommissioning or other disposition of the WIPP facility. These alternatives analyze environmental impacts if DOE decides not to use this facility for transuranic waste disposal.

If DOE is unable to open a high-level waste repository at Yucca Mountain, it would have to reevaluate its long-term plans for high-level waste disposal. The WM PEIS does not analyze the environmental impacts of disposal at Yucca Mountain or alternative locations for a geologic repository. It does, however, analyze the impacts of longer term storage of treated high-level waste if DOE has to delay the construction and operation of a national geologic repository. Impacts from the construction, operation, and closure of a geologic repository would be examined in the Yucca Mountain Repository EIS.

The Stockpile Stewardship and Management PEIS, the Fissile Materials PEIS, and the Surplus Highly Enriched Uranium EIS contain thorough discussions of the other materials listed in the comment, which are considered special nuclear materials. Special nuclear material was not analyzed in the WM PEIS because it is not considered waste, as explained in Section 1.5.6 in Volume I of the PEIS.

Comment (2261)
The WM PEIS does not include very important wastes, including several tons of plutonium not in the weapons stockpile that have been declared surplus. Several tons of plutonium that are indeed waste (scrap plutonium that is in the ductwork of some of the facilities). It is incumbent on DOE to bring the entire waste pie to the table. DOE is doling out little bits of this pie to different parts of the country in a very, very complicated manner that is impossible for the public to understand. "This might not be the type of coverup that we have seen so blatantly in the history of the Department, but is a coverup nonetheless."

Response
DOE is committed to providing as much information as possible to the public so it can receive informed comments and public input. There is no coverup of information, but rather an open and honest attempt to address a number of complex issues, some related and others not related to DOE's Waste Management Program.

The DOE Waste Management Program is separate and distinct from other programs, and DOE believes that it is appropriate to analyze it in this programmatic NEPA document. This WM PEIS is complex; it covers five major types of radioactive and hazardous waste. It does not include some wastes that DOE believes are not ready for the decisionmaking process. It also does not include some other materials (e.g., spent nuclear fuel and plutonium) because they are not wastes and/or have been the subject of other DOE EISs. Volume I, Section 1.8.1, describes these other EISs and their relationship to the WM PEIS. DOE has, to the extent possible, included the impacts identified in these other EISs in the WM PEIS cumulative impacts analysis (Volume I, Chapter 11).

The SNF/INEL EIS evaluates DOE spent nuclear fuel management at the programmatic level, just as this PEIS evaluates the DOE Waste Management Program. In addition, the Foreign Research Reactor Spent Nuclear Fuel EIS evaluates alternatives for the management of reactor fuel irradiated in foreign reactors. DOE believes that these extensive documents cover their subjects thoroughly and completely.

The Stockpile Stewardship and Management PEIS and the Storage and Disposition of Weapons-Usable Fissile Materials PEIS offer thorough discussions of DOE's projected plans for plutonium. The impacts associated with the alternatives analyzed in these EISs were considered in the WM PEIS cumulative impacts analysis.

Comment (2263)
Deputy Assistant Secretary Grumbly made a commitment in Seattle in the early part of October 1995 to include all of the relevant materials in the WM PEIS. His commitment was clear, and he made it in the presence of Governor Lowery. This process tonight [the Richland, Washington, public hearing] does not meet that commitment, and we are challenging DOE to live up to its promises.

Response
DOE believes that the WM PEIS includes all relevant materials pertinent to the proposed action to improve the management of its radioactive and hazardous wastes. The WM PEIS is DOE's national and programmatic planning tool to achieve this objective. The Waste Management Program is separate and discrete from other DOE programs, and as such is appropriately analyzed in this programmatic NEPA document. Section 1.5 in Volume I of the WM PEIS defines and discusses each of the waste types considered. For wastes and materials that are not managed by the Waste Management Program and, thus, are not evaluated in the WM PEIS, cumulative impacts are considered to the extent possible (see Chapter 11). When the Department makes decisions on this and other programs, Under-Secretary Grumbly and DOE are committed to integrated decisionmaking regarding the future of the DOE complex. Equity is one of several criteria for decisionmaking as described in Section 1.7.3 in Volume I of the WM PEIS.

In accordance with NEPA and the CEQ implementing regulations, DOE released the Draft WM PEIS for public comment. Public hearings such as the one in Richland provided an opportunity for members of the public to discuss and comment on any part of the WM PEIS, and issues relating to the materials included

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in the WM PEIS. The public comment period and hearings met the requirements for public participation under NEPA.

Comment (2403)
The PEIS should make it clear that there is no intent for long-term disposal of transuranic and high-level wastes at SRS. The section should also be clear on the risks that might drive disposal at the various DOE sites (other than WIPP and Nevada). Contingency planning should be discussed for the unplanned disposal. The analysis should also include impacts of long-term storage or disposal should the high-level waste repository be found to be unacceptable.

Response
The WM PEIS evaluates the disposal of only two waste types--low-level waste and low-level mixed waste. Sections 6.4.1.6 and 7.4.1.5, respectively, discuss the screening-level analyses that DOE used to estimate risk, and the results of the analyses including descriptions of the radionuclides that would drive the risks.

The WM PEIS does not analyze the disposal of transuranic or high-level waste at any DOE site. The WIPP SEIS-II addresses the disposal of transuranic waste, and future NEPA analyses on the potential geological repository will address the disposal of high-level waste.

For analytical purposes only, the WM PEIS assumes that vitrified high-level waste will eventually be accepted for disposal at a geologic repository at the potential location of Yucca Mountain, Nevada, and that transuranic waste will be disposed of at WIPP.

Comment (2409)
Some alternatives in the WM PEIS consider shipping WVDP high-level waste to SRS for interim storage. Include a discussion of the consequences of actions needed at SRS should this WVDP waste not be suitable for disposal.

Response
The scope of the WM PEIS does not include the issue of high-level waste treatment and disposal. Only storage of vitrified high-level waste is within the scope of the WM PEIS. Some high-level waste alternatives include shipment of WVDP vitrified high-level waste to SRS for storage. Waste would not be shipped to SRS until it is vitrified.

Chapter 9 in Volume I of the WM PEIS includes an analysis of the impacts of long-term storage of vitrified high-level waste, should capacity in a high-level waste repository not be available as anticipated. As described in Chapter 9, the impacts of long-term storage would be minor.

Comment (2412)
This PEIS, which will help guide DOE waste management for the next 20 years, does not consider high-level waste treatment, greater-than-Class-C and special-case waste management, environmental restoration wastes, tank remediation at Hanford, or the possible resumption of some activities (like fuel reprocessing) that could or will affect waste management. These activities will likely have significant impacts, but those impacts are segmented from the impacts of the activities considered in this PEIS. Such segmentation seriously undermines the usefulness of this document to decisionmakers.

Response
The WM PEIS considers critical issues that are related to waste treatment, storage, and disposal on a broad, programmatic level. However, as mentioned in this comment, DOE has excluded some activities from evaluation in the PEIS. In addition to explanations in the following paragraphs, Volume I, Chapter 1, explains DOE's reasons for excluding these waste activities. Impact estimates from activities that DOE excluded from evaluation in the PEIS are included, if available, in the cumulative impacts analysis in Chapter 11. For example, the cumulative impacts analysis includes the effects of high-level waste treatment.

The PEIS does not include greater-than-Class-C wastes or special-case wastes, as explained in Volume I, Section 1.5.6. DOE will perform NEPA reviews for management of these wastes as it develops proposals for their treatment, storage, and disposal.

The Hanford Tank Waste Remediation System EIS analyzes tank waste remediation at Hanford. It was prepared partly to fulfill DOE's commitment in the 1988 Record of Decision for the Hanford Defense Waste EIS to supplement the analysis. A description of the Tank Waste Remediation EIS and its relationship to the WM PEIS is presented in Section 1.8.1 in Volume I. The impacts of the actions analyzed in that EIS are included in the WM PEIS cumulative impacts analysis (Chapter 11).

DOE originally intended the WM PEIS to perform a programmatic analysis of the impacts associated with both the Waste Management Program and environmental restoration activities. In 1995, however, DOE determined that programmatic decisionmaking would not be possible for the Environmental Restoration Program. DOE believes that local conditions and the concerns of local stakeholders are the appropriate drivers for site-specific cleanup decisions. Additionally, DOE recognizes that the current information available about environmental restoration wastes is not sufficient for meaningful impact analysis.

After review and approval by the DOE Environmental Management Advisory Board, DOE published a *Federal Register* announcement that stated DOE's intent to remove the Environmental Restoration Program from the scope of the PEIS and to rename the document. This rescoping announcement solicited public comments for DOE consideration. Appendix A in Volume III of the WM PEIS summarizes the comments received and DOE responses to them, and outlines the means for public involvement in DOE environmental restoration planning and decisionmaking.

Although the WM PEIS will not lead to decisions on the Environmental Restoration Program, it does consider the subset of environmental restoration wastes that will be transferred to the Waste Management Program (see Appendix B). The PEIS analysis indicates that the sites and facilities selected for waste management activities are a minimum set that are needed regardless of environmental restoration transferred waste. However, future environmental restoration activities might affect necessary onsite capacity or might result in additional waste being transported to another site that was selected for treatment, storage, or disposal. As information about these wastes becomes available, additional environmental analyses would lead to appropriate decisions.

Fuel reprocessing is not a waste management activity and, therefore, was not included in the WM PEIS analysis. Moreover, DOE generally has ceased reprocessing of spent nuclear fuel because recycling of plutonium and uranium for weapons production is no longer a priority.

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Comment (2718)
The EIS analysis may be simplified to the extent of focusing on the obscure. The EIS analyzes only the impacts of storing vitrified high-level waste. The overwhelming environmental risk associated with these wastes is caused by storing the high-level waste as liquid. INEL will be storing non-vitrified high-level waste for the next 30 years. DOE should consider addressing the question of expedience in solidifying high-level waste? DOE should explain whether estimated low-level waste and/or transuranic waste to be generated from high-level waste processing is included in projected inventories.

Response
DOE's high-level waste solidification program is one of the top priorities of the Office of Environmental Management. The storage and vitrification of high-level waste has been reviewed by DOE in the SRS DWPF EIS, WVDP EIS, SNF/INEL PEIS, and the Hanford Tank Waste Remediation EIS. High-level waste vitrification facilities have been constructed at WVDP and SRS. Operations began at the SRS Defense Waste Processing Facility on March 12, 1996, and at WVDP on July 2, 1996. Vitrification processes high-level waste into a solid form that is not readily dispersible into air or leachable into groundwater or surface water. High-level waste at INEL is stored in an inert calcined form that does not pose the threat posed by storage of liquid high-level waste. Where these NEPA reviews identify high-level waste treatment impacts that add to the impacts identified in the WM PEIS, those impacts have been included in the cumulative impacts analysis in Chapter 11 in Volume I of the WM PEIS.

Low-level waste and transuranic waste generated by high-level waste treatment and stabilization are not included in projected inventories. More information on the DOE High-Level Waste Program is provided in Section 9.1 in Volume I of the WM PEIS.

Comment (3617)
The WM PEIS needs to capture and quantify the human health risks, environmental impacts, and costs.

Response
The WM PEIS documents DOE's analysis of the human health risks, environmental impacts, and costs of alternatives to manage low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste. When commentors have indicated specifically where the analysis was deficient or incorrect, DOE has made appropriate corrections and modifications. These changes are summarized in Volume I.

Comment (3689)
High-level wastes from commercial reactors that will become DOE's responsibility have been excluded from the WM PEIS. These wastes are also expected to go to the Yucca Mountain repository. The potential cumulative impacts of managing all high-level waste have not been addressed; therefore, the analysis is incomplete and not in compliance with NEPA. The commercial high-level waste is also an issue that will and has affected Native Nations. DOE's objective of sighting interim storage (monitored retrievable storage) on Native lands is highly contentious, if not despicable, creating great tensions and divisions within the Native Nations that have been approached. What is particularly important to understand about the potential monitored retrievable storage sites is that there is no reason to believe they would be temporary.

Response
Commercial nuclear reactors generate spent nuclear fuel, not high-level waste. Spent nuclear fuel is not a waste, and thus, outside the scope of the WM PEIS. Disposal of high-level waste and spent nuclear fuel at Yucca Mountain will be the subject of a separate NEPA review. Storage of spent nuclear fuel in a monitored retrievable storage facility is outside the scope of the WM PEIS.

Comment (3766)
When handled properly, hazardous waste is no threat to workers or the public. It is disposed of commercially at licensed facilities. Including hazardous waste in this study diverts the public from the real issues. DOE needs to put the hazardous waste issues to bed.

Response
The WM PEIS focuses on mixed radioactive and hazardous waste in the analysis of mixed low-level waste and transuranic waste, as well as the analysis of hazardous waste that does not contain radioactive elements. The management decision for purely hazardous waste was limited to examining whether more onsite treatment of organic wastes should occur, versus continued reliance on commercial facilities, considering that sites are also being evaluated for organic destruction facilities to treat mixed low-level waste and transuranic waste. This analysis allows DOE to consider multiple uses for its organic destruction facilities, and provides the public a more complete picture of the impacts of possible DOE activities. DOE did not evaluate disposal alternatives for hazardous waste, leaving such decisions to site-specific processes. Omission of hazardous waste in the WM PEIS would have represented a gap in DOE's analysis of alternatives for radioactive and hazardous waste that would have rendered the analysis incomplete.

Comment (4018)
The WM PEIS omits nearly 600,000 metric tons of depleted uranium currently in the DOE waste inventory. Disposition and disposal of depleted uranium is a clearly foreseeable significant Federal action with direct and indirect impacts to both human health and the natural environment, and is a most serious omission. Disposition and disposal of depleted uranium should be fully addressed and the WM PEIS should be reissued.

Response
DOE does not consider depleted uranium [primarily in the form of depleted uranium hexafluoride (DUF_6)] a waste. However, as stated in Section 1.8.1 in Volume I of the WM PEIS, which discusses the relationship of other NEPA reviews to the WM PEIS, the Long-Term Management of Depleted Uranium Hexafluoride EIS will evaluate alternative strategies for long-term management of DOE-owned DUF_6 currently stored at the K-25 Site in Oak Ridge, Tennessee; Paducah, Kentucky; and Portsmouth, Ohio.

Comment (4020)
Referencing the SNF/INEL PEIS in the WM PEIS does not adequately address disposition of spent nuclear fuel. The dangers of increasing high-level liquid wastes should be fully addressed in the WM PEIS. The material should not be made, sold, or transported.

Response
U.S. Government-owned and foreign reactor spent nuclear fuel are addressed in separate NEPA reviews, which are identified in Section 1.8.1 in Volume I of the WM PEIS. Section 1.8.1 provides

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brief discussions of the relationship of these documents to the WM PEIS, and the PEIS considers impacts from other programs on the waste management complex. For example, Section 9.4.4 in Volume I discusses the potential reprocessing of foreign research reactor spent nuclear fuel at SRS, and the high-level waste resulting from that activity. Also, Chapter 11 in Volume I of the PEIS includes the results of the SNF/INEL EIS and the Foreign Research Reactor Spent Fuel EIS in assessing cumulative impacts.

DOE assumes the comment concerns high-level liquid wastes generated during reprocessing of spent nuclear fuel and irradiated targets in nuclear defense, research, and production activities. The analysis of high-level waste management in the PEIS pertains to the interim storage of vitrified high-level waste in canisters only. Management involving storage of liquid high-level waste was not considered in the WM PEIS, as discussed in Section 9.1.1 in Volume I. Management of liquid high-level waste would occur onsite and, therefore, has or will be addressed in site-specific NEPA analyses.

Comment (4025)
Treatment of high-level waste and the direct and indirect impacts of this clearly foreseeable agency action upon human health and the environment have been omitted [from the WM PEIS]. DOE should include high-level waste treatment in a programmatic EIS.

Response
The decision to vitrify high-level waste is explained in Section 9.1. Thus the treatment of high-level waste is not within the scope of the EIS. The NEPA documents that analyze current treatment of high-level waste at Hanford, INEL, SRS and WVDP are identified in Sections 9.1.2.1, 9.1.2.2, 9.1.2.3, and 9.1.2.4, respectively. The effects of high-level waste treatment are contained in Chapter 11, Cumulative Impacts. Since decisions about treatment of high-level waste were made or were being studied during the development of the WM PEIS, the treatment decisions were not included in the WM PEIS. The WM PEIS analyzes only the impacts of storing vitrified high-level waste.

Comment (4027)
The WM PEIS does not consider buried transuranic waste even though it constitutes the most urgent and serious of transuranic waste problems. DOE should include buried transuranic waste in the WM PEIS, not merely reference the Environmental Restoration PEIS.

Response
Buried (pre-1970) transuranic waste is considered environmental restoration waste. Appendix B in Volume III of the WM PEIS discusses how those environmental restoration wastes for which responsibility could be transferred to the Waste Management Program could influence the comparison among waste management alternatives. Note that DOE is not preparing an Environmental Restoration PEIS.

Comment (4140)
The WM PEIS was supposed to be a comprehensive document. It should include all waste in the complex, including plutonium, impacts of civilian reactor fuel, and impacts of importing foreign spent fuel and naval wastes.

Response

NEPA and CEQ implementing regulations do not require DOE to consolidate all its programs into a single NEPA document. Volume I, Section 1.5.6 of the WM PEIS identifies waste types not considered in the PEIS and explains why they were not considered. Spent nuclear fuel is addressed in the SNF/INEL PEIS and the Foreign Research Reactor Spent Nuclear Fuel plutonium stored at Hanford is addressed in two ongoing DOE programmatic studies that address storage and disposition of fissile materials and stockpile stewardship and management. However, the WM PEIS cumulative impacts analysis (see Chapter 11) includes estimates of impacts from other programs including domestic and foreign research reactor spent nuclear fuel, plutonium, and high-level waste treatment. The impacts of civilian reactor fuel will be analyzed in the Yucca Mountain Repository EIS.

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

Comment (133)
Clarify how the WM PEIS fits into the overall DOE complex-wide issues and comprehensive planning, and its relationship to the Baseline Environmental Management Report (BEMR), the Federal Facility Compliance Act (FFCAct) and Site Treatment Plans, and the Risk Report. Explain how decisions on various wastes, and in documents such as the WM PEIS, Site Treatment Plans, BEMR, and EISs for other projects will be integrated at both a higher and lower level, that is, at a system-wide and a sitewide level. Clarify where and when such integration will occur. DOE should explain the separate system, if any, for managing environmental restoration and environmental management wastes.

Response
The WM PEIS is a nationwide study to help DOE develop a strategy to manage five waste types (low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste) in the nuclear weapons complex. The WM PEIS is one tool DOE will use in deciding how and where it will manage its radioactive and hazardous wastes. DOE needs to ensure safe and efficient management of these wastes and to comply with all applicable Federal and State laws to protect public health and safety.

The WM PEIS identifies the potential cost and environmental impacts of alternative waste management scenarios that could be implemented for each type of DOE waste. After selecting the overall strategy that identifies where DOE will locate waste management facilities, DOE would conduct site-specific NEPA reviews, as necessary, before building any waste management facilities or transporting waste.

Along with other studies such as BEMR, FFCAct STPs, and other EISs, the WM PEIS provides decisionmakers with a national perspective to compare impacts of various strategies. Section 1.8.2 in Volume I of the WM PEIS discusses the other actions and programs taken into account in the PEIS. DOE has updated Section 1.8.1 to include new information and additional relevant EISs.

BEMR is a DOE report required by Congress to specify all activities and projects within the Environmental Management Program. The most current BEMR, submitted in June 1996, was based on a broad range of assumptions regarding the outcome of various decisionmaking processes that will determine the ultimate disposition of DOE facilities and sites and, thus, the scope and pace of the program. One of the key assumptions was related to the location of sites for waste management facilities. BEMR used *current* plans and agreements to define where wastes could be treated and disposed of. The WM PEIS, however, examined alternative configurations in addition to the one which DOE is now using to develop the BEMR cost estimates.

The FFCAct waives the sovereign immunity of DOE by allowing States and EPA to impose penalties for noncompliance with RCRA and requires DOE to develop plans for developing treatment capacity for treating the hazardous components of radioactive wastes (i.e., mixed wastes) subject to RCRA requirements. Pursuant to the FFCAct, STPs are developed by DOE with involvement by the States and EPA. The preparation of the WM PEIS has been accomplished in parallel with the process for development of the STPs.

The Risk Report, which was prepared in 1995, relates to the prioritization of DOE environmental restoration and waste management activities. It used information from many sources, including the WM PEIS. The Risk Report evaluated risk to workers, to the public, and to the environment from all

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

Environmental Management Program activities, not just cleanup. The Final WM PEIS describes the Risk Report in Section 1.8.2 in Volume I.

DOE's Environmental Management Program includes the Waste Management and Environmental Restoration Programs. The Environmental Restoration Program encompasses remedial actions and decontamination and decommissioning. Section 1.8.2 of the WM PEIS includes a description of the Environmental Restoration Program. The waste generated from environmental restoration activities is not analyzed in the WM PEIS because of the site-specific nature of these activities. However, Appendix B of the WM PEIS presents estimated volumes of environmental restoration wastes that could come into the waste management complex and discusses how environmental restoration activities could influence the Waste Management Program.

DOE has for several years explored alternatives for public participation in decisionmaking and policy development for waste management and environmental restoration. Such alternatives vary, depending on the nature of the activity to be discussed or the pending decision. For example, public participation in DOE activities regarding environmental restoration frequently occurs at the site level, because these activities typically concern site-specific cleanup actions. In such cases, DOE uses a variety of methods to provide the public with opportunities for dialogue, including general public meetings and forums and participation in site advisory boards. Recent efforts to enhance public participation in decisionmaking include the National Dialogue and Environmental Management Ten Year Plan discussed in Section 1.8.2 in Volume I of the WM PEIS. Additionally, Appendix A in Volume III outlines the means for public involvement in planning and decisionmaking for DOE's environmental restoration activities.

Comment (153)
The assumption made for Hanford that defense waste will be treated, stored, and disposed of in accordance with the Hanford Defense Waste EIS is wrong.

Response
The commentor is correct. The management strategy in the Hanford Defense Waste EIS has been superseded by the Hanford Tri-Party Agreement. The Hanford Defense Waste EIS, however, is used in Chapter 9 (Volume I) of the WM PEIS only as a source of estimates of volumes of high-level waste at Hanford and for defining the No Action Alternative. DOE acknowledges the role of the Tri-Party Agreement in waste management actions at Hanford and discusses the Tri-Party Agreement in Section 9.3.5.

Comment (160)
FEMP's existing Records of Decision, Consent Agreements, and Site Treatment Plans, especially the 10-year accelerated remediation plan, should not be impacted by the WM PEIS.

Response
The preparation of the WM PEIS was accomplished in parallel with the development of the Site Treatment Plans. DOE assumes the commentor is referring to CERCLA Records of Decision. Existing Records of Decision and agreements will be considered in programmatic waste management decisionmaking. DOE does not anticipate that its programmatic waste management decisions would impede cleanup plans at FEMP. However, it is possible that some site-specific decisions will need to be revisited as a result of the decisions stemming from the WM PEIS. DOE recognizes that specific procedures, including consultation

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

with stakeholders and regulatory authorities, would need to be followed before previous site-specific decisions could be altered to conform to programmatic strategies.

Comment (489)
The WM PEIS needs to include a discussion of waste inventories associated with weapons dismantlement materials and highly enriched uranium disposition.

Response
Section 1.8.1 of the Final WM PEIS discusses related NEPA documents, such as those which analyze weapons-usable fissile materials including the Stockpile Stewardship and Management PEIS and the Storage and Disposition of Weapons-Usable Fissile Materials PEIS, and highly enriched uranium in the Disposition of Surplus Highly Enriched Uranium EIS. The total amount of weapons-usable plutonium and highly enriched uranium considered for disposition, as wastes or for reuse, is approximately 250 metric tons, an amount that is small in comparison to other DOE wastes. Wastes resulting from those actions under DOE initiatives would be treated, stored, and disposed of in accordance with the decisions based on the WM PEIS. In addition, the Pantex Plant Sitewide EIS identifies wastes generated from various levels of weapons dismantlement activities.

Comment (508)
What environmental documentation would determine how waste destined for the WIPP in New Mexico would have to be treated to qualify for disposal at that facility? What is the schedule for completing the WIPP Disposal Phase Supplemental EIS (WIPP SEIS-II)?

Response
The Draft WIPP SEIS-II was issued for public review in November 1996. The Record of Decision is scheduled to be issued in June 1997. As described in Volume I, Section 1.8.1 of the WM PEIS, the WIPP SEIS-II will be used to inform DOE's decision on the minimum level of treatment needed to meet the waste acceptance criteria for transuranic waste disposal at WIPP.

Comment (509)
DOE needs to explain how the WM PEIS relates to other EISs on such issues as transportation and cultural resources.

Response
Section 1.8 in Volume I of the WM PEIS describes the relationship of this PEIS to other actions and programs, including other EISs. Sitewide or project-level NEPA documents are generally more precise than programmatic NEPA documents with regard to detailed site parameters, including transportation and cultural resources.

Chapter 11 in Volume I describes cumulative impacts, including impacts described in other EISs. Some impacts that were addressed in the individual waste-type chapters of the WM PEIS were not considered in the cumulative impacts analysis for various reasons. For example, impacts to cultural resources were not combined because they depend on location-specific factors and mitigation developed during implementation, which are not addressed in this programmatic EIS. DOE updated Section 1.8 (formerly Section 1.7.4) and Chapter 11 of the WM PEIS to include new information and additional relevant EISs.

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

Comment (1103)
DOE should clearly explain the importance of the WM PEIS to activities at the FEMP.

Response
The WM PEIS is directly relevant to the low-level mixed waste activities at FEMP because it evaluates the effects of the waste management facilities required to treat and dispose of the site's low-level mixed waste volumes. Chapter 6 in Volume I of the WM PEIS describes the impacts of the alternatives of managing low-level mixed waste at FEMP. FEMP was also included as a candidate site for management of low-level waste. However, since all onsite low-level waste at FEMP is currently considered to be environmental restoration waste, it was not evaluated. Some offsite low-level waste was evaluated for treatment at FEMP under Regionalized Alternative 2, as described in Chapter 7 (Volume I).

Because the WM PEIS does not address environmental restoration actions and decisions, it is not as relevant to such activities at FEMP. The cumulative effects that could occur from the implementation of waste management activities and environmental restoration activities are discussed in Chapter 11 in Volume I; however, radiological effects of environmental restoration activities at FEMP are not included in the cumulative analysis because of differences in analytical approaches. The analyses of environmental restoration activities report health effects as Incidental Lifetime Cancer Risk (ILCR). ILCR includes risks from radionuclide and chemical exposure. Therefore, ILCRs cannot be added directly to the radiological dose and latent cancer fatality risk parameters used in the WM PEIS cumulative impacts section. The PEIS also discusses the relationship of environmental restoration waste volumes projected to be transferred to the Waste Management Program and how that transferred waste could affect the comparison among waste management alternatives (see Appendix B, Volume III).

Comment (1138)
Several commentors stated that preparing a separate PEIS on waste management is segmentation. Commentors stated that there should be a comprehensive analysis of production, waste management, and environmental restoration in one PEIS, but that DOE has continued to proliferate PEIS's to prevent such a comprehensive analysis. Rather than having one comprehensive PEIS or even the two that DOE announced in 1990, DOE now has seven PEISs--Spent Fuel, Foreign Research Reactor Nuclear Fuel, Tritium, Stockpile Stewardship and Management, Fissile Materials, Highly Enriched Uranium, and Waste Management--and still no PEIS for environmental restoration. One commentor stated that all activities with the potential to release radionuclides and hazardous chemicals should be analyzed together to calculate the total dose of all combined releases.

Response
NEPA and CEQ implementing regulations recognize that separate NEPA reviews are justified for an agency's programs due to timing or the need for specificity or in-depth analyses. By preparing separate environmental impact analyses on a number of extremely complex subjects, DOE has not ignored a comprehensive analysis (as suggested in the comment), but rather has developed a more in-depth body of information by preparing a number of PEISs. Moreover, the cumulative impacts analysis in this WM PEIS (Volume I, Chapter 11) includes the impacts of the preferred alternatives in the NEPA analyses prepared for other DOE programs, allowing DOE to evaluate the impacts of DOE's operations as a whole.

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

Preparing separate EISs on separate but related programs does not avoid the necessity for coordination among the programs to ensure integrated decisions and consistent presentation of information. DOE, therefore, has made every effort to ensure that the WM PEIS is generally consistent with other related EISs, including those cited in the comment. Section 1.8 in Volume I of the WM PEIS discusses these related EISs, as well as other DOE programs, and their relationship to the WM PEIS.

DOE reviews every proposal to prepare a NEPA document to determine if the decision is sound and in compliance with CEQ regulations and guidelines on segmentation and interim actions. Any decision to prepare a NEPA document, including those listed by the commentor, must comply with those criteria. DOE believes that the preparation of one environmental impact statement on all DOE activities (operations, environmental restoration, and waste management) would necessarily be so broad that it would result in an essentially meaningless and unmanageable analysis. DOE is committed, as a matter of policy, to prepare sitewide EISs for most of its large, multi-facility sites. DOE believes that sitewide analyses result in a meaningful assessment of all of DOE activities at a particular location.

Section 1.7.1 in Volume I of the WM PEIS describes the DOE rationale for not including environmental restoration impacts in the PEIS. DOE determined that its original intention to include both environmental restoration and waste management was not appropriate, primarily because environmental restoration decisions tend to be site-specific and, therefore, do not lend themselves to programmatic decisions.

The WM PEIS does contain information on the anticipated waste volumes generated as a result of restoration activities and a qualitative discussion of the extent to which those environmental restoration waste volumes, for which responsibility could be transferred to the Waste Management Program, could affect the comparison among waste management alternatives. See Appendix B in Volume III, and Sections 6.15, 7.15, and 8.15 in Volume I.

The impacts of environmental restoration activities will be evaluated in separate site-specific environmental analyses prepared in support of the RCRA corrective action and CERCLA remedial action processes.

Comment (1517)
The PEIS is a wholesale segmentation of environmental review because waste remediation is being considered separately from waste management.

Response
Section 1.7.1 in Volume I of the WM PEIS describes DOE's rationale for not including environmental restoration impacts in the PEIS. DOE determined that its original intention to include both environmental restoration and waste management was not appropriate, primarily because environmental restoration decisions are site-specific and, therefore, do not lend themselves to programmatic decisions.

The WM PEIS focuses on waste management alternatives. It does not analyze environmental restoration alternatives, but it does contain information on the anticipated waste volumes generated as a result of restoration activities and a qualitative discussion of the extent to which such volumes could affect the comparison among waste management alternatives. See Appendix B in Volume III.

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

Chapter 11 in Volume I describes the cumulative impacts for each site from a number of different programs. To the extent possible, Chapter 11 considers environmental restoration and existing operations.

Comment (1611)
DOE needs to correct the inconsistencies between documents such as the Baseline Environmental Management Report, the NTS EIS, and the WM PEIS. For example, the number of waste shipments and amount of waste analyzed for NTS differ greatly from document to document. Conflicting information can damage DOE's credibility.

Response
The WM PEIS evaluates programmatic alternatives concerning DOE's management of five waste types in the nuclear weapons complex. As such, it must address waste amounts in a more general way than individual site projects or programs. Volume I, Section 1.8, explains the relationship between the WM PEIS and the other documents cited by the commentor.

Inconsistencies in waste data among documents arise for several reasons. Waste inventories change over time as the waste is treated or disposed of and as new waste is generated. Furthermore, characterization of the waste can result in reclassification to a different waste type. For example, waste assumed to be transuranic waste might be found to actually be low-level waste upon more thorough testing. Waste generation estimates could change as estimates of future work and technologies change. Accordingly, waste data reported in documents produced at different times might be somewhat different.

In addition, the time periods analyzed in other documents might be different, resulting in different totals being reported. For example, the WM PEIS analysis covers 20 years in order to better compare a wide variety of treatment and disposal alternatives. The Baseline Environmental Management Report was a report mandated by Congress that was required to consider all waste generated throughout the life of the waste management complex.

Comment (1614)
There is a need for a national level of dialogue on low-level waste disposal, which is being ignored by the segmented approaches of the various DOE EISs.

Response
DOE recognizes the need to develop an effective decisionmaking process to integrate waste management and radioactive materials disposition. In 1995, DOE began a "National Dialogue" on radioactive waste and materials dispositions through discussions with interested States, site-specific advisory boards, and their forums on these issues. This process is described in Volume I, Section 1.8.2.

In addition, DOE has completed a comprehensive Department-wide review of its management of low-level waste and the radioactive component of low-level mixed waste, which includes evaluation of low-level waste disposal. The Final Complex-Wide Review Report, available in DOE public reading rooms, was published April 30, 1996, and will be used in conjunction with the WM PEIS to make decisions on low-level waste management. The complex-wide review is further described in Section 1.8.2 in Volume I of the WM PEIS. DOE public reading rooms are listed in Section 1.9 in Volume I of the Final WM PEIS.

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

Comment (1662)
Discrepancies identified in current environmental documents related to the shipment and disposal of low-level waste contribute to an incoherent proposal from DOE. Shipping volumes are up to five times higher than volumes reported in the NTS EIS. A comprehensive response to the WM PEIS is not possible without resolution of these discrepancies.

Response
Discrepancies in the shipment numbers exist due to the 20-year analysis period assumed by the WM PEIS as compared to 10 years for the NTS EIS, and shipments based on weight (most shipments were estimated to be weight- rather than volume-limited) in the WM PEIS versus volume, as in the NTS EIS. The WM PEIS results are valid for programmatic decisionmaking because the same assumptions were used for all alternatives and the relative potential risks provide the necessary information to evaluate programmatic alternatives.

During the preparation of the WM PEIS, DOE reviewed other NEPA documents, including the NTS EIS, to ensure that these documents present information that is as consistent as possible. DOE acknowledges that some estimated values in the WM PEIS might be higher than comparable values presented in site-specific NEPA documents. DOE believes that the use of these higher, more conservative values is acceptable because they include the potential impacts of the actions discussed in the lower tier evaluations and provide programmatic flexibility to accommodate frequently changing inventory projections.

Comment (1667)
The NTS EIS reported relatively low total risks, and the percentage of health effects due to the radiological nature of the cargo are a small percentage of the total risk. In the WM PEIS, the total number of predicted health effects and the percentage of health effects due to low-level waste radiation are potentially significant.

Response
The primary differences in estimated routine exposures between the WM PEIS and the NTS EIS are due to shielding considerations and the assumed values for the external dose rates from low-level waste shipments. As discussed in Section E.6.2.2 in Volume IV, the PEIS used an external dose rate of 1 millirem per hour at 1 meter for the low-level waste shipments. This estimate, which is based on historic DOE low-level waste shipments, is appropriate for the Department-wide programmatic nature of the WM PEIS. The NTS EIS based its estimated external dose rates on site inventories and assumed shipment configurations, resulting in some dose rates that were as much as two orders of magnitude less than 1 millirem per hour at 1 meter. In addition, the PEIS took no credit for potential shielding between the waste package and the crew or the public, in order to be conservative by tending to overestimate doses. On the other hand, the NTS EIS factored in mitigation measures in order to keep radiation exposure as low as reasonably achievable, thereby reducing the estimated exposure doses to the crew and public.

Accordingly, estimated health effects from radiological exposure during the routine transportation of low-level waste are higher in the WM PEIS than in the NTS EIS. At the same time, estimated nonradiological fatalities from physical trauma are roughly equivalent on a per kilometer basis. Therefore, the percentage of estimated radiological health effects (potential fatalities) is higher in the WM PEIS low-level waste transportation assessment than in the NTS EIS.

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

DOE reviewed other NEPA documents, including the NTS EIS, to ensure that, to the extent possible, those documents present consistent information. However, some of the values used in the WM PEIS might be higher than some used in project-level or sitewide EISs. In most cases, this is acceptable because the PEIS estimates tend to overestimate the impacts of the site-specific analyses. Two Centralized Alternatives in the WM PEIS propose that the NTS dispose of all low-level waste within the complex. Disposing of these large volumes of low-level waste would result in higher risks than those reported in NTS site-specific document.

Comment (1690)
Referring to Volume I, Section 1.7.4, a commentor asked whether portions of the Baseline Environmental Management Report (BEMR) relating to the opening dates of key facilities (e.g., WIPP, Yucca Mountain, etc.) were used in the WM PEIS or was an independent analysis of the openings performed by the PEIS?

Response
The BEMR analysis was not directly used in determining the opening dates for the national geologic repository and WIPP. Volume I of the 1996 BEMR indicates that the BEMR analysis assumed that high-level waste would be accepted by the national geologic repository beginning in 2016, with WIPP accepting waste in 1998. For the high-level waste repository, the BEMR and WM PEIS analysis differ. It was assumed in the WM PEIS that the national geologic repository would start accepting high-level waste in 2015. As stated above, the BEMR analysis assumes a delay to 2016 for the national geologic repository. The potential impacts of delaying opening of the high-level waste national geologic repository were evaluated in the WM PEIS for Centralized Alternative 2. The potential impacts of the first 20 years of longer term storage of transuranic waste at the treatment sites, assuming a delayed opening of WIPP, are analyzed in the WM PEIS under the transuranic waste No Action Alternative. The impacts of storage beyond 20 years are analyzed as part of the No Action Alternatives in the WIPP SEIS-II.

Comment (2147)
One commentor asked when the U.S. agreement on the receipt of European spent fuel would expire.

Response
DOE analyzed foreign research reactor fuel in the Foreign Research Reactor Spent Nuclear Fuel EIS. The Record of Decision was issued in May 1996. This agreement allows for acceptance of spent nuclear fuel from 1996 to 2009.

Comment (2189)
DOE is already implementing alternatives at PGDP that are a part of the decisionmaking process associated with the WM PEIS. This violates CEQ regulations under limitation of actions. Vitrifying waste limits the alternatives available to the site for transuranic waste treatment.

Response
DOE is preparing some site-specific NEPA documents on waste management facilities in parallel with the preparation of the WM PEIS to expedite compliance with site-specific agreements, the Federal Facility Compliance Act, and its responsibilities under NEPA. For example, PGDP has several agreements with the Commonwealth of Kentucky and EPA Region IV that require PGDP to treat and

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

dispose of its RCRA and Toxic Substances Control Act waste within 1 year. Prior to a startup of the vitrification project, PGDP will have conducted a NEPA review.

The WM PEIS will not be used to select waste management technologies and, therefore, does not analyze alternative technologies. Any technologies used in the WM PEIS analyses were used as representative technologies only, for the purpose of comparing potential impacts of waste management activities across sites. Therefore, the implementation of a specific technology, such as waste vitrification, at a site prior to the completion of the WM PEIS would not limit the WM PEIS alternatives.

Any actions undertaken by DOE at PGDP before the Final WM PEIS is issued will have complied with the limitations on action during the development of a programmatic EIS set forth in 40 CFR 1506(c). However, once decisions are made resulting from the WM PEIS, prior sitewide or project-level decisions may be reevaluated to ensure consistency with the subsequent programmatic decisions. More detail on the relationship of the WM PEIS to other NEPA documents is provided in Section 1.8.1 in Volume I of the WM PEIS.

Comment (2244)
There is a chart in the WM PEIS that lists EISs and related material. Clarify how these documents relate to the PEIS, impact the PEIS, and explain how these EISs interact.

Response
Section 1.8.1 in Volume I of the Final WM PEIS provides a comprehensive description of other EISs that are related to the WM PEIS, including a discussion of how they relate to or impact the PEIS. Chapter 11 in Volume I contains a summary of cumulative impacts at each of the 17 sites, including the impacts identified in other related studies.

Comment (2245)
The WM PEIS should clarify if DOE will conduct site-specific NEPA studies before waste management alternatives are implemented.

Response
Volume I, Section 1.7.3, states that DOE will use the analyses presented in the PEIS to decide on a programmatic or strategic approach to managing its waste. DOE intends to select a configuration of DOE sites for waste management activities on the basis of the WM PEIS and other factors. The level of analysis in the WM PEIS is appropriate for making broad programmatic decisions on what DOE sites should be used for waste management. At the programmatic level, however, it is not possible to take into account special requirements for particular waste streams, different technologies that are or may be available to manage particular wastes, or site-specific environmental considerations such as the presence of culturally important resources or endangered species at a specific location on a site. DOE will rely upon other NEPA reviews, primarily ones that evaluate particular locations on sites or projects (sitewide or project-level reviews), for these analyses. Thus, decisions regarding specific locations or technologies for waste management facilities at DOE sites or the waste management technologies to be used will be made on the basis of sitewide or project-level NEPA reviews.

In addition, Section 1.8 and Chapter 11, discuss project-level and site-specific NEPA documents which consider waste management facilities in parallel with the preparation of the WM PEIS.

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

Comment (2255)
The WM PEIS used data that was generated for the Baseline Environmental Management Report (BEMR), which was never subjected to public reviews. Using the waste volume information from that report as a basis for this PEIS might be inappropriate. Furthermore, WM PEIS Appendix B notes that the environmental restoration waste volumes expected to come into the Waste Management Program do not appear in the published volumes of BEMR, but were provided from internal BEMR working documents. If DOE is going to continue to use BEMR-generated information, that material should be released for public comment so that we can make certain that we all agree that the assumptions are correct.

Response
It would be impractical to submit all source information for public review and approval. To be consistent, it was appropriate to use the environmental restoration waste data from BEMR. The Final WM PEIS includes environmental restoration waste data used for the 1996 BEMR (see Appendix B in Volume III). These are the latest available data and have been approved by the sites and by the DOE Environmental Restoration Program.

Comment (2264)
In Section 1.7.4 in Volume I of the PEIS, there is a fairly comprehensive list of relevant NEPA processes and other EISs. Listing these EISs is not sufficient. The entire pie should be put on the table so that everyone in this country has an opportunity to evaluate what the risks are, determine what the capabilities are in their particular part of the country for dealing with these risks, and equitably distribute the risks, once and for all. The piecemeal approach is a coverup for DOE's problems, and the public around Hanford will not stand for it.

Response
DOE is committed to providing as much information as possible to the public so the Department can receive informed comments and public input. There is no coverup of information, but rather an open and honest attempt to address a number of complex issues, some related and others not related to DOE's Waste Management Program. By preparing separate EISs on a number of complex subjects, DOE has not prevented a comprehensive analysis, as suggested in the comment, but rather has developed a more in-depth body of information.

The DOE Waste Management Program is separate and distinct from other programs, and DOE believes that it is appropriate to analyze it in this separate programmatic NEPA document. The WM PEIS is complex; it covers five major types of radioactive and hazardous waste. It does not include some wastes that DOE believes are not ready for the decisionmaking process, and other materials (e.g., spent nuclear fuel) because they are not wastes. However, DOE has, to the extent possible, included the impacts of these in the cumulative impact analysis in Volume I, Chapter 11.

DOE has revised Chapter 11 in the Final WM PEIS to provide a more comprehensive evaluation of other DOE actions that could affect the sites, including the Hanford Site.

DOE must select alternatives to meet the urgent national priority for safe and efficient waste management. While residents might perceive that one approach, such as Decentralization, offers particular benefits or damage to a community or region, DOE must base its final decision on the diverse national needs and issues that affect many sites and regions. DOE has revised its list of

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decision factors in Section 1.7.3 in Volume I to include equity. DOE will favor alternatives that tend to distribute waste management facilities in a manner that is equitable.

Comment (2301)
DOE must organize the timing and review of its WM PEIS and other related documents, to permit review, response, and interaction time for local review groups, etc., with those making the recommendations.

Response
DOE has provided a variety of opportunities for reviews by local groups over the past 6 years of this PEIS process, including the 5-month public review for the Draft WM PEIS. See Section 1.7.2 in Volume I of the Final WM PEIS, which describes public involvement and review for this PEIS. The timing of reviews of NEPA documents is determined by the NEPA requirements of individual programs. NEPA does not preclude holding simultaneous reviews of a number of independent NEPA documents. Volume I, Chapter 11, does provide information on the consequences of multiple actions for each site, to the extent that such information is available.

Comment (2318)
The WM PEIS should include the values of the Hanford Future Site Uses Working Group, values from the Tank Waste Remediation System Rebaselining Task Force, and comments and discussions from the public.

Response
The decision criteria and factors to be used in the cited reports contain valuable stakeholder Tribal Nation input and values and were considered in the selection of WM PEIS preferred alternatives (see Section 1.7.3 in Volume I). Input from the general public has occurred during the public scoping period, early in the development of the PEIS, and during the public comment period on the Draft WM PEIS.

Comment (2425)
The WM PEIS mentions that because of Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-2, a DOE complex-wide review of low-level waste management is under way. It should also note that DNFSB's intent is to upgrade DOE low-level waste management, bringing it more in line with commercial and international standards.

Response
DOE has expanded the discussion of DNFSB Recommendation 94-2 in Volume I, Section 1.8.2, to more fully inform readers of the nature of the DNFSB concerns and DOE's actions to address those concerns.

Comment (2428)
Volume I, Chapter 1, discusses other actions under way and also quotes from 40 CFR 1506.1(c) regarding the taking of actions that might prejudice a NEPA decision. With all the other activities taking place in the DOE complex, how can they not bias this PEIS?

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Response
40 CFR 1506.1(c) does not restrict the performance of NEPA analyses or the issuance of EISs. This regulation prohibits agencies from taking other major Federal actions (i.e., the implementation of a Record of Decision) that would prejudice the ultimate decision on an EIS. An interim action prejudices the ultimate decision on the program when it tends to determine subsequent development or limit alternatives. DOE will review the implementation of each DOE Record of Decision to ensure there is no prejudice to the WM PEIS decisions, as noted in Volume I, Section 1.8.1. DOE evaluates every action it takes to ensure compliance with 40 CFR 1506.1(c) before it implements that action.

Comment (2571)
It is unclear how tiering works. The WM PEIS Summary document states that decisions regarding the actual location of waste management facilities at particular DOE sites will not be made on the basis of this PEIS, but rather will be the subject of site-specific NEPA documents. Then what is the purpose of this EIS? A site-specific waste management EIS has already been done for INEL and for SRS. How does the PEIS integrate the decisions made in these documents?

Response
The WM PEIS is a nationwide study to help DOE develop a strategy to manage five waste types (low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste) in the DOE complex. The WM PEIS is one tool DOE will use in deciding how and where it will manage its radioactive and hazardous wastes. DOE needs to ensure safe and efficient management of these wastes and to comply with all applicable Federal and State laws to protect public health and safety.

As described in Section 1.8.1 in Volume I of the Final WM PEIS, three levels or "tiers" of NEPA documentation may be prepared: programmatic, sitewide, and project-level. Programmatic documents, such as the WM PEIS, inform decisions on broad agency actions, such as the adoption of future proposed plans, programs, and strategies. The second-tier, sitewide NEPA documents, allow DOE to consider changes in the overall operation of a site, including mission changes, and provide a current environmental baseline for the site, both to support and to simplify project-level NEPA documents. The third-tier, project-level NEPA documents, evaluate the impacts of a specific project proposed for a specific location on a site, and are intended to identify and evaluate alternatives on how the facility should be sited, constructed, and operated. Sitewide NEPA documents, which evaluate projects that could be implemented in the near-term at a site, would also include project-level NEPA reviews if sufficient information is available to allow the proposed to be adequately analyzed.

Comment (2591)
How does the Final Tritium Supply EIS affect the cumulative impacts analysis?

Response
DOE published the Final Tritium Supply and Recycling PEIS in October 1995. It analyzes alternatives associated with new tritium production and recycling of tritium recovered from nuclear weapons retired from service. The Record of Decision based on the Tritium Supply and Recycling PEIS included two courses of action, either tritium production in a commercial reactor or development of an accelerator at SRS. The Tritium Supply and Recycling PEIS and its Record of Decision are included in the WM PEIS cumulative impacts analysis presented in Chapter 11 in Volume I. Table 11.17-2, the "Other Actions" column, includes impacts from the Tritium Supply and Recycling PEIS for SRS.

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Comment (2689)
Preferred alternatives selected by DOE do not appear to be contrary to the Nuclear Waste Agreement negotiated by the State of Idaho with DOE. This should be confirmed and documented in the WM PEIS for each preferred alternative.

Response
The WM PEIS is DOE's NEPA review for its Waste Management Program. NEPA requires Federal agencies to include a discussion of reasonable alternatives to the proposed action in an EIS. An agency must provide sufficient information for each alternative to allow reviewers to evaluate the comparative merits of those alternatives.

While the WM PEIS is a national and programmatic study to assist DOE in formulating and implementing a strategy for its Waste Management Program, actual programmatic decisions will be announced in Records of Decision. The decisions will be based on this WM PEIS, regulatory compliance, compliance with site agreements with States, national priorities, budgets, schedules, and other DOE studies. Thus, the decision process will include consideration of the Nuclear Waste Agreement.

Comment (2710)
The WM PEIS does not consider binding Records of Decision are in place at some sites that eliminate some alternatives considered in the WM PEIS.

Response
As discussed in Volume I, Section 3.2, the CEQ regulations implementing NEPA require Federal agencies to include a discussion of reasonable alternatives and provide sufficient information for each alternative, even if alternatives are not within the agency's jurisdiction (e.g., in conflict with current law), so that reviewers can evaluate the comparative merits of those alternatives. Sections 1.7.3 and 3.5 in Volume I discuss the methodology for identifying alternatives.

DOE will use the analyses presented in the WM PEIS to decide on a programmatic or strategic approach to managing its waste. DOE intends to select a configuration of DOE sites for waste management activities on the basis of the WM PEIS and other factors. DOE will rely upon other NEPA reviews, primarily ones that evaluate particular locations on sites or projects (sitewide or project-level reviews), for decisions regarding specific locations or technologies for waste management facilities at DOE sites or the waste management technologies to be used.

In addition to preparing sitewide or project-level NEPA reviews, DOE would also rely upon reviews that have already been completed. Existing sitewide and project-level NEPA analyses will be reviewed to determine whether modifications are needed to implement the decisions based on evaluations in the WM PEIS.

Comment (3034)
Table 1.7-1 overlooks the Hanford Remedial Action EIS and the Fissile Materials and Pantex EISs, which include options affecting the Hanford Site.

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Response
Section 1.8.1 in Volume I of the Final WM PEIS includes a more comprehensive discussion of related NEPA documents, including those mentioned by the commentors.

Comment (3169)
A commentor is concerned that the WM PEIS used the Baseline Environmental Management Report as its source for estimated waste volumes and urges DOE to work with individual sites to verify and validate these estimates, as well as other identified assumptions.

Response
The estimates of waste volumes used in the 1996 Baseline Environmental Management Report were actually taken from baseline reports originally generated by each site to support the WM PEIS and program planning efforts. As described in WM PEIS Appendix B (Volume III) and Sections 6.15, 7.15, 8.15, and 10.15 (Volume I), environmental restoration waste volumes were updated for the Final WM PEIS based on the database used for the 1996 Baseline Environmental Management Report, which was the best information available when the Final WM PEIS was prepared. The environmental restoration waste volumes at certain sites have substantially increased based on the updated data. The WM PEIS contains a qualitative discussion on the potential transfer of some environmental restoration wastes to Waste management Program responsibility. Much of the environmental restoration waste is likely to be managed in place or in environmental restoration facilities. Environmental restoration waste management decisions will be made on a site-by-site basis.

Comment (3174)
It is essential that DOE submit the risk analysis in the Hanford Remedial Action EIS, the Tank Waste Remediation System EIS, and the WM PEIS to independent technical peer review and then through a second review by Federal, State, Tribal agencies and departments before publication of final EISs and Records of Decision. The public and regulators cannot assess the technical adequacy of the risk analyses in these EISs in a 30 to 60 day comment period.

Response
The issues analyzed in the Hanford Remedial Action and Tank Waste Remediation System EISs are outside the scope of the WM PEIS, which is a national and programmatic study on DOE's Waste Management Program. The WM PEIS risk analysis used state-of-the-art models and conservative assumptions. The health risk methods were subjected to peer review by EPA and others before being used in the WM PEIS. Moreover, DOE provided a 150-day public comment period to allow for detailed review.

Comment (3276)
Storage alternatives for high-level waste are not sufficiently analyzed. While the WM PEIS states that high-level waste treatment and disposal are not within the range of decisions to be considered under this PEIS, treatment and disposal are integral parts of a comprehensive waste management policy. Assuming the existence of and then analyzing a single disposal alternative, Yucca Mountain in this case, is contrary to the intent of NEPA.

Response
The treatment of high-level waste is not within the scope of the WM PEIS, as explained in Volume I, Section 9.1.1. However, impacts related to high-level waste treatment, where known, have been added

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to the revised cumulative impacts analysis sections of Chapter 11 for the Hanford Site, INEL, SRS, and WVDP. These estimates of potential risks from recent site-specific NEPA analyses (e.g., Hanford Tank Waste Remediation System and WVDP Completion and Closure EISs) are based on additional detailed site-specific information.

Impacts from transportation of high-level waste are included in the cumulative impacts analysis in Volume I, Section 11.20 of the WM PEIS. Impacts from high-level waste disposal at Yucca Mountain are not included in the cumulative impacts section for NTS because the Yucca Mountain Repository EIS is just getting under way. If the high-level waste repository is not established at Yucca Mountain, DOE would have to reevaluate long-term plans for disposition of high-level waste. The WM PEIS does not analyze environmental impacts of disposal at Yucca Mountain or alternative locations for a geologic repository. However, the WM PEIS does analyze the environmental impacts of the longer term storage of treated high-level waste in the event that the construction and operation of a national geologic repository is delayed. Impacts from the construction, operation, and closure of a geologic repository would be examined in the Yucca Mountain Repository EIS.

Comment (3553)
It is not clear how the WM PEIS will tier down to site-specific EISs for waste management. DOE seems to be equally perplexed with the information presented--only three preferred alternatives are tentatively identified.

Response
The WM PEIS is a nationwide study to help DOE develop a strategy to manage five waste types (low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste) in the DOE complex. The WM PEIS is one tool DOE will use in deciding how and where it will manage its radioactive and hazardous wastes. DOE needs to ensure safe and efficient management of these wastes and to comply with all applicable Federal and State laws to protect public health and safety.

As described in Section 1.8.1 in Volume I of the Final WM PEIS, three levels or "tiers" of NEPA documentation may be prepared: programmatic, sitewide, and project-level. Programmatic documents, such as the WM PEIS, inform decisions on broad agency actions, such as the adoption of future proposed plans, programs, and strategies. The second-tier, sitewide NEPA documents, allow DOE to consider changes in the overall operation of a site, including mission changes, and provide a current environmental baseline for the site, both to support and to simplify project-level NEPA documents. The third-tier, project-level NEPA documents, evaluate the impacts of a specific project proposed for a specific location on a site, and are intended to identify and evaluate alternatives on how the facility should be sited, constructed, and operated. Sitewide NEPA documents, which evaluate projects that could be implemented in the near-term at a site, would also include project-level NEPA reviews if sufficient information is available to allow the proposed to be adequately analyzed.

NEPA and CEQ implementing regulations require the Federal agency to identify preferred alternatives, if known, in the Draft EIS, and to identify preferred alternatives in the Final EIS unless another law prohibits the expression of such a preference. In accordance with the law, the Final WM PEIS identifies a preferred alternative for each waste type. DOE identifies its preferred waste management alternatives and the reasons they are preferred in Section 3.7 of the Final PEIS.

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

Comment (3680)
It is the taxpayers who have paid trillions of dollars for research to find a safe method of high-level waste disposal. After 50 years of assumptions that a safe method would be chosen, none has been found. It is time to take a hard look at the reality of the situation. Segmenting or narrowing the scope of managing nuclear materials as well as divorcing past contamination and clean-up from the total management scheme, only minimizes a problem that is global in its presence and implications. DOE alone cannot undertake the requisite hard look and analysis. In the least, every facet of the Federal Government needs to cooperate and discuss the problem. Most importantly, the public, including Native Nations, must be co-equals in this discussion.

Response
By preparing separate environmental impact analyses for a number of extremely complex subjects, DOE has not minimized the various issues surrounding nuclear materials and waste management, but rather has developed a more in-depth body of information. Moreover, the cumulative impacts analysis in this WM PEIS (Volume I, Chapter 11) includes the impacts for the preferred alternatives analyzed in other DOE NEPA documents, and the impacts of other DOE programs. This allows consideration of impacts from DOE operations as a whole.

DOE has and will continue to comply with the NEPA requirements for consulting with other Federal agencies, Native Nations, and State and local agencies with jurisdiction by law or special expertise with regard to the proposed actions analyzed in DOE NEPA documents.

Comment (3690)
Commentors asked whether there is another EIS on the vitrification of high-level waste (HLW) and stated that the exclusion of HLW treatment from the PEIS is an example of segmentation and, thus, a violation of NEPA. In evaluating the intensity of a proposed action to determine its significance, the CEQ regulations at Section 1508.27(7) tell agencies to consider whether "the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance cannot be avoided by determining an action temporary or by breaking it down in to small component parts."

Response
The decision to vitrify HLW is explained in Volume I, Section 9.1. DOE does consider HLW vitrification to be significant and, has already prepared EISs to evaluate the environmental impacts of alternatives for HLW management. Section 1.8.1 identifies several site-specific DOE EISs that analyze the treatment of HLW. As stated in Volume I, Section 2.1, the WM PEIS analyzes only storage of treated (vitrified) HLW canisters until a geologic repository is available. However, the impacts of treating high-level waste are considered in the WM PEIS cumulative impacts analysis in Chapter 11. In this way, the cumulative impacts of treatment and storage of HLW are evaluated.

NEPA and CEQ implementing regulations recognize that separate NEPA reviews are justified for an agency's programs due to timing or the need for specificity or in-depth analyses. By preparing separate environmental impact analyses on a number of extremely complex subjects, DOE has not ignored a comprehensive analysis, but rather has developed a more in-depth body of information by preparing a number of PEISs. Moreover, the cumulative impacts analysis in this WM PEIS (Volume I, Chapter 11) includes the impacts of the preferred alternatives in the NEPA analyses prepared for other DOE programs, allowing DOE to evaluate the impacts of DOE's operations as a whole.

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

The ability to prepare separate EISs on separate but related programs does not avoid the necessity for coordination among the programs to ensure integrated decisions and consistent presentation of information. DOE, therefore, has made every effort to ensure that the WM PEIS is generally consistent with other related EISs, including those cited in the comment. Section 1.8 in Volume I of the WM PEIS discusses these related EISs, as well as other DOE programs, and their relationship to the WM PEIS.

DOE reviews every proposal to prepare a NEPA document to determine if the decision is sound and in compliance with CEQ regulations and guidelines on segmentation and interim actions. Any decision to prepare a NEPA document, including those listed by the commentor, must comply with those criteria. DOE believes that the preparation of one environmental impact statement on all DOE activities (operations, environmental restoration, and waste management) would necessarily be so broad that it would result in an essentially meaningless and unmanageable analysis. DOE is committed, as a matter of policy, to prepare sitewide EISs for most of its large, multi-facility sites. DOE believes that sitewide analyses result in a meaningful assessment of all of DOE activities at a particular location.

Impacts related to HLW treatment, where known, have been added to the revised cumulative impacts analysis sections of Chapter 11 for the Hanford Site, INEL, SRS, and WVDP. These estimates of potential risks from recent project-level and sitewide NEPA analyses are based on additional detailed site-specific information.

Comment (3750)
DOE should include the following in consideration of public values and principles: full disclosure (in one EIS, with a full public review) of all wastes that might be moved from other sites through the Northwest for "treatment" or burial; full disclosure of all projected environmental restoration waste, weapons plant decontamination waste, and plutonium wastes already at Hanford, along with all the other wastes that DOE might ship for treatment or burial; and the cumulative health impacts, cumulative environmental impacts, and the effect on Hanford cleanup schedules from importing all the wastes that DOE is likely to consider for treatment or burial at Hanford.

Response
DOE is committed to considering public values and input. DOE believes that integrating additional non-waste management wastes and materials into one NEPA review will not promote understanding or efficient and timely decisionmaking. Section 1.8.1 in Volume I describes the analyses contained in the other DOE EISs that affect the Hanford Site, including the issues identified in the comment. DOE revised Chapter 11 of the WM PEIS to provide a more comprehensive evaluation of the impacts of other DOE actions combined with waste management activities on individual sites, including Hanford. The Hanford Remedial Action EIS, described in Section 1.8.1 in Volume I, analyzes the impacts of environmental restoration wastes. However, Appendix B in Volume III of the WM PEIS discusses how environmental restoration wastes transferred to the Waste Management Program could influence WM PEIS alternatives and impacts analyses.

Comment (3759)
The WM PEIS fails to integrate impacts from DOE's proposals to ship plutonium (which DOE refuses to call waste, thus allowing it to escape regulations), to Hanford. Proposals include: (1) using Hanford to make it into reactor fuel; (2) burning the plutonium reactor fuel at the Washington Public Power Supply System, WNP-2 commercial power reactor, or other reactors; and (3) glassifying (vitrifying)

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

the plutonium along with Hanford's high-level nuclear waste, so that it cannot be reused in weapons and can be disposed of.

Response
This PEIS addresses only five waste types, as defined in Volume I, Section 1.5, and analyzed in Chapters 6, 7, 8, 9, and 10. The impacts from the plutonium vitrification process are covered in the Hanford Plutonium Finishing Plant Complex EIS and the impacts of DOE's proposals for long-term disposition of its plutonium are analyzed in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic EIS. Both of these EISs are identified in Section 1.8.1 in Volume I of the PEIS, which provides an overview of related NEPA reviews. Chapter 11 in Volume I of the PEIS analyzes the specific cumulative impacts for other actions at a given site.

Comment (3925)
The WM PEIS should fully address spent nuclear fuel disposition and not merely reference the SNF EIS.

Response
The management of spent nuclear fuel is outside the scope of the WM PEIS. In April 1995, DOE issued the SNF/INEL EIS, which evaluated alternatives for managing existing and reasonably foreseeable inventories of spent nuclear fuel through the year 2035, therefore, there is no need to repeat the analysis. DOE, in its Record of Decision (ROD), decided to regionalize spent nuclear fuel management by fuel type at three sites--the Hanford Site, INEL, and SRS--pending disposal in a geologic repository. Volume 2 of the SNF/INEL EIS, in addition to evaluating programmatic spent nuclear fuel alternatives, evaluates sitewide alternatives for environmental restoration and waste management programs at INEL. In the SNF/INEL EIS ROD, DOE decided to implement the preferred alternative, for INEL as evaluated in the Final EIS. Section 1.8.1 describes Volumes I and II of the SNF/INEL EIS.

The cumulative impacts analysis of the waste management alternatives in Chapter 11 in Volume I of the WM PEIS includes the environmental impacts resulting from the decision on spent nuclear fuel management and on the implementation of the preferred alternative at INEL.

Comment (4028)
Some DOE sites, such as LLNL, are already committing significant resources to new waste management facilities, which will have the effect of "locking in" a particular alternative described in the WM PEIS, even though programmatic environmental review is far from complete.

Response
Facilities being constructed at LLNL and other DOE sites have been the subject of site-specific NEPA documentation. They are being constructed to meet particular needs at those sites. The WM PEIS accounted for existing and approved facilities at DOE sites in determining the alternatives to be addressed and in the No Action Alternative analyses. Note that the mixed waste management facility demonstration project at LLNL has been canceled.

NEPA and CEQ implementing regulations recognize that separate NEPA reviews are justified for an agency's programs due to timing or the need for specificity or in-depth analyses. By preparing separate environmental impact analyses on a number of extremely complex subjects, DOE has not ignored a

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

comprehensive analysis, but rather has developed a more in-depth body of information by preparing a number of PEISs. Moreover, the cumulative impacts analysis in this WM PEIS (Volume I, Chapter 11) includes the impacts of the preferred alternatives in the NEPA analyses prepared for other DOE programs, allowing DOE to evaluate the impacts of DOE's operations as a whole.

The ability to prepare separate EISs on separate but related programs does not avoid the necessity for coordination among the programs to ensure integrated decisions and consistent presentation of information. DOE, therefore, has made every effort to ensure that the WM PEIS is generally consistent with other related EISs, including those cited in the comment. Section 1.8 in Volume I of the WM PEIS discusses these related EISs, as well as other DOE programs, and their relationship to the WM PEIS.

DOE reviews every proposal to prepare a NEPA document to determine if the decision is sound and in compliance with CEQ regulations and guidelines on segmentation and interim actions. Any decision to prepare a NEPA document, including those listed by the commentor, must comply with those criteria. DOE believes that the preparation of one environmental impact statement on all DOE activities (operations, environmental restoration, and waste management) would necessarily be so broad that it would result in an essentially meaningless and unmanageable analysis. DOE is committed, as a matter of policy, to prepare sitewide EISs for most of its large, multi-facility sites. DOE believes that sitewide analyses result in a meaningful assessment of all of DOE activities at a particular location.

Comment (4037)
The WM PEIS exemplifies that the principal role of DOE's Waste Management Program, as it is presently configured, is to serve as the handmaiden of DOE's nuclear weapons program. While noting that much of the infrastructure requirements of the proposed action are to service waste streams generated by the Stockpile Stewardship and Management Program, the Draft WM PEIS already indicates that more wastes will be generated from ongoing Science Based Stockpile Stewardship and related actions than from site remediation and cleanup activities, although the programmatic NEPA document for Science Based Stockpile Stewardship has not yet been published.

Response
The Final Stockpile Stewardship and Management PEIS was published in November 1996. Impacts of the Stockpile Stewardship and Management Program are considered in the WM PEIS cumulative impacts analysis presented in Chapter 11 in Volume I. As described in Appendix B (Volume III) and Sections 6.15, 7.15, and 8.15 (Volume I), the total volume of environmental restoration waste is larger than waste management; however, much of the environmental restoration waste is likely to be managed in place or in environmental restoration facilities.

Comment (4051)
The WM PEIS working assumption of a fully funded and robust Stockpile Stewardship and Management Program removes from the scope of the document the significant policy alternative of waste minimization through the conversion or scaling back of nuclear programs. By separating defense programs and waste management, any consideration of waste management impacts is limited to a narrow range of alternatives: to transport or not to transport, and where to maintain or construct DOE waste management facilities. If the National Ignition Facility (NIF), Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility, or new prototype plutonium fabrication plants are not constructed, what will be the likely impact on waste management actions?

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

Response
Decisions on whether to construct and operate facilities such as NIF and DARHT are made, in part, on the basis of NEPA documents prepared for those proposed actions. The need for agency action is addressed in those NEPA documents. The purpose of the WM PEIS is to help develop a strategy to deal with the wastes generated by those and other past and present DOE actions.

Alternatives for the Stockpile Stewardship and Management Program are evaluated in the PEIS on that subject identified in Volume I, Section 1.8.1, of the WM PEIS. The WM PEIS contains 20-year projections of waste volumes for the various alternatives that reflect planning for facilities, including NIF, DARHT, or a new plutonium fabrication plant. If these facilities are not built, there would be less waste generated.

DOE does not consider a shutdown of its nuclear weapons programs to be a reasonable alternative at this time. Based on the best available information at the time of the analysis on future waste generation, DOE assumed that current waste generation rates would continue for the next 20 years. Volume I, Section 1.8.2, describes DOE programs and actions that will generate waste analyzed in the PEIS.

Comment (4339)
If DOE revises the WM PEIS sections on cumulative impacts and relationships with other EISs to more fully account for other programs, the document will provide an adequate basis for selecting conceptual approaches to treat, store, or dispose of the five waste types. However, the WM PEIS is not adequate to select sites within a conceptual alternative because data are old or inaccurate, analytic methods are too generic, and cumulative effects are not accounted for on a site-by-site basis. Decisions about the configuration of sites should be supported by a second level of NEPA review.

Response
DOE believes that the Final WM PEIS is an adequate basis not only to support decisions about strategies for dealing with each waste type, but also to support decisions about sites chosen to manage each waste type. In the PEIS, DOE has attempted not only to examine in an integrated fashion the impacts of Department-wide waste management decisions for each waste type in the nuclear weapons complex, but also the cumulative impacts for all the waste facilities at a given site.

While the PEIS identifies preferred alternatives in accordance with NEPA and the CEQ regulations, actual programmatic decisions on configurations will be announced in Records of Decision. The "second level of NEPA review" referenced in the comment will occur before DOE decides on the location of a waste management facility at a programmatic site.

In moving from the draft to the final document and incorporating public comments, DOE has made extensive revisions pertaining to relationships with other EISs (see Section 1.8.1 in Volume I) and cumulative impacts, including on a site-by-site basis (see Chapter 11 in Volume I). Regarding the data used in the analysis, the Final PEIS includes updated waste volumes for low-level waste, low-level mixed waste, and transuranic waste, and analyzes how newly available data might impact the analyses of alternatives in the WM PEIS (see Appendix I in Volume IV).

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

Comment (4403)
The WM PEIS unacceptably excludes high-level waste of U.S. commercial nuclear programs that is and will become the total responsibility of DOE to manage and dispose of under the Nuclear Waste Policy Act of 1982. DOE must include a fully integrated analysis of the potential impacts and risks to humans and the environment from the management and disposal of commercial nuclear wastes in a new WM PEIS. The WM PEIS's reference to an EIS on commercial spent nuclear fuel management is not adequate.

Response
The WM PEIS was prepared to help DOE develop a Department-wide waste management strategy. The PEIS addresses, in a programmatic manner, most of the radioactive wastes produced over the past years by national defense activities at DOE facilities. The PEIS does not address radioactive wastes produced by commercial activities; DOE does not have the authority or responsibility for making decisions on such wastes.

DOE has sought public input at various stages in the WM PEIS process so that the PEIS could seriously address the issues of DOE wastes. Spent nuclear fuel is not classified as a waste and, thus, is not included in the WM PEIS as a waste type. Other EISs dealing with spent nuclear fuel management are discussed in Volume I, Section 1.8.1. In addition, issues relating to the characterization of the candidate geologic repository at Yucca Mountain are outside the scope of the WM PEIS, but would be addressed in the Yucca Mountain Repository EIS.

Comment (4407)
The WM PEIS violates NEPA by basing the analysis of high-level wastes on the assumption that the future permanent repository will be at Yucca Mountain, despite the fact that Yucca Mountain is geologically unfeasible due to seismic activity, and despite serious misgivings concerning the actual licensing and opening of the repository. Secretary O'Leary has indicated a 50% chance of Yucca Mountain actually being licensed. DOE calculations have indicated that Yucca Mountain cannot meet the dose limits for a subsistence farm scenario. DOE must address the known problems concerning the site and the "non-possibility" of Yucca Mountain as a final repository in a credible PEIS.

Response
Section 1.8.1 in Volume I describes the relationship between the WM PEIS and the EIS for a potential geologic repository at Yucca Mountain. Section 9.1.1 in Volume I indicates that the impacts of disposing of high-level waste in a repository are not within the scope of the WM PEIS, but will be analyzed in a subsequent DOE NEPA document relating to a geologic repository. Because the Yucca Mountain site is the only candidate repository site being studied at present, DOE assumed the existence of a geologic repository there for purposes of analyzing the impacts of transporting the high-level waste to a potential disposal facility. The WM PEIS Centralized Alternative examines long-term storage of vitrified high-level waste at Hanford should a geologic repository not open as expected.

Comment (4464)
Will a supplemental NEPA document be prepared for alternative high-level waste disposal sites to Yucca Mountain, or for leaving the waste onsite for an extended period in retrievable storage until acceptable permanent storage sites are identified and finalized? DOE should include in the WM PEIS the alternatives advocated in *High Level Dollars, Low Level Sense*, a book commissioned by the State of Nevada. Also, what criteria would trigger the need for supplemental or additional NEPA

11.4 Segmentation/Relationship and Consistency with Other DOE Documents and Programs

documents? What would be the significance of high-level waste acceptance rates at the candidate geologic repository of other than the 800 canisters per year DOE assessed in the Draft WM PEIS?

Response
The impacts from disposing of high-level waste in a repository are not within the scope of the WM PEIS, but DOE will analyze them in the Yucca Mountain Repository EIS, which is described in Section 1.8.1 in Volume I. Under the Nuclear Waste Policy Act, DOE will dispose of high-level waste at a geologic repository, and Yucca Mountain in Nevada is the only site currently being studied for suitability to house the repository. DOE assumes that acceptance of its high-level waste at this facility would begin in 2015. However, for this PEIS, DOE has analyzed high-level waste canister storage requirements in case the repository opens after 2015.

Section 9.3 of the Final WM PEIS states that for each of the five high-level waste alternatives, DOE assumed that the candidate geologic repository would begin accepting DOE-managed high-level waste in year 2015 at the rate of 800 canisters per year. The acceptance rate at the repository will determine the duration of glass canister storage, so an acceptance rate of 400 canisters per year would double the duration of current storage of glass canisters. DOE based the value of 800 canisters per year on the latest available data for the projected acceptance rate for the high-level waste geologic repository. A reduced acceptance rate would cause effects to continue at the sites for a longer period, while reducing transportation effects on an annual basis. A higher rate would shorten the duration of effects at the sites and increase annual transportation effects. DOE estimated the effects of longer-term storage of high-level waste for Centralized Alternative 2.

11.5 Cost of Preparation

Comment (56)
DOE is wasting "trillions" of tax dollars by producing "Final Environmental Impact Statements" that do not contain solutions. Persons "working on the problem" are not inclined to find a solution to managing wastes because they view their work as "a lucrative gravy train."

Response
The total costs of all of DOE's NEPA documents would not approach "trillions" of dollars. The costs represent a fraction of the costs needed to properly manage the programs and are consistent with the level of effort required. Moreover, DOE must comply with the law, in this case NEPA. NEPA requires Federal agencies to consider the potential environmental consequences related to their proposed actions before they can be taken and to prepare detailed statements on environmental impacts, alternatives to the proposed action, and measures to avoid or minimize adverse impacts. CEQ regulations and DOE's own regulations (10 CFR 1021) provide specific guidance for the preparation of NEPA documents.

NEPA provides for the preparation of programmatic EISs that serve as a basis for broad decisions and help avoid the development of redundant studies that, in turn, might drive costs up. As a programmatic review, the WM PEIS will serve as a basis for decisions involving national strategies for waste management. Sitewide or project-level NEPA reviews concerning facility locations or technology selection will build on technical information presented in the WM PEIS. This hierarchy promotes efficiency in targeting the areas ready for action and in maximizing the use of available technical data.

Comment (1524)
It will be interesting to compare the cost of the Stockpile Stewardship and Management PEIS to the cost of this WM PEIS.

Response
The total cost of producing the WM PEIS--from project initiation in 1990 to publication of the Final PEIS--was approximately $31 million. The cost of the Stockpile Stewardship and Management PEIS is estimated at $10 million. Both documents are broad and complex, and the costs of developing these studies are commensurate with the level of effort required to meet the letter and spirit of NEPA, CEQ, and DOE requirements.

Comment (2157)
How much did it cost to prepare the WM PEIS?

Response
The total cost of producing the WM PEIS--from project initiation in 1990 to publication of the final study in 1996--was approximately $31 million.

Comment (3780)
DOE needs to consider how the tax dollars are being used on this project, and how those dollars could be better spent, including spending the money on cleanup. In the Final WM PEIS, DOE needs to explain how all the money for preliminary studies, etc., was targeted for this study. The PEIS was originally supposed to cost $8 million and 6 years later has cost $59 million because META wants to rip off the taxpayers instead of finding a solution to the waste management problem.

11.5 Cost of Preparation

Response

From project initiation in 1990 to publication of the Final WM PEIS in 1996, the cost of the study itself was approximately $31 million. The $59 million figure mentioned by several commentors includes ancillary efforts that support other DOE activities in addition to the WM PEIS. In fact, DOE used results of early efforts for several purposes to increase the utility of tax dollars already spent. For example, the cost-estimating models used in the PEIS were also used in producing the Baseline Environmental Management Report to Congress, which has been updated using those same models. The waste inventories set up for the PEIS analyses continue to be updated and used in many ways. The models to predict risk and potential environmental impacts can be used for other environmental studies at the national and local level and for transportation planning, just to name a few examples. These valuable planning and analytic tools have continuing, direct applicability to a multitude of other DOE efforts.

Further, the cost of the WM PEIS project should be viewed within the context of the overall Waste Management Program. The PEIS will be an important basis for determining the best long-range waste management strategies. The cost of the PEIS is only a small fraction of the cost per year to safely and responsibly manage the country's radioactive and hazardous wastes over the next 20 years. This up-front planning effort will result in big returns in the future. For example, the WM PEIS fulfills requirements under NEPA to conduct environmental reviews before making decisions on improving the existing waste management configuration. Moreover, it provides technical information that should help streamline future NEPA reviews that would be required prior to specific decisions about facilities, facility locations or sites, and waste management technologies.

One of NEPA's major objectives is to inform the public of proposed Federal actions and provide opportunities for public input to those decisions. From its inception, the WM PEIS project has devoted a substantial amount of time and effort to obtaining public comment on the scope and content of the study, to carefully considering the comments received, and to making appropriate changes in response to public input. As a result, the WM PEIS project has demonstrated DOE's commitment to meeting both the spirit and letter of NEPA requirements and DOE's commitment to openness with the public.

11.6 Other

Comment (425)
A special commission should be dedicated to revise and coordinate this project.

Response
An independent oversight advisory committee provided advice to the preparers of the WM PEIS. In January 1992, DOE chartered the Environmental Restoration and Waste Management Advisory Committee to advise DOE's Assistant Secretary for Environmental Management on both the substance of and the process for the WM PEIS, from the perspective of affected groups and State, local and Tribal Governments. The members of this Committee were selected from universities; trade organizations; Federal, State, and local government agencies; Native American organizations and groups; environmental groups; and other interested parties. There has been a significant exchange of information on this WM PEIS with the Committee. In addition, site advisory boards have also provided comments on the scope and content of this WM PEIS. The same will hold true for DOE's decisionmaking process for DOE's Waste Management Program.

Comment (1632)
DOE should provide a centralized database of WM PEIS data that can be accessed by State and local governments.

Response
The WM PEIS draws on a variety of sources, all of which are referenced and either readily available in public libraries or available to the public in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS. Hard copies and/or microfiche have been distributed to DOE reading rooms across the Nation. Therefore, anyone can access the technical documentation identified in the WM PEIS.

Comment (1648)
DOE should explain to Congress that NEPA is fundamentally flawed and needs to be revised.

Response
DOE believes that implementing NEPA has led to greater protection of human health and environment. The public involvement process required by NEPA has enhanced DOE decisionmaking. Please send specific recommendations on how NEPA can be improved to the President's Council on Environmental Quality, 722 Jackson Place, NW, Washington, D.C. 20006.

Comment (1877)
Referring to an error in the DOE letter that announced the extension of the Draft WM PEIS public comment period (February 19, 1995, instead of February 19, 1996), the commentor stated, "As always the DOE is regressing."

Response
DOE apologizes for this typographical error.

Comment (2149)
DOE should have a legal review of the WM PEIS to ensure that it is very clear.

Response
DOE's Office of General Counsel was involved in the development of the Notice of Intent and scoping meetings in 1990 and reviewed the Draft and Final WM PEIS prior to issuance.

Comment (2160)
What was the prior involvement of contractors on this project and are any of them new?

Response
DOE prepared the Draft and Final WM PEIS. Several National laboratories and contractors assisted DOE at some point, and to varying degrees, during the preparation of these documents. They are Argonne National Laboratory (the primary technical support organization during preparation of the Final WM PEIS); Idaho National Engineering Laboratory; Los Alamos National Laboratory; Oak Ridge National Laboratory; Pacific Northwest Laboratory; META/Berger (the primary technical support organization during preparation of the Draft WM PEIS, META/Berger are the prime and subcontractor firms, respectively, Maria Elena Torrano Associates--META--and Louis A. Berger and Associates); Brown & Root Environmental; Science Applications International Corporation; Lamb Associates, Inc. Significant individual contributions are listed in Volume I, Chapter 13, of the Final WM PEIS.

Comment (4001)
A commentor noted that the Bureau of National Affairs *Environment Reporter* announced an addendum to the Draft WM PEIS.

Response
The statement in the Bureau of National Affairs (BNA) *Environment Reporter*, February 16, 1996, that there had been an amendment to the Draft WM PEIS was incorrect. BNA referenced an EPA *Federal Register* notice acknowledging an amendment to DOE's Notice of Availability for the Draft WM PEIS. The amendment notified the public that DOE extended the public comment period for the Draft PEIS by an additional 60 days, from the initial 90-day period. There was no addendum to the Draft PEIS, and BNA was notified of this error. BNA subsequently published a correction.

Comment (4068)
Can DOE do a PEIS on its mission?

Response
This WM PEIS was prepared in compliance with NEPA and CEQ implementing regulations requiring agencies to prepare an EIS for every "major Federal action significantly affecting the quality of the human environment." The overall agency mission does not amount to an action, whereas DOE's proposal to manage the five waste types does constitute an action. Section 2.2 in Volume I of the WM PEIS describes the purpose and need for DOE action; Section 1.8 discusses the WM PEIS relationship to other DOE actions and programs.

Comment (4413)
The articles published in the February 15 and 16, 1996, *USA Today*, which describe the Draft WM PEIS as flawed, incomplete, and irrelevant, should be considered as comments on the Draft WM PEIS.

11.6 Other

Response

The articles published in the *USA Today* were not submitted to DOE as comments and, therefore, were not considered in this comment response document.

On March 1, 1996, Richard J. Guimond, the Principal Deputy Assistant Secretary of Energy for Environmental Management, responded to the Editor of *USA Today* on these articles. Mr. Guimond's response refuted the *USA Today* characterization of the WM PEIS and stated that the study provides a solid foundation for DOE's future strategy to transport, store, treat, and dispose of radioactive and hazardous waste from nuclear weapons production and nuclear research.

12. Public Involvement

Comment (152)
Several commentors suggested that DOE needed to conduct a more comprehensive public outreach program for the potential actions evaluated in the WM PEIS. Although some people indicated that they believe DOE is listening and addressing comments "honestly and collaboratively," others felt that greater efforts needed to be made to involve communities, as well as State and local governments, in decisionmaking; to provide educational information regarding waste management activities and facilities, as well as pertinent laws and regulations; and to consider public input on issues such as equity, site-selection criteria, transportation of waste, disposal configuration, and overall waste management goals. Some commentors suggested that additional public hearings should be held once DOE selects its preferred alternatives. Others suggested that DOE conduct a "National Dialogue" on waste management to facilitate the discussion of intersite issues and that such a dialogue should be convened between the advisory boards representing citizens living near DOE nuclear weapons plants to discuss what wastes the citizens are willing to keep on the sites or receive from other sites. Several commentors indicated that more time is needed to build stronger agency-community working relationships.

Response
Open dialogue and cooperation with the public is essential to determining the most appropriate method(s) for managing DOE's current and future wastes. DOE is committed to meaningful public involvement in its waste management decisions. DOE has a variety of public outreach programs in place to facilitate public participation at both the national and local level. Specifically in conjunction with the WM PEIS, DOE held 23 scoping meetings, 6 regional workshops on the PEIS Implementation Plan, and 2 public workshops on the risk assessment methodology; published 3 newsletters and 20 fact sheets; produced 2 videos; provided periodic briefings for the Environmental Management Advisory Board and several Site-Specific Advisory Boards; and most recently, conducted 13 public hearings on the Draft WM PEIS. The Draft WM PEIS public comment period was held open for 150 days in response to requests from the public. Sections 1.7.1 and 1.7.2 in Volume I of the WM PEIS describe public involvement related to the WM PEIS.

Aided by an extensive public scoping process, DOE developed the waste management alternatives and selected the major sites for analysis as potential candidates for waste treatment, storage, or disposal functions. Section 1.6 in Volume I provides an overview of the waste management sites covered in the PEIS and Section 3.5 in Volume I describes the methodology used by DOE for identifying alternatives.

After the Final WM PEIS is published, the decision process will begin. DOE does not expect that all waste management decisions will be made at one time for all waste types. Rather, DOE expects that the PEIS will result in separate Records of Decision by waste type to be issued in a staggered fashion starting in calendar year 1997. Section 1.7.3 in Volume I has been revised to explain the process for making waste management decisions subsequent to issuance of the Final PEIS.

DOE will use all relevant information, in addition to the WM PEIS, necessary for making responsible waste management decisions. DOE agrees that public input to the decision process will be worthwhile. Forthright dialogue with the public on the important issues regarding the management of the Nation's nuclear waste is important to DOE as well as to the potentially affected communities.

DOE has not only specifically sought comments on the Draft WM PEIS from State and local officials and the general public through the NEPA process, DOE is sponsoring a "National Dialogue" initiative

12. Public Involvement

to provide a forum to communicate with interested members of the general public, State and Tribal Governments, and representatives from the site-specific citizens advisory boards to discuss potential national decisions on waste management and on the intersite management and disposition of other nuclear materials. This initiative is discussed in Section 1.8.2 in Volume I of the Final WM PEIS.

DOE is considering how best to sustain and strengthen that initiative to provide additional avenues for public input to its decisionmaking processes. The ensuing public dialogue will specifically include input to the development of waste management decisions on a national scale, and will include the example topics identified in the comments as they are relevant to waste management decisions and of concern to public participants.

Comment (2151)
BNL needs to have an open channel to DOE Headquarters to help to nail down the Brookhaven National Laboratory (BNL) cleanup and waste management issues, such as a civic board, which should be looking at these issues within 6 months.

Response
DOE is committed to public involvement and welcomes input on how to improve this process. BNL is assisting the community with the formulation of a community forum. This group is open to the public and will provide an opportunity for people to voice their concerns and identify issues regarding BNL. For more information, please call the BNL Public Affairs Office.

Comment (2187)
The public needed to be better informed about how many volumes [books] were included in the entire Draft WM PEIS document.

Response
DOE recognizes that there was some confusion because the "Readers' Guide" in the Draft WM PEIS Summary document erroneously stated that the document consisted of two (rather than four) volumes. The Final PEIS consists of five volumes, as noted in the Final WM PEIS Readers Guide, and has been distributed in whole sets to those who requested it. As was done with the Draft, the Final WM PEIS Summary document also is distributed separately, based on requests.

Comment (2310)
Commentors questioned the absence of a Site-Specific Advisory Board (SSAB) and health studies at the Portsmouth Plant. Commentors also expressed concern over the effectiveness of SSABs and Citizen Advisory Boards (CABs), commenting that CABs do not adequately represent the public, might be distracted by multiple issues, and could describe issues more creatively to the public.

Response
SSABs have been established at a number of DOE sites to provide a mechanism for members of the community to contribute to site-specific policy and technical decisions on waste management and environmental restoration decisions. The SSAB is only one component of the public participation efforts that occur at the DOE sites. Each SSAB defines its own membership and/or charter and works with DOE to set its own agenda and define the issues that are important to the local communities. Health studies are conducted at certain DOE sites if warranted by specific circumstances at those sites.

Not every site has an SSAB; some are established, others are forming, and others do not have a board. Some of the SSABs submitted comments and recommendations to DOE on the WM PEIS.

The Portsmouth Plant does have a stakeholders group and meetings and workshops are routinely held with DOE site personnel.

Comment (2334)
DOE should release to the media and the general public performance summaries of actual emissions data as measured by continuous monitoring systems at Oak Ridge National Laboratory (ORNL); numbers like 99.99% removal of toxics in contaminated feeds are not as convincing as actual hard data.

Response
The management of current ongoing site operations is not within the scope of the WM PEIS. However, many other sources of data, such as annual reports, are available on request from local DOE offices. DOE encourages interested citizens to contact their site for more detailed operational information. In addition, when sites for waste management facilities are selected and any required environmental reviews are undertaken, site-specific questions such as emissions control monitoring will be addressed.

Comment (2402)
The Savannah River Site (SRS) Citizen's Advisory Board (CAB) has worked to discover, and has what appears to be, a developing consensus about what matters to people who live near SRS; but the CAB has real difficulty in relating these citizen priorities to the alternatives developed in the WM PEIS. One definition of the failure to communicate is this: When the public cannot see clearly how its values will play out in DOE alternatives even after the public knows what it cares about, and after it has been given thousands of pages that claim to explain what DOE plans to do, affects what the public cares about. The Draft WM PEIS fails the SRS CAB in too many ways. Since the data in the draft is now widely available to the interested public, DOE should take the time to develop a more useful final document, including independent scientific peer review, that addresses the issues of scope and communication that we have addressed here.

Response
The initial scope of the WM PEIS was defined in 1990, prior to the establishment of many of the DOE advisory boards. DOE conducted a series of public hearings across the Nation that were announced in the *Federal Register* and advertised through newspapers, on the radio, and at press meetings. DOE's WM PEIS public participation activities exceeded the requirements of NEPA. The priorities developed by the SRS CAB were considered in developing the Final WM PEIS, along with other comments collected during the public comment period, which extended from September 22, 1995, through February 19, 1996. DOE made substantial changes to the WM PEIS based on comments received on the Draft WM PEIS (see the summary of changes in Volume I). This comment-response document, which was developed as part of the WM PEIS pursuant to NEPA requirements, also identifies where changes were made to the PEIS based on public input. Where requested changes could not be made, this document explains why. The rationales for incorporating or not incorporating suggested changes show that DOE carefully considered all input and made suggested changes to the extent possible.

12. Public Involvement

In developing the WM PEIS, DOE consulted with EPA, and has obtained the comments of other Federal, Tribal, State, and local agencies with jurisdiction by law, or special expertise, as required by the CEQ regulations.

The WM PEIS analysis will not be the only basis for ultimately making waste management decisions; budgets, schedules, and national priorities, as well as other DOE studies, will be considered in developing Records of Decision.

Comment (2687)
DOE has no idea how to clean up our existing waste problems, since you are asking for suggestions from private citizens.

Response
The WM PEIS was presented to the public in draft form, not because DOE does not have any ideas or plans to manage its waste, but rather, to provide the public an opportunity to comment on those plans prior to DOE making its decisions. DOE currently faces the challenge of safely and efficiently managing over 2 million cubic meters of radioactive and hazardous waste from its past, present, and future activities at 54 sites across the United States. To provide a national, programmatic basis for comparing alternative waste management configurations, the Draft WM PEIS analyzes the health, environmental, and socioeconomic impacts of multiple alternatives for the treatment, storage, and disposal of five waste types: hazardous waste, high-level radioactive waste, transuranic waste, low-level radioactive waste, and mixed low-level waste (radioactive and hazardous components). DOE's preferred alternatives for managing each waste type and the reasons they are preferred are identified in Volume I, Section 3.7.

Comment (3297)
DOE should work in partnership with local governments to ensure that they are well informed and given support to be able to educate and respond to public stakeholders.

Response
DOE has public affairs and community involvement personnel available to work with public officials. DOE is committed to public education and involvement at all its sites, and believes that active participation by its local governments, regulators, and the general public can lead to reasonable, effective, decisions.

Comment (3308)
Local governments should be kept informed of any analyses addressing the factors [other than those listed in Section 1.8] that will be considered in making final decisions among alternatives.

Response
Local governments and other interested parties are kept informed of the decision process through the Site-Specific Advisory Boards and Public Affairs Offices at each DOE site. Volume I, Section 1.7.3, describes the WM PEIS decision factors and criteria, which DOE used to identify the preferred alternatives. Further dialogue will be undertaken between the Final WM PEIS and the issuance of the Records of Decision.

12. Public Involvement

Comment (3886)
The public and DOE need to look for other alternatives. The public expects DOE to listen and heed the mandate of the people. Citizens must use all avenues to keep control of the DOE decision, such as controlling the project on a local level, knowing the laws, reading all material available, and using local media and Congressional involvement to help sway the decision.

Response
DOE welcomes the level of interest in its waste management decisions, and has considered all comments offered during the public comment period in finalizing the WM PEIS. A well-informed and involved citizenry can provide valuable insight into what DOE should consider in its decisionmaking. However, DOE is, by law, responsible for making decisions such as those outlined in the WM PEIS, and is held accountable by the public and regulators for safely implementing those decisions.

Comment (4054)
DOE's failure to respond to the requests of residents and officials to hold a hearing in Livermore (in addition to the one held in Tracy), which is a community that will be directly impacted by the WM PEIS preferred alternative for low-level mixed wastes, adds another reason why the WM PEIS should be revised and reissued before proceeding to a final document and Records of Decision.

Response
Although NEPA regulations only require one public hearing to be held, DOE conducted a series of public hearings all across the Nation that were announced in the *Federal Register* and advertised through newspapers, radio stations, press meetings, etc. Meeting summaries were made available at the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

The Tracy, California, hearing location was chosen because of its proximity to Site 300, which is considered in the WM PEIS as an alternative disposal site.

Comment (4412)
DOE should place a moratorium not only on privatization of DOE facilities and environmental remediation, but on the production of all nuclear weapons materials until a credible WM PEIS is issued. Public participation is a crucial and vital aspect of an accurate, efficient, and acceptable nuclear and hazardous waste management analysis under the NEPA process where DOE must make every effort to include public participation to the fullest extent.

Response
DOE is committed to public involvement. Sections 1.7.1 and 1.7.2 in Volume I of the WM PEIS describe public involvement related to this WM PEIS. Section 1.7.4 has been added to Volume I of the WM PEIS for a discussion of the issue of waste management privatization at DOE sites. As stated in Section 1.7.4, the impacts associated with DOE waste management facilities are expected to be representative of the impacts of private facilities on DOE sites. Although DOE identified preferred alternatives in the WM PEIS, decisions on privatization are site-specific in nature, and would be addressed in site-specific documents.

Environmental remediation activities are considered in the WM PEIS only to the extent that waste generated would enter the waste management system. More detail is provided in Appendix B in Volume III of the WM PEIS. Environmental remediation activities are implemented based on

12. Public Involvement

site-specific studies, technical evaluations, and discussions with regulatory authorities and the public. Nuclear weapons material production issues are being evaluated by other NEPA reviews addressing stockpile stewardship and management, the disposition of fissile materials, tritium supply and recycling, and the production of highly enriched uranium. These NEPA documents are described in Section 1.8.1 in Volume I of the WM PEIS. Where these documents identify impacts that add to the impacts identified in the WM PEIS, these impacts have been included in the analysis of cumulative impacts in Chapter 11 in Volume I of the WM PEIS. The other studies, along with the WM PEIS analysis of environmental impacts from waste management activities, will help to focus DOE decisions.

Comment (4427)
DOE should evaluate programmatic alternatives for the consolidation of administration, environmental oversight, and environmental policymaking between the waste management and environmental restoration programs, and alternatives for the role of the public in overall strategic decisionmaking.

Response
DOE originally intended to perform a programmatic analysis of the impacts associated with both environmental restoration (ER), and waste management, but changed the scope of the WM PEIS in January 1995. Volume I, Section 1.7.1, explains why the WM PEIS does not include ER alternatives. In summary, after collecting data and doing some preliminary analyses, DOE determined that, because ER decisions should reflect the particular conditions at each site, as well as the involvement of state regulators and local stakeholders, addressing them at a programmatic level would be inappropriate.

DOE has for several years explored alternatives for public participation in decisionmaking and policy development for waste management and ER. Such alternatives vary, depending on the nature of the activity to be discussed or the pending decision. For example, public participation in DOE activities regarding ER frequently occurs at the site level, because these activities typically concern site-specific cleanup actions. In such cases, DOE uses a variety of methods to provide the public with opportunities for dialogue, including general public meetings and forums and participation in site advisory boards. Recent efforts to enhance public participation in decisionmaking include the National Dialogue and Environmental Management Ten Year Plan discussed in Section 1.8.2 in Volume I of the WM PEIS. Additionally, Appendix A in Volume III outlines the means for public involvement in planning and decisionmaking for DOE's ER activities.

Potential decisions on issues such as those addressed in developing the WM PEIS have involved national-level as well as site-specific opportunities for public involvement. For example, the decision to remove ER alternatives from the WM PEIS analysis was discussed with and reviewed by DOE's Environmental Management Advisory Board from a national perspective.

The extensive series of public hearings held on the Draft PEIS tended to consider local concerns about sites' potential roles in the national Waste Management Program. During the public comment period on the draft, public input was sought on the criteria for national decisionmaking, the selection of preferred alternatives, and specific issues important to individual sites.

In all such cases, the objective is to employ alternatives for informing the public and seeking public input that best reflect the type of activity under consideration, whether it involves a national decisionmaking process or a site-specific action. Other examples of alternatives that have been pursued to achieve this objective include extensive public disclosure of previously classified material on past

DOE activities; major reports to the Congress, States, and the general public such as the Baseline Environmental Management Report; regular news briefs released to the national media; and community meetings on local DOE activities.

12.1 WM PEIS Scoping Process

Comment (3172)
When DOE re-scoped the WM PEIS to remove environmental restoration waste, site specific advisory boards were in operation. There is no record that DOE brought this re-scoping to any site boards for comment.

Response
The Environmental Management Advisory Board reviewed this change in the focus or scope of the WM PEIS in its meeting on July 15, 1994. In a *Federal Register* notice issued in January 1995, DOE asked for public comments on its proposal to modify the scope of the WM PEIS (60 FR 4607, January 24, 1995). See Volume I, Section 1.7.1, of the WM PEIS for an explanation of the WM PEIS scope. Appendix A in Volume III of the WM PEIS contains a summary of the comments received in response to the proposed change in scope and DOE's responses to those comments. DOE also provided information to the public about the PEIS scope change through its site personnel and regular public communication channels.

12.2 Draft WM PEIS Public Comment Process and Hearings

Comment (206)
Several commentors stated that DOE's notification of times, dates and locations of the public hearings on the Draft WM PEIS was inadequate. Poor attendance at some hearings was attributed to lack of wide notification. More specifically, some individuals raised concerns regarding DOE's general notification to the residents around the potentially affected sites about its waste management plans and wanted to know what efforts DOE had made to inform local communities about the WM PEIS, decisions being considered in the WM PEIS, and their potential implications. A few people suggested that DOE's inadequate notification reflected an intention on DOE's part to deliberately keep information from the public and wanted to be assured that the WM PEIS was being reviewed by someone with "impeccable credentials."

Some of the suggestions for improving publicity included more extensive individual mailings, and greater use of radio and cable TV to announce the meetings. One commentor suggested that DOE consider publishing articles regularly in local newspapers to keep stakeholders informed and engaged; another suggested that postcards be used to inform the public of major document scope changes, such as the decision to eliminate an analysis of environmental restoration activities from the WM PEIS.

Response
In compliance with the NEPA public participation requirements, the WM PEIS public hearings were announced in the *Federal Register*. In addition, DOE advertised through newspapers, radio stations, and press briefings. DOE also used a variety of other methods at the sites to provide information to the public about the WM PEIS and the hearings, including briefings at other meetings related to the site such as Site-Specific Advisory Board meetings or other project meetings and information fairs. In the months prior to the release of the Draft WM PEIS, three newsletters were sent to everyone on the WM PEIS mailing list to update them on the status of the document; this list included individuals who had attended scoping meetings or provided scoping comments, as well as others expressing an interest in the WM PEIS. The first page of the Summary contained a letter to citizens that lists a toll-free information number. Notification and schedules of the hearings were available through this service.

A short video was made available at meetings and other public forums that announced the pending release of the WM PEIS. The video, as well as the WM PEIS itself, includes information on potential decisions and the decisionmaking process.

DOE did receive comments from individuals with "impeccable credentials," including the Site-Specific Advisory Boards, the Environmental Management Advisory Board, and individual technical experts. DOE in no way made any effort to keep information from the public; DOE fully complied with NEPA and CEQ requirements. DOE sought comments from other Federal and State agencies with jurisdiction by law or special expertise, including EPA. The comments from these agencies were objective and were not only welcome, but many resulted in substantive technical and other changes to the WM PEIS that helped improve the final document.

Suggestions from the public on how to improve communication about progress related to the WM PEIS, such as subsequent decisionmaking processes, are also welcome and are being used to enhance DOE's public involvement efforts. For example, specific suggestions about the use of postcards resulted in a mailer sent to all persons receiving the Draft WM PEIS to determine continued interest in receiving the final document. Further, DOE is considering ways of obtaining public input to

12.2 Draft WM PEIS Public Comment Process and Hearings

future waste management decisions, and suggestions received on the Draft WM PEIS that can help achieve this objective will continue to be factored into the evolving processes.

Sections 1.7.1 and 1.7.2 in Volume I of the WM PEIS contains a discussion of DOE's public participation process. Documents related to the WM PEIS are available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (254)
Several commentors requested additional opportunities for public comment on the WM PEIS. There were some requests for additional hearings, but most of the requests were for an extension of 1 to 6 months of the public comment period.

Response
A 90-day public comment period for the Draft WM PEIS was scheduled from September 22 until December 21, 1995. In response to requests from the public, DOE extended this comment period through February 19, 1996. Thus, DOE provided a 150-day comment period, 105 days more than required by NEPA. During this time, DOE conducted 13 public hearings across the nation and received comments from many interested parties including local officials, environmental groups, community representatives and individual citizens. In response to the requests for an additional hearing at ANL-E, DOE held an informational meeting with stakeholders (December 14, 1995), and a second hearing with afternoon and evening sessions (January 24, 1996).

Comment (363)
Two individuals notified DOE that they failed in their attempts to preregister for public hearings using the Center for Environmental Management Information 800 number.

Response
DOE found that in both cases, personnel errors caused the problems. DOE regrets any inconvenience experienced by the commentors and appreciates their feedback on the preregistration process. DOE offered the toll-free preregistration opportunity to facilitate the hearing process. However, preregistration was not required. During the course of each hearing, everyone who wished to speak was given an opportunity to do so.

Comment (365)
An attendee at the Richland, Washington, public hearing complained that because preregistered speakers were taken first, followed by speakers from five different sites in rotation, many members of the public had to wait hours for the opportunity to speak. The commentor left without having an opportunity to speak. Another commentor stated that people who attend public hearings should be entitled to speak and should not have to compete with each other for limited time because they are all compressed into one hearing in one evening.

Response
The videoconference format allowed members of the public from five communities near the Hanford Site to hear each other's comments and to hear discussion and responses from technical experts in Washington, DC. During all public hearings on the WM PEIS, DOE emphasized that the hearing would remain open until all participants who wished to speak, preregistered or not, would have an opportunity to do so. DOE did not attempt to limit the number of people allowed to attend the

hearings; on the contrary, all those wishing to attend were encouraged to do so, and the resulting mix of views was welcome. As a courtesy, preregistered speakers were called in the order in which they registered. The hearing did remain open until everyone who indicated a desire to speak had done so. The benefits of allowing multiple communities to hear each others' concerns made it necessary to allow sufficient time for all speakers to participate in an orderly manner. DOE regrets the inconvenience to the commentors and appreciates the written feedback they provided.

Comment (1484)
Some commentors liked the public hearing videoconference format. Others criticized the format for the following reasons: They thought it limited dialogue; the methods for recording comments were not acceptable; comments should have been attributed to commentors; and hearings were not independently facilitated. Some doubted the format saved money.

Response
DOE appreciates both the favorable and critical comments on the teleconference hearing format and will apply them to improving future hearings. The hearings were held to obtain public comments on the Draft WM PEIS for consideration in development of the Final WM PEIS, and to provide for some discussion as time permitted. The videoconference format used for hearings on the Draft WM PEIS offered an opportunity for more people to participate, which helped to expand the dialogue. This includes dialogue among members of the public who could be affected by DOE's proposed actions, as well as a number of DOE officials and technical experts preparing the WM PEIS analyses. On the other hand, DOE recognizes that the benefit of opening a discussion to a large number of people should be balanced with the need for patience and cooperation on the part of all involved so that everyone who indicates a desire to speak will have the opportunity to do so.

The format used did not limit DOE's ability to record the meeting. Rather, it provided a highly accurate method of documenting the session in the form of audio- and videotapes. The notes taken during the hearing and the hearing summary placed in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS have been used as supplements to capturing public comments offered in the hearings and in developing appropriate responses to public comments on the Draft WM PEIS. Further, whenever a verbatim record and/or individual attribution was requested, audiotapes were used to read the individual's statement into the hearing summary.

Although some of the hearing facilitators work in some connection for DOE or have done so in the past, all were experienced in conducting sessions of this nature. The hearing format was not structured as an "arm's length" negotiation session requiring an unbiased arbitrator. Rather, it was structured as a true dialogue in which DOE officials and technical personnel could directly hear the public's perspectives and enter into a discussion in which the public's perspectives could be properly understood to facilitate development of appropriate changes to the Draft WM PEIS.

The hearing did save money by allowing a maximum number of involved DOE officials and technical experts to hear public comments first-hand, while avoiding unnecessary travel costs. Recognizing that personal contact is also desirable and thought to be important to some individuals, DOE provided at least one individual from its Headquarters WM PEIS Team at all hearings for onsite participation, as well as DOE officials from the sites who are knowledgeable about local DOE programs and public issues.

12.2 Draft WM PEIS Public Comment Process and Hearings

Comment (1567)
The video shown at the beginning of the hearing was informative; however, it was not honest. *DOE was involved in a number of activities*. The PEIS was forced by a lawsuit.

Response
As acknowledged in the beginning of the videotape, DOE has, in the past, undertaken waste management activities primarily at the sites where the waste was generated so that a minimum of waste was moved between sites. However, this may or may not be the best strategy for future management of DOE waste. And, while it is true that the preparation of the WM PEIS was initiated in response to a lawsuit, that does not in any way diminish its value or DOE's intent to use the analysis and results presented in the PEIS to help make decisions regarding the treatment, storage, and disposal of waste. These analyses will help DOE to understand the potential environmental impacts, human health risks, and costs of various waste management strategies. Furthermore, DOE believes that choosing the right balance among these and other factors should be based on good science, safety, common sense, and public values.

Comment (1576)
The teleconference hearing was not a consensus process because it did not include all of the public at all of the sites simultaneously; DOE should have held all the hearings at the same time to get a true national consensus.

Response
The WM PEIS public hearings, like all others held under the process for implementing NEPA, were not designed or intended to form a "consensus" process, but to provide for the expression of diverse viewpoints where they exist. The hearings were held to obtain public input on the Draft PEIS that would be considered and factored into the Final WM PEIS, as appropriate. The format used for the WM PEIS hearings was also developed to provide experts to answer the public's questions and provide a discussion forum to promote a clear understanding of the public comments conveyed.

In contrast to the commentor's preference for a single national forum, some commentors felt that holding simultaneous hearings involving multiple sites is unwieldy. DOE's approach was to balance the need to open the hearings to as many individuals as possible, while keeping the participation orderly and focused. To this end, hearings were held in all potentially affected regions of the country. Through this mechanism and through subsequent public involvement opportunities, differences in regional or other perspectives can be considered in the national decision process supported by the WM PEIS.

Recent efforts to enhance public participation in decisionmaking include the National Dialogue discussed in Volume I, Section 1.8.2, of the WM PEIS.

Comment (2217)
When I arrived at this hearing I was given a form to provide written comments. I made the effort to come down here, I don't need to write down a bunch of stuff and send it to you.

Response
Comment forms were provided to meeting attendees as a convenience for those who wished to hear the proceedings but preferred to offer written rather than oral comments. The forms could be used to

submit written comments at the hearing or to send written comments to DOE after the hearing. There was no requirement to write comments. Everyone who wished to provide oral comments at hearings was given an opportunity to do so. All oral comments were recorded.

Comment (2218)
I don't trust DOE to summarize the comments I give at public hearings.

Response
Comments given at public hearings on the WM PEIS were recorded verbatim for members of the public who requested this service. Comments from all public hearings were documented and placed in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS in early February 1996. Thus, hearing summary comments and verbatim comments (when requested by individuals) were available for commentor review before the end of the public comment period and publication of the Final PEIS.

Comment (3186)
We believe the concerns we raised in our testimony at the November 9, 1995 hearing have not been addressed. The issues in that testimony should be addressed in the Final EIS.

Response
DOE considered all comments received during the public comment period in preparing the Final WM PEIS. This includes all comments received during the public meetings on the Draft WM PEIS.

Comment (3334)
Public involvement for this WM PEIS was deficient because (1) there were no public hearings, which tainted the process and indicated a breach of trust; and (2) it was not fair to have public hearings "on some line" that most Americans could not access "(e.g., like asking that these comments be postmarked by February 19, Presidents Day, when most PO's are closed)."

Response
Thirteen public hearings were held during the public comment period, which ran from September 22 until February 19, 1996. Recognizing that February 19, 1996, was a holiday, DOE accepted comments postmarked on February 20, 1996.

Although NEPA regulations only require one public hearing to be held, DOE conducted these public hearings all across the Nation and utilized the video conference format to allow for a greater involvement of DOE managers and program staff and to reduce costs. The hearings were announced in the *Federal Register* and advertised in newspapers, on radio stations, at press meetings, and via other local announcements. Meeting summaries were made available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

DOE has conformed to the CEQ regulations concerned with public involvement in the NEPA process. Persons wishing to participate in the hearings were encouraged to attend. The videoconference format actually allowed the public at two or more locations to hear each other's comments, which enhanced understanding of the issues.

12.2 Draft WM PEIS Public Comment Process and Hearings

Comment (3774)
This public hearing format was different from other hearings. DOE should not require speakers to sign up to speak at the meeting.

Response
Many DOE public hearings offer preregistration to ensure early opportunities to speak and to allow DOE to provide adequately sized facilities for the hearing. However, sign-up was not required in order to speak up at the public meeting. Preregistration was conducted to facilitate the organization of the meeting, and was supplemented by sign-up at the hearing location.

Comment (3797)
DOE needs to ensure that public involvement in the meetings such as these include notifying Argonne National Laboratory-East (ANL-E) workers.

Response
DOE notified the public of its public hearings through the typical avenues, including a *Federal Register* notice, radio and newspaper announcements, and, in some cases, information mailed to those on the site mailing list. In the future, DOE will work closely with the ANL-E management to provide adequate notification to the ANL-E workers.

Comment (3914)
DOE needs to be more responsive to the questions asked at hearings. "Yes" or "no" answers and fewer technical terms would be helpful.

Response
The WM PEIS public hearings, which were conducted all across the Nation, served several purposes. They were intended as a public forum to submit oral comments on the PEIS, and to facilitate a direct and open dialogue between the attendees and DOE. Thus, DOE had an opportunity to listen to and collect public comments, clarify issues and respond to questions, and interact with the public to make the WM PEIS the best document possible.

Waste management planning involves complex technical and other types of issues; therefore, DOE cannot always avoid using technical terms and cannot always give "yes" or "no" responses to questions. In addition, there are questions that cannot be answered with a 100% certainty, especially when dealing with predictions. DOE strives to explain technical terms and encourages hearing participants to ask for clarifications when they need them.

Comment (4568)
DOE should provide the meeting (public hearing) records to the public before the public makes written comments on the PEIS.

Response
The public hearings were held as one of two primary avenues for obtaining public comments on the Draft WM PEIS; the other was a 5-month comment period during which written comments could be submitted. These two avenues were provided simultaneously and one was not contingent on the other. The number of hearings and length of time allowed for public input were well beyond the requirements of NEPA and its implementing regulations. DOE is strongly committed to informing the public of its

proposed actions and highly receptive to public input on the NEPA reviews of those actions. To this end, DOE believes it is essential to keep the public's attention and comments focused on the NEPA document itself, in this case the WM PEIS, rather than on the public hearing record. That record is available for information in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

Comment (4571)
Notice for the Hanford public hearing was abysmal. The notices did not identify proposals to ship vast quantities of waste to the Northwest or the resulting potential human health risks. Legal notices are not designed to reasonably reach the affected population.

Response
Flyers were distributed to approximately 5,000 people who are on Hanford's distribution list of most interested citizens and stakeholders. These flyers clearly identified the alternatives that would send waste to Hanford. A display advertisement was run in the Tri-City Herald, which did state that certain alternatives, if selected, would send waste to Hanford. The DOE video on the WM PEIS was aired approximately 12 times on Northwest Public Television. This video clearly defined the alternatives that could send waste to Hanford. Radio advertisements and editorials were also used to inform the public of the public hearings. DOE, therefore, believes satisfactory notice was given.

13. Waste Management Programmatic Decisionmaking

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(No comments were received for this section)

13.1 Decision Criteria

Comment (158)
PEIS criteria for selecting preferred alternatives and issuing Records of Decision should include the impact the decisions would have on the environmental restoration activities at each site, including the Records of Decision, Consent Agreements, and Site Treatment Plans already in place.

Response
The WM PEIS is a programmatic document that addresses future configurations for selected waste management facilities. The factors and criteria used to select PEIS preferred alternatives are identified in Volume I, Section 1.7.3, and include favoring alternatives that comply with all applicable regulatory requirements, DOE Orders, and commitments made through the FFCAct process or Department agreements with states and other regulators. DOE's preferred alternatives and the reasons they are preferred are identified in Section 3.7. DOE will consider all available information, including site-specific environmental restoration concerns, when making decisions.

Comment (552)
The regulatory risk decision criterion should focus not only on more stringent future statutes, but also on the possibility of less stringent requirements. The regulatory risk assessment should be tied closely with the implementation flexibility decision criterion.

Response
DOE agrees with this comment, and has (1) included the possibility of less stringent future statutes in the WM PEIS regulatory risk decision criterion and will (2) use the regulatory risk and implementation flexibility criteria in concert with the other decision criteria and factors to guide decisions on waste management.

In the context of this PEIS, regulatory risk addresses how the preference for an alternative might be affected by regulatory and statutory changes, regardless of whether the change is toward more or less stringent requirements. Selecting more costly alternatives could result in needless expenditures if less stringent regulations were to go into effect. Conversely, selecting less costly alternatives could save money in the short term, but could also introduce delays and "backfitting" costs if more stringent statutes and regulations were to go into effect.

DOE modified Section 1.6 of the WM PEIS Summary document and Section 1.7.3 in Volume I, which discuss the regulatory risk criterion.

Comment (1525)
Economic issues are important, but not at the expense of human health and environmental risk. DOE needs to consider environmental values and human health.

Response
Volume I, Section 1.7.3, describes the decision criteria and factors DOE has used and will use to select waste management alternatives. The waste management alternatives in the WM PEIS could affect a number of environmental resources, among them human health and safety, socioeconomic conditions, ecological resources, and more. DOE has evaluated the impacts of its programmatic alternatives on these areas. These evaluations are part of DOE's decisionmaking process.

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Comment (1535)
DOE needs to state clearly the factors and criteria it will use in selecting a waste management alternative, and how these factors will be ranked. The public should have input to the selection and ranking of these criteria. The decision criteria should be weighted toward feasibility, costs, and ways of mitigating impacts.

Response
The WM PEIS lists and discusses the criteria used to select a preferred alternative for each waste type in Section 1.7.3. These criteria are not ranked in terms of importance, which provides DOE with maximum flexibility in the decisionmaking process. The public has had an opportunity to provide input to the selection and use of the decisionmaking criteria used in the PEIS during the public comment period on the draft document. Cost and ways of mitigating impacts are two of the criteria used to select a preferred alternative. Feasibility plays a central role both in defining alternatives to consider, and in selecting a preferred alternative.

DOE's ultimate decision on how to manage each waste type examined in the WM PEIS will follow the issuing of the Final PEIS and will be outlined in published Record(s) of Decision. In making these decisions, DOE will consider the criteria examined in the WM PEIS, as well as other factors such as budgets, schedules, and national priorities.

Comment (1541)
The WM PEIS lists the decisionmaking factors and criteria. DOE needs to tell the public how it will rank these factors. There needs to be public involvement in the assumptions used for ranking and weighting.

Response
DOE solicited public comments on the criteria it proposed for decisionmaking, which are described in Volume I, Section 1.7.3, of the WM PEIS; this volume describes those comments. During the public meetings on the Draft WM PEIS, DOE specifically asked the public four main questions:

- Is the document technically adequate?
- What values should DOE consider in making these decisions?
- What alternatives does the public prefer or oppose?
- Is the proposed process for making these decisions reasonable?

The WM PEIS lists and discusses the criteria used to select a preferred alternative for each waste type in Section 1.7.3. These criteria are not ranked in terms of importance, which provides DOE with maximum flexibility in the decisionmaking process. The public has had an opportunity to provide input to the selection and use of the decisionmaking criteria used in the PEIS during the public comment period on the draft document.

The first step in the development of waste management decisions is the identification of the preferred alternatives for each waste type (see Volume I, Section 3.7). This identification does not mean that DOE has made final decisions.

DOE's ultimate decision on how to manage each waste type examined in the WM PEIS will follow the issuing of the Final PEIS and will be outlined in published Record(s) of Decision. In making these

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decisions, DOE will consider the criteria examined in the WM PEIS, as well as other factors such as budgets, schedules, and National priorities.

Comment (1542)
DOE might rate cost factors higher than the public would.

Response
Volume I, Section 1.7.3, describes the decision criteria and factors DOE has used and will use to select waste management alternatives. Human health and environmental risks are two important decision criteria. However, DOE has not weighted or ranked its decision criteria because DOE decisionmakers will take other factors such as budget, schedules, and national priorities into account in arriving at waste management decisions.

Comment (1545)
Risk analysis is being debated by the public. Attaching numeric and dollar values to human life is a big problem. DOE needs to consider whether risk analysis is an appropriate criterion for screening alternatives.

Response
DOE believes that health risk is an appropriate criterion on which to base its waste management decisions. However, DOE is not attempting to put dollar values on human life. In the WM PEIS, the risk analyses are evaluations of the potential risks from each alternative considered. These risks include cancer incidences and deaths from radiological or chemical sources from accidents and normal operations as well as trauma deaths from accidents. These impacts are measured for waste management workers, other onsite workers, and the general public. In addition, the PEIS evaluates the impacts to the maximally exposed individual (generally a member of a farm family located at the boundary of the facility) and to an intruder who drills into a disposal site after institutional control of the site ends. These risk calculations do not include a monetary value for human life.

Comment (1547)
Decisionmaking criteria do not address economic impacts to the communities.

Response
DOE included economic dislocation as a decision criterion in Section 1.7.3; therefore, DOE will consider alternatives that tend to minimize economic dislocation, including job losses. Furthermore, the WM PEIS provides an analysis of economic impacts. The economic impacts analyzed include (1) changes in regional and national employment, (2) changes in personal incomes at the national and regional levels, (3) changes in national economic output, and (4) changes in job-years at the national level.

Comment (1605)
The PEIS should weight the factors of the analysis and discuss them in terms of what is good for the nation and the public.

Response
The WM PEIS is DOE's national programmatic study leading to the decisions to be made on the safe and efficient management of its radioactive and hazardous wastes, which will benefit the Nation and the

public. During the comment period on the Draft WM PEIS, DOE solicited public input on the decision criteria and factors for the siting and management alternatives to help identify the preferred alternatives in the Final WM PEIS; Section 1.7.3 in Volume I describes these criteria.

In addition to the environmental (including human health) impacts and costs addressed in the WM PEIS, DOE decisionmakers will take other factors such as budgets, schedules, and national priorities into account in arriving at waste management decisions. For this reason, the WM PEIS is not the appropriate forum to determine ranking criteria or to weight factors of analysis.

Comment (1633)
The PEIS should consider the community context for siting decisions and discuss the effects of the alternatives on local government resources (including costs), because local governments are responsible for public safety and will bear many of the costs of these actions.

Response
DOE agrees that impacts on the community around a site are important. The WM PEIS considers many potential community impacts, including health risk to the offsite population; economic impacts to the region of influence around the site, including regional income and employment; population changes to the region and their likelihood to cause changes to community size, stability, diversity, identity, and provision of necessary services; and potentially disproportionately high and adverse impacts on minority or low-income populations around each site (environmental justice).

Comment (1634)
The decision criteria should be weighted toward the feasibility, costs, and ways of mitigating impacts.

Response
During the comment period for the Draft WM PEIS, DOE emphasized its interest in public opinion on the decision criteria. DOE considered those comments and refined the list of decision criteria presented in Volume I, Section 1.7.3, of the Final WM PEIS. DOE will continue to use these criteria and other decisionmaking principles during the decisionmaking process as it did in choosing the preferred alternatives.

Comment (1668)
Criteria that DOE should consider in selecting preferred alternatives and making final decisions include:

- The concept that cost and risk are major parameters for decisionmaking in the absence of extreme or unknown hazards that require high priority regardless of cost.

- Relative to low-level waste, it is apparent that transportation is the dominant source of public risk and that treatment and disposal are dominant for worker risks. It is also apparent that development of disposal facilities is expensive relative to transportation. This presents decisionmakers with the dilemma of trading off dollar savings for potential increases in public and worker risks.

- Many Nevadans are opposed to the disposal of these wastes in our State regardless of cost and risk issues. What additional and ongoing opportunities do you plan to provide to listen to this

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viewpoint, expand local oversight authority, and manage wastes on a national scale to minimize or eliminate the need for waste disposal in Nevada?

Response
The decisionmaking process following publication of the Final WM PEIS will certainly include cost and risk considerations, but it will also consider a number of other important factors, including those described in Section 1.7.3 in Volume I. The decisionmakers will be faced with many trade-offs. Thoughtful consideration of these many factors is a part of the decision process. In some cases the decision can be made easier since mitigation measures can be used to reduce the impacts of the selected alternative. The decision process will result in Records of Decision issued subsequent to this PEIS. They will identify DOE's strategy for the management of wastes on a national scale.

DOE is developing additional opportunities for a public National Dialogue during the decisionmaking process. This initiative is discussed in Section 1.8.2 in Volume I of the Final WM PEIS. To this end, all potentially affected states, including Nevada, are being provided with the same opportunities for input. The potential for expansion of local oversight authority is a site-specific issue that could be considered during sitewide or project-level NEPA reviews. This issue is outside the scope of the WM PEIS.

One of the major decisions to be made as a result of the WM PEIS is whether to manage wastes in a decentralized, regionalized, or centralized configuration. Therefore, DOE is considering the "national scale" configuration of its waste management facilities in the WM PEIS.

Comment (1772)
The WM PEIS includes regulatory compliance as a criterion DOE "may use" to screen, evaluate, and narrow the current alternatives for each waste type. The wording should be changed to "shall use" and the PEIS should list all State and Federal regulations for clarification.

Response
Section 1.6 in the Summary document and Section 1.7.3 in Volume I of the Final WM PEIS were revised to state that DOE will use the listed factors and criteria to make decisions. However, DOE remains open to public input to further develop principles for making decisions.

Section 1.4 in Volume I of the WM PEIS identifies the major Federal laws and requirements that might apply to the programmatic alternatives for waste management. As noted in Section 1.4, there may be other State and local measures, applicable to the Waste Management Program; however, these additional requirements will be addressed in sitewide and project-level NEPA reviews.

Comment (2304)
Minimize transportation. With many of your plans, transportation across this country would be phenomenal and the risks to public health and safety would be beyond belief.

Response
Transportation requirements are considered a factor in examining different programmatic siting and management alternatives. Included in the analysis is whether transportation should be minimized by DOE. DOE will have to balance the number of shipments with potential environmental risks, safety consequences, public concerns, mission needs, and costs. DOE's preferred alternatives and the reasons

they are preferred are identified in Section 3.7 in Volume I of the WM PEIS. Programmatic decisions will be announced in Records of Decision after the Final WM PEIS is published.

Comment (2966)
It is not clear how conflicting comments dealing with site preferences will be resolved in the DOE decision process.

Response
The decision criteria and factors described in Volume I, Section 1.7.3, were used in selecting preferred alternatives. To the extent possible, DOE incorporated stakeholder preferences along with its needs in the WM PEIS decisionmaking process. The Final WM PEIS considered public comments on the Draft WM PEIS in developing the preferred alternatives identified in Section 3.7.

The WM PEIS will inform DOE decisionmakers by providing an analysis of the environmental and human health impacts of the alternatives. However, the PEIS will not be the only basis for making decisions, especially in the event of conflicting opinions about site preferences. DOE will consider budgets, schedules, national priorities, and other DOE studies in making these decisions.

Comment (2974)
DOE should consider the following criteria in selecting preferred alternatives and making final decisions: Are cost estimates based on DOE-owned or privately owned and operated facilities?

Response
Waste management costs, especially those for construction, can vary by region, season, and vendor. Moreover, there are many offsite waste management facilities operated by private companies. It would be difficult to determine which facilities DOE would use, how much waste they would receive, and what types of waste they would receive. In order to ensure consistency in the WM PEIS analysis, DOE based the costs for the conceptual treatment, storage, and disposal facilities identified in the PEIS on experience gained during the construction of its own facilities. Therefore, the relative costs of the respective alternatives is a valid discriminator among alternatives. Chapters 6 through 10 (Volume I) and Appendix C (Volume III) of the PEIS provide details of the cost analyses. DOE project managers will minimize actual expenditures after the development of specific facility plans. DOE encourages commercial participation in its Waste Management Program. Section 1.7.4 in Volume I addresses use of privatized or commercial facilities to manage DOE waste. Cost would be one factor DOE would consider in deciding whether to commercialize or privatize specific waste management operations.

Comment (2975)
DOE should consider the following criteria in selecting preferred alternatives and making final decisions: Cost estimates for transportation should include funding for emergency response training and equipment for State and local officials.

Response
The costs to train emergency responders are not included in the WM PEIS. Since there are over two million radioactive materials shipments in the United States by public and private entities each year, most State HAZMAT emergency responders are already trained to respond to hazardous waste, low-level waste, and low-level mixed waste transportation incidents. DOE is working with the States to train emergency responders for future WIPP transuranic waste shipments. Future training of State emergency

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responders for high-level waste is also planned. DOE will work with the States to develop transportation plans that will determine the needs of State emergency responders prior to waste shipment where required.

Because of existing State emergency response training for hazardous waste, low-level waste, and low-level mixed waste, DOE expects emergency response training and equipment costs to be small compared to shipping costs and, therefore, has not included these costs in the WM PEIS cost estimates.

Comment (2985)
Site geology and proximity of offsite population should be primary factors in making disposal (and treatment) decisions.

Response
Site geology and offsite population are factors that influence human health risk and other environmental impacts. Volume I, Section 1.7.3, was revised to indicate that human health risks depend on factors such as the population surrounding the sites and the hydrogeology of disposal sites. DOE did not attempt to quantitatively estimate risks to offsite populations from disposal because any credible analysis would require knowing specific locations for each disposal unit. However, DOE did analyze the vulnerability of the populations at the 16 potential disposal sites to risks from disposal based on site factors such as population, site size, and hydrology. The sites relative risk vulnerability grouping was used to compare the disposal alternatives. See Section 5.4.1.2.3 in Volume I of the WM PEIS.

Comment (2992)
In its decision process, DOE should consider impacts on the existing workforce, particularly in options that rely on the private sector.

Response
DOE does consider the impacts of its actions on the existing workforce in terms of economic dislocation. These impacts were added as a decision criterion, as explained in Section 1.7.3 of the WM PEIS. Chapters 6 through 10 of the PEIS discuss the economic and population (including worker) impacts from the alternatives for each waste type.

Comment (3028)
When the analysis highlights environmental problems within alternatives, those problems should be used to eliminate the alternative, or to tag it as less desirable. Instead, the PEIS states that the problems can be mitigated, with little explanation of how such mitigation might be accomplished, or the impacts of carrying out the mitigation. If environmental criteria are not used to discriminate between alternatives, this PEIS is of very little use.

Response
NEPA requires consideration of reasonable alternatives, not just the most environmentally protective alternatives. As stated in Section 1.7.3 in Volume I of the Final PEIS, DOE, in its decisionmaking process, will consider factors which favor selection of alternatives and sites that would minimize adverse environmental impacts. In accordance with CEQ guidelines, when adverse impacts are indicated, potential mitigation measures are discussed to show how DOE could reduce or eliminate such impacts. However, the impacts without mitigation are displayed in the PEIS.

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Comment (3306)
The list of decision criteria should explicitly include health and safety and socioeconomic impacts.

Response
The Summary document and Volume I, Section 1.7.3, which identifies the decision factors and criteria associated with the WM PEIS, have been revised. Health and safety are included in the human health risk factor. Socioeconomic impacts are included in the economic dislocation and environmental impact factors.

Comment (3786)
The public needs to know what the siting criteria will be.

Response
Decisions on which DOE sites will host waste management facilities will be made on the basis of this WM PEIS and other relevant input (e.g., other risk studies). Factors and criteria for these siting decisions are explained in Volume I, Section 1.7.3. Decisions as to where on a selected site a waste management facility will be located will occur after consideration of sitewide or project-level NEPA reviews. Such NEPA reviews will include public participation. Thus, the public will be informed of siting criteria on a site-specific or project-level basis.

Comment (3799)
DOE needs to consider the people that they are affecting by their decisions.

Response
As a programmatic EIS, the WM PEIS assesses a variety of impact parameters for the five waste types under the different alternatives. Impact parameters relating to people, for example, include human health, socioeconomic conditions, and environmental justice. Moreover, DOE considers public input a major driver of the WM PEIS process. In many instances, public comments have precipitated changes in the PEIS.

Comment (3861)
DOE should consider these decision criteria: logistics, economics, and public health and safety.

Response
As described in Section 1.7.3 in Volume I of the PEIS, DOE will consider a range of decision criteria. Logistics are considered in the decision criteria for site mission, transportation, and implementation flexibility. Economics are considered in the environmental impact, cost, and economic dislocation decision criteria. Public health and safety are considered in the human health risk and transportation decision criteria.

Comment (3901)
We need to consider future generations in these decisions.

Response
The decision criteria for preferred alternative selection included human health risk, which includes long-term (multi-generational) risk.

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Comment (3922)
DOE needs to explain the criteria they will use to make the final decision regarding disposal facilities and how those criteria might apply to Argonne National Laboratory-East (ANL-E).

Response
The WM PEIS outlines the decision criteria and factors for the development of its preferred alternatives in Volume I, Section 1.7.3. Records of Decision will be issued following this WM PEIS for each waste type.

Comment (4236)
If reducing waste volume and treatment also reduces the possibility of waste leaching into the environment or groundwater, then the cost is worthwhile.

Response
Environmental impact, health risk, and cost are among a number of decision criteria DOE considered in selecting its preferred alternatives for each waste type identified in Section 3.7 (Volume I). Chapter 1, Section 1.7.3, in Volume I of the PEIS describes the factors and criteria considered.

Comment (4440)
With respect to the factors and criteria DOE may use to select preferred alternatives, DOE should explain what is meant by minimizing adverse environmental impacts in detail, including:

- How risks during treatment, storage and disposal are weighed for those immediately impacted versus all future generations (DOE had a tradition of using time-discounting in related risk management decisionmaking, and this and alternatives to this approach need to be fully evaluated);

- How environmental impacts are evaluated for onsite workers (for whom the risk can be considered to be voluntary) versus the general public, and associated trade-offs;

- How trade-offs between the different factors, such as cost and environmental impacts, are evaluated should be explained;

- The DOE administrative mechanisms and lines of authority used to make such decisions and the tools DOE uses for this purpose.

Response
The WM PEIS evaluates the potential health risk from waste treatment and storage for offsite populations and DOE site workers resulting from facility releases during the projected 10-year period of waste management operations. Exceptions to this assumption would include a full 20-year operations phase (i.e., construction phase not applicable) for the No Action Alternative, and the site-specific operational periods for high-level waste storage facilities, which are discussed in Chapter 9 in Volume I of the WM PEIS. The WM PEIS evaluates risks to receptors for a single lifetime (70 years).

The PEIS also evaluates health risk from the disposal of low-level mixed waste and low-level waste for successive lifetimes (143 lifetimes of 70 years) of the hypothetical farm family over a 10,000-year period of analysis. However, it evaluates each lifetime independent of risks estimated for other lifetimes and does not discount risk estimates on the basis of time.

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Section 5.4.1 in Volume I and Appendix D in Volume III describe the methodology for worker risk. The WM PEIS does not distinguish voluntary risk from involuntary risk, and assumes no trade-offs between worker risk and public risks.

Section 1.7.3 in Volume I describes the waste management decisions to be made by DOE. The decision process will occur after publication of the Final WM PEIS. The decision process is not part of the PEIS preparation, although the Final PEIS describes the preferred alternatives in Volume I, Section 3.7, and the reasons they are preferred. DOE asked for public input on the decision process during the public meetings on the Draft WM PEIS. The Records of Decision will explain how DOE used the impacts presented in the WM PEIS, together with other factors including cost, in the decisionmaking process.

13.2 Decision Process

Comment (466)
DOE needs to delineate whether site-specific environmental concerns are secondary to programmatic decisions being considered.

Response
DOE does not consider site-specific concerns to be secondary to programmatic concerns, even though it will deal with programmatic issues first in relation to waste management. The WM PEIS will help DOE make broad-based decisions, the implementation of which could require additional sitewide or project-level NEPA reviews to provide more in-depth assessments of impacts at potentially affected sites. Additional reviews would also consider the location, design, and operation of proposed waste management facilities at the particular DOE sites selected on the basis of the WM PEIS.

Comment (536)
DOE needs to clarify whether the WM PEIS will enable decisions on the treatment, shipment, and disposal of low-level waste, and whether this document will affect the levels of waste entering Idaho.

Response
The WM PEIS supports decisionmaking on the treatment, storage, and disposal of low-level waste at all DOE sites, including the Idaho National Engineering Laboratory (INEL) (see Volume I, Chapter 7). Under Regionalized Alternative 5, INEL would receive low-level waste from other sites for treatment or disposal. Under all other low-level waste alternatives, INEL would treat and dispose of its own low-level waste or ship it offsite for treatment and disposal.

Comment (538)
DOE needs to clarify if it will use other documents or impact analyses to make decisions regarding the treatment, transportation, and disposal of low-level waste at INEL, and to identify those documents.

Response
Section 1.8 in Volume I of the WM PEIS discusses the relationship of other documents and programs to the WM PEIS. It includes a discussion of the SNF/INEL EIS, in which DOE analyzed the treatment, transportation, and disposal of low-level waste at INEL. The impacts of actions analyzed in the SNF/INEL EIS were included in the cumulative impacts analysis in Chapter 11 of the WM PEIS. DOE will also consider other DOE studies in making waste management decisions, as discussed in Section 1.8.1 in Volume I.

Comment (554)
The low-level and low-level mixed waste storage (disposal) evaluation should consider the siting evaluation process utilized by the various compact commissions. The evaluation and implementation strategies should indicate the regulatory risk and implementation flexibility decision criteria identified in the WM PEIS.

Response
DOE will consider not only all applicable regulations in siting future low-level and low-level mixed waste disposal facilities, but also relevant guidance to the extent possible. Further, DOE typically includes both regulatory risk and implementation flexibility in its evaluations of the merits of proposed future programs.

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The primary objective of the siting evaluation process used by interstate low-level waste disposal compacts is to ensure the public is protected from releases of radiation. Performance assessments, which must relate to specific locations, confirm that releases are below the threshold set to protect the public. DOE uses the same process that compacts do to determine the location of a disposal facility on a site, and performance assessments to demonstrate that a site is suitable. Because the WM PEIS is a programmatic document, however, it does not consider specific locations for disposal facilities. The exact location of such a facility on a DOE site selected on the basis of this WM PEIS would be the subject of a sitewide or project-level NEPA analysis.

A facility for the disposal of low-level mixed waste must conform not only to standards set by the compacts for protection against radiological releases, but also to standards set by the EPA or a State agency to protect the public from hazardous chemical releases, in accordance with the Resource Conservation and Recovery Act. Section 1.7.4 discusses the use of commercial facilities.

Comment (1115)
The WM PEIS should provide an upgraded sensitivity analysis of all the decisionmaking factors that DOE will use for Records of Decision.

Response
Section 1.7.3 in Volume I of the WM PEIS describes the decision factors and criteria, many of which are not related to environmental impacts. The Records of Decision will be based on these factors and criteria. However, DOE will not perform a sensitivity analysis in the PEIS on decision factors that are not related to environmental or human health impacts, because such an analysis is beyond the scope of the WM PEIS and the requirements of NEPA. The decision factors and criteria not related to impacts analyzed in the WM PEIS will be considered through other documents and processes.

Comment (1164)
If no objections are made to DOE, plans for disposal at the Paducah Gaseous Diffusion Plant (PGDP) would proceed.

Response
This is not the case. DOE will base its programmatic decisions related to national waste management configurations on the Final WM PEIS and other studies, and on decision factors and criteria, most of which DOE identified in the Draft PEIS (Section 1.8) and in the Final WM PEIS (Section 1.7.3). DOE explicitly invited public input on these factors and criteria and on the decisionmaking process that will select the preferred alternatives.

Comment (1578)
It is difficult to believe that DOE does not know which alternatives are preferred.

Response
CEQ regulations implementing NEPA require the agency to identify its preferred alternative, if one is known, in the Draft EIS, and to identify the preferred alternative in the Final EIS unless another law prohibits the expression of such a preference.

In the Draft WM PEIS, DOE identified preferred alternatives for management of three of the five waste types because, at that time, only those had been developed. DOE intended to benefit from the public

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input as to the selection of preferred alternatives. Selection factors criteria for the preferred alternatives are identified in Section 1.7.3 in Volume I in the WM PEIS. Section 3.7 in Volume I of the Final WM PEIS identifies preferred alternatives and the reasons they are preferred for management of all of the five waste types.

Comment (1595)
DOE needs to clarify how it will make its decisions if all 16 potential communities oppose the PEIS proposals, and what it will take to get a site off the list.

Response
Volume I, Section 1.7.3, describes the WM PEIS decision factors and criteria, and Volume I, Section 3.7, describes DOE's preferred alternatives and the reasons they are preferred.

DOE analyzed 17 major sites in the WM PEIS. The designation of a site as "major" does not mean it will be selected for a waste management role. Rather, it means that DOE analyzed potential impacts from waste management activities.

DOE must select a preferred alternative for each waste type to meet the urgent national priority for sound waste management. While residents might perceive that one approach, such as decentralization, offers particular benefits or damage to a community or region, DOE must base its decisions on the diverse national needs and issues that affect many sites and regions.

Comment (1630)
DOE needs to explain how it will decide what the nationwide alternatives will be.

Response
CEQ regulations for implementing NEPA require an EIS to identify preferred alternatives, and for Federal agencies, including DOE, to announce their decisions on EISs in Records of Decision. Volume I, Section 1.4.1, describes the NEPA process, including the Record of Decision process. Section 3.7 identifies DOE's preferred alternatives, and the reasons they are preferred, for managing the WM PEIS wastes. Section 1.7.3 lists and describes the decision factors and criteria DOE will employ to make decisions based on the WM PEIS.

Comment (2305)
It is unclear how DOE will make the ultimate decision on the management of the various wastes found at numerous waste sites and how it will coordinate decisions made by individual sites; therefore, DOE should explain how and by whom these decisions will be made, how discrepancies will be resolved, and what appeals communities have.

Response
The WM PEIS evaluates alternatives for the treatment, storage, and disposal of radioactive and hazardous wastes. It is an integrated examination of the impacts of Department-wide management decisions for each waste type and of the collective impacts for all waste facilities at a given site.

The WM PEIS identifies DOE's preferred alternatives and the reasons they are preferred for each of the five waste types considered (see Volume I, Section 3.7). The decision factors and criteria identified in Section 1.7.3 were refined based on public comments and were used to help select preferred alternatives. DOE decisionmakers will consider these decision factors and criteria and public input to develop Records of Decision. No sooner than 30 days after public availability of the Final WM PEIS, DOE can begin to issue its Records of Decision, which the Secretary of Energy will sign and in which DOE will announce and explain its programmatic waste management decisions.

The programmatic waste management decisions which result from the PEIS form a base for sitewide or project-level decisionmaking, including subsequent sitewide or project-level NEPA reviews. These reviews will be tiered from the programmatic decisions. They will also include further public involvement opportunities, including those associated with the National Dialogue and the Environmental Management Ten Year Plan discussed in Section 1.8.2 in Volume I of the WM PEIS.

Comment (2969)
In its decision process DOE should consider that transportation poses greater risk to the general public than construction and operation of waste management facilities, yet decentralization is generally more expensive.

Response
The facts that transportation associated with the Regionalized and Centralized Alternatives would pose greater risks than those associated with the Decentralized Alternatives, and that the Decentralized Alternatives would be more expensive, is a primary issue in the DOE waste management evaluation. This WM PEIS analysis will be the basis for decisions that will weigh costs, risks, and other criteria. Section 1.7.3 in Volume I of the WM PEIS includes both cost and human health risk as decision criteria and factors.

Comment (2971)
In its decision process, DOE should carefully consider the aesthetics of shipping low-level waste any appreciable distance.

Response
Section 1.7.3 in Volume I of the WM PEIS identifies transportation (in terms of the amount required) as a decision criterion. However, aesthetics of transportation of low-level waste was not evaluated in the WM PEIS because the types of trucks or trains involved would be essentially identical to the types of trucks or trains used to ship similar nonwaste materials.

Comment (2990)
In its decision process, DOE should consider what impacts the agency's choices would have on the diversification of local economies.

Response
At the programmatic level, DOE was not able to consider the effects on potential economic diversification of a locality because of the complexity involved in such an analysis and has not included this in the decision criteria. The waste management actions in most cases would lead to substantially increased expenditures in the local economy at each site. How these funds would affect economic diversity would depend on an array of factors external to the simple model used to estimate economic effects and would require making a great deal of assumptions to make any reasonable forecast. The speculative nature of such forecasts would make them of only marginal value in programmatic decisionmaking. This site-specific topic can better be considered at the site level.

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Comment (2995)
DOE needs to consider the requirements of DOE Orders in its decisionmaking process.

Response
DOE will comply with all applicable laws, regulations, and Orders. Section 1.7.3 in Volume I of the WM PEIS identifies compliance with DOE Orders as part of the regulatory compliance decision criterion.

Comment (3170)
DOE should develop an effective decisionmaking process to integrate EISs dealing with waste storage, treatment, and disposal. This process must be designed in a way that will earn the agreement of the affected States and Indian Nations, and the support of Site-Specific Advisory Boards and other affected stakeholders; this process must also contain a strong public involvement element. The Site-Specific Advisory Boards can play a key role in public involvement, but it must be augmented by a broader outreach program. DOE should work with stakeholders to ensure that their values are factored into alternatives being considered in the WM PEIS.

The Washington State Department of Ecology and the U.S. EPA should be fully involved in decisions that would impact the Hanford Site, particularly in decisions that could compete with or detract from the site's cleanup mission and the resources it requires.

Response
DOE agrees that there is a need for the development of an effective process that will integrate decisions DOE makes on waste treatment, storage, and disposal with those dealing with the disposition of other radioactive materials. In the Fall of 1995, DOE began a "National Dialogue" on radioactive waste and materials disposition with interested States, Site-Specific Advisory Boards, and other interested public. The purposes of the National Dialogue are to promote openness, to increase trust and confidence in DOE decisionmaking, and to complement the traditional public outreach efforts conducted under the process prescribed by NEPA and other environmental regulations. The National Dialogue effort will enable DOE and stakeholders, especially affected States, to explore potential trade-offs in decisionmaking that could benefit DOE and its host communities. At first, the National Dialogue will focus on decisions that DOE must make over the next few years and that could affect more than one DOE site, how DOE will arrive at the decisions, and how stakeholders can influence the decisions. While DOE's close work with the National Governors Association will be a cross-cutting vehicle for interactions with the States, the National Dialogue effort will strive to reach traditional and nontraditional stakeholders in an open and inclusive manner.

DOE has revised Volume I, Section 1.8.2, of the WM PEIS to include a description of this National Dialogue initiative. Chapter 11 considers the impacts of the actions associated with the PEIS in combination with the impacts of other DOE actions.

Section 1.7.3 in Volume I identifies the factors and criteria that DOE will use in its waste management decisionmaking process. Among the criteria that DOE will look for in selecting waste management alternatives are consistency with other DOE studies and comparability across sites, and the distribution of waste management facilities in ways that are equitable.

13.2 Decision Process

DOE has provided several opportunities for the public to provide input to the PEIS process. DOE's public participation effort for the PEIS is detailed in Volume I, Sections 1.7.1 and 1.7.2. Comments received from individual members of the public, interest groups, Federal, State, and local agencies, and others have played a significant role in shaping the PEIS and DOE's decisionmaking process.

As required by NEPA, DOE has or will consult with Federal and State agencies with jurisdiction by law or special expertise in the proposed action(s). Consultations with State agencies will occur during the development of sitewide or project-level NEPA documents that address specific locations of potential waste management facilities.

Comment (3659)
How is DOE going to make a decision based on impacts to water, ecological, cultural, and land-use impacts when it will be necessary to prepare site-specific studies prior to the selection of a site for the location of a facility? This seems to be an attempt to put the cart before the horse and would result in an irretrievable commitment of resources without proper NEPA-required impact analysis.

Response
The WM PEIS provides a screening-level analysis of the potential for impacts to water resources, ecological resources, and land use at the 17 major DOE sites. The PEIS analysis indicates that there is little potential for significant impacts on these resources at the sites for all waste types and alternatives because DOE will have considerable flexibility in siting any proposed waste management facilities and, thus, should be able to avoid or minimize such impacts. Therefore, these impacts should not weigh heavily in decisionmaking. More detailed analyses of these impacts would be done in sitewide and project-level NEPA analyses before a facility is located at a site and an alternative is implemented.

DOE acknowledges that the lands used for waste management facility construction, particularly disposal units, would constitute an irreversible commitment of resources--although exactly where those lands would be located at a site has yet to be determined.

Comment (3770)
DOE needs to be responsible in its decisionmaking.

Response
DOE intends to be responsible in its decisionmaking. Section 1.7.3 in Volume I has been revised to explain the decision process for making waste management decisions subsequent to issuance of the Final PEIS.

Comment (3794)
DOE needs to ensure the public that their meetings and opinions matter in the decisionmaking process.

Response
The CEQ and DOE NEPA regulations, under which this WM PEIS is prepared, mandate rigorous public participation efforts including public meetings. DOE considered all comments received on the Draft WM PEIS while preparing the Final PEIS. In numerous instances, public comments caused changes in the Draft PEIS that are reflected in the final version. Public input was also a major driver for the selection of preferred alternatives and will be considered in the decisionmaking process. Public input caused substantial changes to the decision factors and criteria to be used in the waste management

13.2 Decision Process

decisionmaking process (Volume I, Section 1.7.3). See Volume I, Section 1.7.2, for a summary of the comments DOE received and the changes DOE made to the PEIS based on those comments.

Comment (3795)
DOE needs to educate the public about the decisionmaking process and how it differs from a local referendum.

Response
As described in Volume I, Section 1.7.3, of the Final WM PEIS, decisions on waste management sites will be based on the information and analyses in the WM PEIS and other considerations such as regulatory compliance, budget constraints, schedules, compliance with regulatory agreements, including public input on each of the preferred alternatives for each waste type, national priorities, and other DOE studies. For example, DOE will continue to work with the DOE Disposal Workgroup and with State representatives in the National Governors Association to evaluate and discuss the issues related to the potential disposal of residuals from treatment of low-level mixed waste at sites subject to the FFCAct. DOE's Nuclear Material and Waste Dialogue Team, established in 1995, will work with interested members of the public and the National Governors Association to explore potential decisionmaking principles that may help DOE in making decisions that reflect public concerns.

The Records of Decision issued on the basis of the WM PEIS will identify sites at which waste management activities will occur. However, a decision on the specific technology and the particular location of a waste management facility at a site will be made on the basis of sitewide or project-level NEPA reviews.

Comment (3801)
DOE needs to help the public understand what steps will be taken in the process after the programmatic decisions are made.

Response
No sooner than 30 days after issuance of the WM PEIS, DOE may publish a Record of Decision that reflects consideration of the WM PEIS analyses, preferred alternatives, and other appropriate factors. Programmatic decisions on waste management may be issued individually for each waste type. In this way, the decisions would occur in a timely manner, which could be phased as the programs mature, and with appropriate discussion with States, regulators, members of Congress and other members of the public.

Implementation of the programmatic decisions would commence upon publication of the Record of Decision. If this involves modification of an existing waste management facility or the construction of new facilities, a determination would be made as to the need for further site-specific NEPA review. In this case, opportunities for additional public participation would arise.

Implementation planning would also involve efforts to assist DOE in complying with all State and Federal regulations, including preparing and submitting all required permit applications, and conducting all required consultations. This could include, for example, compliance with Federal transportation regulations as well as with DOE stipulations regarding the provision of appropriate information to State and local governments.

13.2 Decision Process

Comment (3805)
National papers, such as the *Chicago Tribune,* are carrying stories about this situation. The sooner decisions are made, the better. These news stories make our property values decrease.

Response
DOE is committed to developing a strategy for safe and efficient management of its radioactive and hazardous waste. This includes a timely conclusion of pertinent NEPA reviews and decision processes. WM PEIS Records of Decision will be published as soon as possible, but no sooner than 30 days after issuance of the Final WM PEIS, as required by NEPA. DOE is working hard to maintain an open, cooperative, fair, and constructive relationship with the public, including the press.

Comment (3908)
Any decision we make could be altered. Immediately remove ANL-E from consideration. DOE needs to explain how the waste management decisions will be staggered.

Response
Section 1.6 in Volume I of the WM PEIS provides an overview of the waste management sites covered in the PEIS and Section 3.5 describes the methodology used by DOE for selecting and identifying alternatives. DOE has not found any technical bases that would warrant removal of ANL-E as a major site alternative.

After the Final PEIS is published, the Record of Decision process will start. DOE does not expect that all waste management decisions will be made at one time for all waste types. DOE anticipates that the PEIS will result in separate Records of Decision by waste type to be issued in a staggered fashion starting in calendar year 1997. Section 1.7.3 in Volume I has been revised to explain the waste management decision process.

Comment (4335)
DOE's WM PEIS is a major step toward public understanding and involvement in decisionmaking. For the first time, citizens have available to them, in one document, a great deal of information about the wastes in the complex and the options for treating and disposing of those wastes.

Response
Thank you for your comment.

13.3 Record of Decision

Comment (1756)
Will there be future multiple WM PEIS Records of Decision and what is the potential timetable for these decisions?

Response
DOE anticipates that the PEIS will result in separate Records of Decision by waste type to be issued in phases starting in calendar year 1997. Section 1.7.3 in Volume I has been revised to explain the decision process for making waste management decisions subsequent to issuance of the Final PEIS.

Comment (2208)
Does DOE have an administrative appeal process to challenge the Record of Decision and, if so, where was it codified?

Response
DOE has no administrative appeals process for Records of Decision. Assuming that the issuance of a Record of Decision is the final agency action in a particular case, all such appeals would be through the Administrative Procedure Act.

Comment (3789)
DOE needs to inform the public about the timetable for making decisions. There is a lot of waste; temporary storage is probably worse than permanent storage.

Response
The WM PEIS addresses treatment, storage, and disposal strategies for the management of hazardous and radioactive waste over the next 20 years. Storage is defined as the collection and containment of waste awaiting treatment or disposal. Storage can occur on a longer term basis (i.e., decades or longer), for example, as in the case of high-level waste until its acceptance at a geologic repository.

As soon as possible, but no sooner than 30 days after DOE publishes the Final PEIS, it will publish Records of Decision for the waste types. DOE anticipates that the PEIS will result in separate Records of Decisions by waste type and are anticipated to be issued in a staggered fashion starting in calendar year 1997. Section 1.7.3 in Volume I has been revised to explain the decision process for making waste management decisions subsequent to issuance of the Final PEIS.

Comment (3792)
DOE needs to let the public know when the final decisions are made.

Response
Individuals receiving the Final WM PEIS will remain on the mailing list to receive the Records of Decision supported by the WM PEIS. A *Federal Register* notice will be published for each Record of Decision.

14. DOE Policies, Mission, Authorities, and Responsibilities

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(No comments were received for this section)

14.1 General Comments

Comment (371)
Several commentors suggested that DOE discontinue the generation of waste. DOE should change its mission and stop production of waste, nuclear power plants, and weapons, as well as funding for the nuclear industry. DOE should consider renewable energy, increased efficiency, and conservation in its decisions. Tax money should be spent on resources that can be recycled and used without endangering human or animal life.

Response
Issues relating to DOE's energy mission (e.g., nuclear energy, alternative and renewable energy resources, energy efficiency and conservation) and DOE's defense mission (e.g., production of nuclear weapons) are outside the scope of the WM PEIS.

Since the end of the Cold War there has been a shift away from the nuclear arms race and toward environmental restoration and waste management. DOE is committed to operating its facilities and managing its wastes safely and in compliance with all applicable laws and regulations, so that human health, safety, and the environment are not endangered.

The WM PEIS is a tool to help DOE develop a national waste management strategy for its radioactive and hazardous wastes. The wastes addressed in the WM PEIS primarily resulted from the development, production, and testing of nuclear weapons, and are mostly in storage pending treatment or disposal. The majority of additional wastes projected will be generated as a result of environmental restoration, decontamination and decommissioning, and other DOE energy research activities.

DOE is strongly committed to pollution prevention and reduction in all its program activities. Recycling is part of DOE's pollution prevention strategy, and is practiced to the extent possible. Appendix G in Volume IV of the WM PEIS addresses pollution prevention for the Waste Management Program. Individual DOE sites have site-specific waste minimization and pollution prevention programs and plans in place.

Comment (379)
Other waste cleanup or disposal issues must not slow the Hanford cleanup effort or divert funding or resources from Hanford cleanup.

Response
DOE is committed to cleaning up the Hanford Site and other DOE sites. The overall goal at the Hanford Site is to cleanup the site in accordance with the Hanford Federal Facility Agreement and Consent Order (commonly known as the Tri-Party Agreement), other agreements, and all applicable Federal, State, and local laws. The Tri-Party Agreement between DOE, EPA, and the Washington State Department of Ecology was signed in 1989 and has been formally amended four times since. It defines DOE actions to comply with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), and the State of Washington Hazardous Waste Management Act. It includes a framework for permitting treatment, storage, and disposal units for the management of hazardous and mixed wastes at the Hanford Site. Compliance with regulatory requirements, including those of the Hanford Tri-Party Agreement, is an important decision criterion considered by DOE in selecting preferred alternatives and will be considered in making programmatic waste management decisions. The decision criteria and factors DOE is using are described in Volume I,

Section 1.7.3, of the WM PEIS. DOE's preferred alternatives and the reasons they are preferred are described in Section 3.7.

Comment (1620)
DOE has done a lot for the African American community in Nevada by its educational programs and employment opportunities at the Nevada Test Site (NTS).

Response
Thank you for this comment.

Comment (1623)
DOE and NTS have helped Nevada grow; many people do not appreciate this.

Response
Thank you for your comment.

Comment (2131)
DOE should not have 54 nuclear generating sites because there are duplicate facilities.

Response
As described in Section 1.6 in Volume I of the WM PEIS, there are 54 sites for which DOE has some waste management responsibility and that are within the scope of the WM PEIS. These sites vary in terms of their operations and missions, and their facilities are not duplicative. Not all of the 54 sites are nuclear generating facilities.

Comment (2324)
Technological advances must be tempered with the lessons learned through history. The history of nuclear power has taught us two basic lessons: (1) nuclear energy is a marvelous resource that has brought technological advances that continue to improve our quality of life; and (2) waste disposal is a risky business and we have much to learn.

Response
DOE is committed to pursuing advances in technology research, development, and application. For example, within DOE's Office of Environmental Management, the Office of Technology Development is responsible for managing an aggressive national program of applied research, development, demonstration, testing, and evaluation for environmental cleanup, waste management, and related technologies. The Technology Development Program takes a focused, problem-oriented approach to having technologies available for use to support DOE's environmental management needs in a manner that also supports DOE's industrial competitiveness goals. The Technology Development Program is designed to resolve major technical issues, to rapidly advance beyond current technologies for waste management operations, and to expedite compliance with applicable environmental laws and regulations. More detail is provided in Appendix H in Volume IV of the WM PEIS.

Comment (2374)
Commentors want DOE to stop creating nuclear waste, in general or at specific sites, and contend that waste management problem will not be solved until waste generation is halted.

14.1 General Comments

Response
DOE has been instructed by the President and Congress to conduct activities related to energy research and to produce nuclear materials and components for national defense. Although DOE has a number of programs for waste minimization and pollution prevention (see Volume IV, Appendix G), some wastes inevitably result from DOE activities. DOE will continue to perform the activities that produce wastes, applying aggressive pollution prevention techniques, until directed otherwise by the President and Congress. Even if DOE stopped generating wastes, it would still be responsible for the existing inventories of wastes.

Comment (3325)
Why were waste management, environmental restoration, and prevention of pollution and contamination not always a part of DOE's central mission, but left to a moral and ethical minority until NEPA was created, although, (1) the scientific community that created nuclear power has always known that nuclear waste would be created and that it could be handled safely and properly without contaminating the environment, and (2) the government and its agencies are empowered to protect the citizens and management of nuclear waste has always been the responsibility of the government.

The lack of a United States Management Plan from the very beginning of the nuclear industry has caused the public to investigate and question what is going on, which is further evidenced by problems with the existing law, for example, (1) environmentally sound management of hazardous waste from "cradle to grave" under RCRA should mean from beginning to end; and (2) the spirit and intent of CERCLA is frustrated by the fact that Superfund money allocated for liability, compensation, remediation, and emergency response is being eaten away by legal fees, since citizens across the country have to file against the Federal Government for justifiable compensation.

Response
During the years of the Manhattan Project and the "Cold War," wastes from nuclear weapons production were managed in accordance with generally accepted practices of the time that were established by the scientific community. Time, experience, and research have shown that some of the past practices were not protective of long-term human health and the environment. DOE has learned through its own experience, and that of the nuclear industry in general, and is applying new knowledge and technologies to manage its facilities in an environmentally protective and cost-effective manner. DOE is in the process of remediating past contamination, upgrading current waste management practices, and planning future waste management activities and pollution prevention efforts. In addition to complying with all applicable laws and regulations, DOE strives to obtain public input, protect human health and safety, and emphasize environmental responsibility within DOE.

DOE agrees that laws passed to solve complex problems such as CERCLA and RCRA should be revised when experience and needs show changes are warranted. For example, within the Superfund process the rise of the share of non-cleanup or "transaction costs" such as legal fees has become a major concern, which is being considered by Congress. DOE is providing input to Congress on that law. In other instances, administrative changes may be made through agency regulations. Public input is a major ingredient in those processes.

Comment (3340)
DOE should explain why it assumes the continuation of the nuclear industry and its waste generation for a projected 20 years rather than shutting it down as a "failure and an economic albatross." We

need to see a full breakdown of the economics of the nuclear industry and determine how it performs as a free-market commodity.

Response
DOE has been instructed by the President and Congress with conducting activities related to energy and to producing nuclear materials and components for national defense. The WM PEIS addresses the management of the waste that is generated by these activities at DOE facilities.

The generation of waste by the nuclear industry and the economics of the nuclear industry are beyond the scope of the WM PEIS.

Comment (3347)
There should be a moratorium on the production of any nuclear products until the waste management questions have been answered.

Response
DOE has been instructed by the President and Congress with responsibilities for nuclear materials related to national defense and scientific and energy research. Changes in DOE's mission are not within the scope of this WM PEIS. As stated in Section 2.2 in Volume I, DOE must manage its current and anticipated volumes of low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste in order to comply with all applicable Federal and State laws, to protect human health and safety, and to enhance protection of the environment. The WM PEIS is one element of DOE's effort to find a programmatic answer to waste management issues.

Comment (3681)
The right people are not running DOE today. The handful of DOE employees who know what they are doing are not the ones managing this agency.

Response
Individuals are appointed to the upper management positions at DOE by the President, with the advice and consent of the Senate. Concerns about the appointment of these managers are outside the scope of the WM PEIS.

Comment (3687)
A U.S. task force must be convened and created for implementation after the American public's reviews and evaluations. The U.S. policy on the management of the nuclear industry *must become reality*, and political intervening must be restricted to a minimum of watchdog oversight. The Office of the Secretary of the Department of Energy must become a separate elected position voted upon to be filled by the American public. And, quite frankly, the noted Civic Leaders across the country who have both thwarted and supported the Nuclear Age should be the determining factors on which individuals sit to comprise this task force.

Response
United States policy and laws governing the nuclear industry are outside the scope for the WM PEIS. Those policies and laws are set by Congress and the President. Both Congress and the President are elected by the American people. The Secretary of Energy is appointed by the President, with the advice and consent of the Senate. DOE strongly believes in a democratic process of agency oversight,

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which includes viable public involvement in planning and executing DOE programs. For this WM PEIS, DOE worked hard to involve the public through the various forums provided (e.g., meetings, workshops, hearings), length of comment periods (e.g., 150 days on the Draft WM PEIS), Environmental Management Advisory Board and Site-Specific Advisory Board processes, and other activities.

Comment (3688)
There are approximately 600 nuclear reactors worldwide. Efforts should be made to scale down, upgrade technology, recycle, and address the mechanics of management as if your environment depended on it. "The Nuclear Age will take us into the 21st Century, we can go kicking and screaming or we can go challenging one another to produce the absolute best."

Response
Issues related to domestic and international energy research and policy are outside the scope of the WM PEIS, which is an analysis of the environmental impacts of alternatives to safely and efficiently manage DOE's radioactive and hazardous wastes. Those wastes result primarily from nuclear defense activities; i.e., the development, production, and testing of nuclear weapons at a variety of sites located around the United States.

Comment (4007)
Several commentors advanced agency-credibility issues. The following statements were made:

- The government has not developed the necessary degree of trust to permit it to make decisions on radioactive and hazardous waste disposal. The public needs to be skeptical about being told it is safe.
- Offsite contamination at the Portsmouth Plant is covered up.
- DOE has falsified my records.
- If the public and the agency learn to work in cooperation rather than opposition, privatization will result in the cloak of privacy for profit replacing the cloak of secrecy for the national defense and security.

Response
The Secretary of Energy places great emphasis on openness and public involvement. The Secretary's *Guidance on Implementation of the Department's Public Participation Policy* (July 29, 1994) states, "The business of the Department must be open to the full view of those whom it serves, consistent with applicable laws, regulations, and contracts. This policy marks a clear break with past practice by challenging the Department and its contractors to perform to a new standard of openness and service. The Department will incorporate public input into its decisions where appropriate and feasible and will provide feedback to the public on its reasoning."

DOE is committed to a policy of open dialogue, interaction, and information exchange with the public. Over the past years, DOE has stepped up its efforts to earn trust and enhance cooperation. DOE believes that such a policy is in the interest of both accomplishing DOE's mission and program objectives and satisfying the legitimate interest in informed participation in DOE decisionmaking processes. If privatization occurs, appropriate regulatory oversight, along with public vigilance, would assist DOE in complying with applicable laws and regulations.

Comment (4035)
It will be difficult for DOE to fund large-scale waste management and environmental restoration programs if the WM PEIS is devoid of a serious discussion of the risks from nuclear and hazardous materials, as opposed to waste management remedial actions. DOE environmental restoration programs must compete for funding with DOE's traditional first priority programs--maintaining the nuclear arsenal and developing new weapons systems.

Response
The WM PEIS is a tool to assist DOE in development a national waste management strategy. Risk analyses form an integral part of the document. Chapter 5 in Volume I of the WM PEIS explains methodology, while Chapters 6 through 10 provide the impacts analysis, focusing on human health and the environment. Chapter 11 provides the cumulative impacts analysis. Appendices C and D in Volume III, and E and F in Volume IV also contain risk analyses.

Environmental restoration decisions are not within the scope of this programmatic waste management study, primarily because of their site-specific nature. Site-specific issues involve questions of cleanup levels, future land use, etc. Volume I, Section 1.7.1, explains why environmental restoration waste was removed from the scope of the WM PEIS. Appendix B in Volume III provides estimates of the wastes that could result from environmental remediation activities at DOE sites that would require treatment and disposal.

The Executive and Legislative Branches of the Federal Government play an important role in the implementation of the DOE Waste Management Program, including projects deemed necessary as a result of the WM PEIS. The budget for the program is ultimately controlled by the President and Congress.

The Executive Branch is required by law to submit annual estimates for operations of its programs and initiatives to the Legislative Branch. This submittal includes funding for DOE and its Waste Management Program. The Legislative Branch develops an annual Appropriations Act to fund Federal programs and initiatives.

The Legislative Branch can choose to limit or increase the funding to specific programs recommended by the Executive Branch. As an alternative, general reductions or increases can be taken or granted. In such cases, specific "report language," which accompanies the Appropriations Act, can clarify the intent of Congress.

Thus, DOE is unable to guarantee full funding for specific projects and programs. Preferred alternatives identified in the WM PEIS, and subsequent Records of Decision, are contingent on the annual Appropriations Act and report language.

Comment (4036)
The necessary Federal environmental restoration effort could be halted in its infancy because of (1) DOE's waste of huge amounts of funds on management perks, "reports upon reports," and

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abandoned projects; and (2) DOE's inability to police its contractors (who are getting rich off DOE programs) and accomplish genuine site remediation.

Response
The Environmental Restoration Program is not within the scope of the WM PEIS. It is DOE policy to ensure that DOE and its contractors are subject to the same rules of accountability as other Federal agencies and their contractors. DOE is in the process of implementing a realignment strategy to streamline and strengthen its programs across the complex. This initiative also extends to DOE's use of contractors to meet its mission. DOE encourages the public to report to DOE specific instances of "management perks," "abandoned projects," and deficient contractor oversight.

14.2 Waste Management Program

Comment (4)
I recommend that DOE consider broadening its work on wastes by encouraging research on microbial waste treatment and disposal.

Response
Due to the programmatic nature of the document, the WM PEIS assumes generic treatment and disposal technologies for purposes of comparing programmatic management options. While technology research, as such, is outside the scope of the WM PEIS, Appendix H in Volume IV does address the potential impact of technology development on the Waste Management Program.

Comment (588)
DOE needs to seriously address the problem of what to do with all of the radioactive byproducts of the nuclear industry and the DOE nuclear weapons enterprise. Only a national, immediate, and concerted effort to discontinue the production of extremely hazardous wastes will save us from its dire consequences.

Response
The WM PEIS was prepared to help DOE develop a national waste management strategy. The PEIS addresses, in a programmatic manner, five types of radioactive and hazardous wastes produced over the past years by national defense activities. These five waste types are described in Section 1.5 in Volume I of the WM PEIS. The PEIS does not address radioactive wastes produced by commercial activities. DOE does not have the authority or responsibility for making decisions on such wastes. DOE has addressed the management of its spent nuclear fuel in the SNF/INEL PEIS. In addition, the disposal of spent nuclear fuel and defense high-level waste will be addressed in DOE's Yucca Mountain Repository EIS. Both documents are described in Section 1.8.1 in Volume I of the WM PEIS.

Since DOE's mission includes national defense activities, DOE will continue to generate defense wastes unless directed to do otherwise by the President and Congress. However, DOE is strongly committed to pollution prevention. DOE's pollution prevention activities related to waste management are described in Appendix G in Volume IV of the WM PEIS.

Comment (1515)
DOE does not know how to manage the waste coming from the nuclear materials.

Response
The WM PEIS has been prepared to enhance the management of DOE's current and anticipated volumes of radioactive and hazardous wastes to ensure safe and efficient management of these wastes, to comply with all Federal and State laws, and to protect public health and safety and the environment.

The WM PEIS analyzes a range of alternatives covering where to store, treat, and dispose of DOE's radioactive and hazardous wastes. Appendix H in Volume IV of the WM PEIS describes the emerging technologies that could influence the Waste Management Program.

Comment (1516)
DOE needs to consider who will be liable for the waste management decisions made today.

14.2 Waste Management Program

Response
DOE is responsible for the waste management decisions made as a result of the WM PEIS activities. DOE believes that the decisionmaking process is sound. DOE must comply with all applicable laws, including those governing liability issues.

Comment (1639)
Postpone lasting decisions regarding the WM PEIS until there is a meaningful public process involving citizens from all sites across the complex, elected officials, other State officials and advisory boards representing citizens living near DOE weapons plants to address questions of equity in the benefits and burdens of the Cold War legacy. The WM PEIS alone is not adequate on its own to solve radioactive waste problems. People need to talk together to deal with waste management issues. This discussion should include, for example, what material is out there, what wastes citizens are willing to keep onsite or receive from other sites, what are the possibilities if there is no repository at Yucca Mountain or if the Waste Isolation Pilot Project (WIPP) never becomes operational.

Response
DOE will use all relevant information, in addition to the WM PEIS, necessary for making responsible waste management decisions. DOE agrees that public input to the decision process will be worthwhile. Forthright dialogue with the public on the important issues regarding the management of the nation's nuclear waste is important to DOE as well as to the potentially affected communities.

DOE specifically sought comments on the Draft WM PEIS from State and local officials as well as the general public. DOE is also sponsoring a "National Dialogue" initiative, described in Volume I in Section 1.8.2, to provide a forum to communicate with interested members of the general public, State and Tribal Governments, and representatives from the Site-Specific Advisory Boards to discuss potential national decisions on waste management and on the inter-site management and disposition of other nuclear-materials. This initiative is discussed in Section 1.8.2 in Volume I of the Final WM PEIS.

DOE is considering how best to sustain and strengthen that initiative to provide additional avenues for public input to the decisionmaking processes. The ensuing public dialogue will specifically include input to the development of waste management decisions on a national scale, and could include the example topics identified in the comments as they are relevant to waste management decisions and of concern to public participants.

Comment (1784)
All wastes need to be stored indefinitely. The concept behind disposal is faulty. There is no "away" to put this material.

Response
The disposal activities proposed in the WM PEIS extend to low-level mixed waste and low-level waste. DOE will manage these wastes to ensure compliance with applicable laws, to protect public health and safety, and to enhance protection of the environment.

DOE considers disposal as a reasonable waste management alternative in this WM PEIS. However, before implementing any disposal decision, DOE would prepare performance assessments on all required disposal facilities and discuss disposal requirements and criteria.

The WM PEIS does analyze storage options, for example, in the No Action Alternative. The No Action Alternative might not necessarily comply with the applicable law. However, analyzing the potential impacts of the first 20 years of indefinite storage provides an environmental baseline against which the impacts of other alternatives can be applied.

Comment (1791)
DOE needs to make a long-term commitment to these wastes.

Response
Chapter 2 in Volume I of the WM PEIS describes the purpose and need for DOE action. DOE will manage its current and anticipated volumes of low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste to ensure compliance with the applicable laws, to protect public health and safety, and to enhance protection of the environment. DOE is committed to finding long-term solutions to the issues of managing such wastes.

Comment (1794)
DOE needs to be able to process wastes and use these facilities for environmental restoration wastes as well.

Response
Appendix B in Volume III of the WM PEIS describes how environmental restoration wastes transferred to the Waste Management Program could affect the waste management facilities. DOE assumed that waste treatment facilities would be constructed in 10 years and that wastes would be treated in the following 10 years. Since the design life of these facilities would be 20 years, DOE assumes that they could be used to treat environmental restoration wastes through the end of their design life. In addition, excess capacity at waste management facilities could be used to treat environmental restoration wastes.

Comment (2068)
DOE needs to look at waste management holistically and at the early, conceptual stages of project development.

Response
The WM PEIS is being written at the earliest possible stage of project development for a nationwide strategy to treat, store, and dispose of DOE wastes. It is intended to enhance DOE's management of its radioactive and hazardous waste in order to comply with applicable laws, to protect public health and safety, and to enhance protection of the environment. In anticipation of future decisions DOE will make regarding waste management activities, the WM PEIS serves as an overview from which more detailed sitewide or project-level NEPA reviews can be conducted.

Comment (2114)
DOE has spent considerable money and professional time on the problems of waste. Nevertheless, the leaks continue. Get to the source of the problem.

Response
DOE is committed to operating its facilities and managing its wastes safely and in compliance with all applicable laws and regulations. If a release occurs, it is contained and remediated, and the source of the problem is identified and corrected. Remedial actions are conducted on a priority basis.

14.2 Waste Management Program

Comment (2690)
The Idaho Nuclear Waste Agreement could serve as a basis for agreements with other states.

Response
Thank you for this suggestion. However, the motivation of the Idaho/DOE/Navy agreement regarding spent nuclear fuel shipments included the need to ensure the Navy's fleet of nuclear powered warships could fulfill their national security mission, and the need for DOE to recover spent fuel containing highly enriched uranium from foreign research reactors in support of U.S. nonproliferation policy. Therefore, that agreement should not be viewed as a precedent for emulation by other States.

Comment (3850)
Instead of cutting back on waste production, DOE spends large amounts of money on an EIS. Consolidate waste, knowledge, facilities, and resources. Downsize DOE operations. Choose sites that are not densely populated for disposal and storage.

Response
With the end of the Cold War in 1989, and the reduced need for special nuclear material and other DOE products, DOE waste production has decreased. However, DOE still has a large inventory of various waste types. DOE must manage its current and anticipated volumes of low-level mixed waste, low-level waste, transuranic waste, high-level waste, and hazardous waste in order to comply with all applicable Federal and State laws, to protect public health and safety, and to enhance protection of the environment. In evaluating the potential health risks of the disposal of low-level mixed waste and low-level waste, DOE considered the sizes of the offsite populations living in the vicinity of the candidate disposal sites. The results of the analyses are presented in Section 5.4.1.2.3 in Volume I. Health risks for storage of low-level mixed waste, low-level waste, transuranic waste and high-level waste at DOE sites are contained in Volume I, Sections 6.4, 7.4, 8.4, and 9.4, respectively. This WM PEIS is complex; it evaluates 5 waste types at 17 sites, with 4 broad approaches to choosing the DOE sites that will manage these wastes: No Action, Regionalized, Decentralized, and Centralized.

DOE developed the WM PEIS to inform the public and decisionmakers of the potential impacts of these proposed Federal actions and to identify which of these impacts might be significant to human health or the environment. Section 5.4.1.2 in Volume I of the WM PEIS details information on populations and individuals at risk. In general, the PEIS considers three population groups: the offsite population (those living within a 50-mile radius of the site, as well as within 0.5 miles on each side of the transportation routes); the onsite population (workers on DOE sites who are not involved in actual environmental management activities); and facility workers (waste management workers including those operating trucks and trains transporting waste). As Section 5.4.12 states, determining populations and individuals at risk is a complex analysis dependent on facility siting locations, well defined exposure routes, and population dietary habits.

Comment (3854)
We must dispose of our waste in as safe and decent a manner as we possibly can and we will spend money to do this. This is not the problem. We've got to deal with what we've got.

14.2 Waste Management Program

Response
The WM PEIS reflects DOE's commitment to developing and implementing a Department-wide strategy to safely and responsibly manage the waste produced over the years by national defense activities.

Comment (3862)
DOE's policy should be to move waste from densely populated areas to less-densely populated areas.

Response
It is DOE policy to meet its mission in a manner that complies with the applicable law, protects public health and safety, and enhances the protection of the environment. To identify reasonable proposed sites for waste management facilities in the WM PEIS, DOE determined where the largest volumes of waste are and where transportation requirements would be minimized. Other site-selection criteria included the characteristics of the waste, specialized treatment requirements, and existing facilities. Sites in less densely populated areas were considered for waste management activities. However, the remoteness of alternative locations for waste management sites constitute only one factor in evaluating alternatives. Other criteria would be construction/modification of facilities, increased transportation requirements, etc. Although storage and disposal in less-densely populated regions may lessen some impacts, the risks from transporting waste to these remote areas would increase. These trade-offs are described in the WM PEIS and are important factors that will be considered in the decision process. Waste management decision factors and criteria are described in Section 1.7.3 in Volume I of the WM PEIS.

Comment (3900)
Don't create nuclear waste. Put the waste in a better geologic area. Encourage cleanup, which could benefit our community. Nuclear accidents do happen.

Response
DOE has been charged by the President and Congress with responsibility for nuclear materials related to national defense and scientific and energy research. Although these activities do generate waste, DOE is committed to an aggressive policy of pollution prevention. Appendix G in Volume IV of the WM PEIS addresses pollution prevention for the Waste Management Program.

DOE is proposing to dispose of transuranic waste at a geologic repository called WIPP, which is near Carlsbad, New Mexico. For high-level waste canisters, DOE is currently studying a candidate geologic repository at Yucca Mountain in Nevada.

DOE actively supports site-specific cleanup through its Environmental Restoration Program. Members of affected communities can obtain information about DOE's cleanup programs in their areas by contacting the local DOE site offices.

In addition to risks from construction and routine facility operations, the WM PEIS analyzes impacts from potential treatment and storage facility accidents and transportation accidents. More detail is provided in Appendices E and F in Volume IV of the PEIS.

14.3 Reactor Programs/Nuclear Weapons Programs

Comment (157)
Nuclear armaments must be abolished worldwide.

Response
The WM PEIS addresses the environmental impacts of waste management alternatives. Issues related to other missions assigned to DOE by law (for example, the nuclear weapons programs) and international disarmament policy are outside the scope of this WM PEIS.

Comment (472)
DOE should curtail its planned stockpile stewardship experiments because of the danger of treating mixed wastes at Lawrence Livermore National Laboratory (LLNL) and transporting them across busy California highways to Tracy for burial.

Response
Issues relating to stockpile stewardship are analyzed in DOE's Stockpile Stewardship and Management PEIS, which is described in Section 1.8.1 in Volume I of the WM PEIS. Impacts from this program are considered in the WM PEIS cumulative impacts analysis (see Chapter 11 in Volume I).

The potential quantities of low-level mixed waste that could be generated as a result of stockpile stewardship and management alternatives being considered for LLNL are quite small (564 cubic meters per year at LLNL and 10 cubic meters per year at Site 300). The increased production from stockpile stewardship and management activities would be a minor contribution to waste management cumulative impacts when compared to the potential impacts of alternatives considered by this WM PEIS. Under any stockpile stewardship and management alternative, LLNL would continue its mission as a multipurpose laboratory.

A shutdown of the nuclear weapons program is currently not considered a reasonable alternative. Further, a shutdown would not eliminate the need for managing existing radioactive and hazardous wastes.

The WM PEIS analyzed impacts on human health and the environment from waste treatment at candidate sites, as well as transportation requirements. This analysis is discussed in the waste type chapters, Chapters 6 through 10 in Volume I of the WM PEIS, and the cumulative impacts analysis, Chapter 11 in Volume I. In general, the analysis finds that impacts would be small. There are no notable national trends for offsite population risks from treatment of low-level mixed waste; however, some sites, such as LLNL, would probably require different technologies to minimize treatment risks.

Comment (1577)
Instead of preparing the elaborate Draft WM PEIS, DOE needs to weigh the cost and benefit of producing nuclear weapons and the burden of irreversible damage posed by the resulting waste. Production is still occurring at Sandia National Laboratories-New Mexico (SNL-NM), and Los Alamos National Laboratory (LANL).

Response
Although the U.S. nuclear weapons stockpile is being significantly reduced, the President and Congress have directed DOE to continue to maintain the safety and reliability of the enduring nuclear weapons stockpile. The Stockpile Stewardship and Management PEIS analyzed the environmental impacts

associated with various downsizing alternatives to allow for the continued production and maintenance of nuclear weapons in the absence of underground nuclear testing, including any such activities proposed to be conducted at SNL-NM and LANL. In conjunction with this activity, DOE has considered the cost of nuclear weapons and has extensively analyzed the costs and benefits of all the alternatives analyzed in the Stockpile Stewardship and Management PEIS. Section 1.8.1 in Volume I of the WM PEIS discusses the relationship between the Stockpile Stewardship and Management PEIS and the decisions to be made based on the WM PEIS analysis.

The cumulative impacts of waste management and stockpile stewardship and management activities, together with the impacts of other reasonably foreseeable future actions, are evaluated in Volume I, Chapter 11, of the WM PEIS.

Comment (2825)
In Volume I, Section 1.5.4, the relationship between spent nuclear fuel and targets is not clear. Are targets a subset of spent nuclear fuel? If not, in what waste category are they included?

Response
Spent nuclear fuel is managed as described in the SNF/INEL EIS Record of Decision and includes uranium/neptunium targets that have been irradiated in a nuclear reactor. Upon irradiation, such targets produce products similar to spent nuclear fuel. Other targets would be managed differently. For example, metal targets irradiated to determine how well they maintain their structural integrity in intense neutron fluxes would be managed as low-level waste. Targets used for the production of tritium are also managed as low-level waste after the tritium has been recovered. The text box in Volume I, Section 1.5.4, of the WM PEIS has been revised to describe the waste classification of neptunium/plutonium targets.

Comment (2891)
Volume I, Page 9-32, 1st paragraph: Are these canisters in fact "similar to the others being managed at the INEL site?"

Response
The comment refers to canisters of foreign research reactor spent nuclear fuel. For analysis purposes, the foreign research reactor spent nuclear fuel presumably would be chemically processed at Idaho National Engineering Laboratory (INEL) producing high-level waste. It is expected that this high-level waste would be immobilized using similar technologies (i.e. canister technologies) applied to the high-level waste already at INEL. The management and transportation of these canisters are discussed in further detail in the SNF/INEL EIS, Volume II, Part A, Section 3.4.

Comment (3339)
Actual costs are not compared with the actual income DOE derives from the nuclear weapons complex. This should be demonstrated before deciding that these alternatives would not impact the national economy, as the WM PEIS repeatedly states.

Response
DOE does not derive any income from the nuclear weapons complex. DOE uses funds appropriated by Congress to fulfill its mission. Chapter 4 in Volume I of the WM PEIS, which describes the affected

14.3 Reactor Programs/Nuclear Weapons Programs

environments at the 17 "major" DOE sites, shows the socioeconomic baseline and impacts data accounting for the economic effect of current expenditures at the sites.

14.4 Other Programs

Comment (1176)
If Argonne National Laboratory-East (ANL-E) has no long-term plan to dispose of its nuclear waste other than in densely populated areas, then perhaps they should get out of the nuclear research business.

Response
The WM PEIS is an important tool in DOE's process to develop a long-term plan to manage waste generated at DOE sites, including ANL-E. Volume I, Section 1.7.3, of the WM PEIS describes the waste management decisions to be made by DOE. DOE used the decision factors and criteria described in Section 1.7.3 to make preferred alternative decisions for each waste type. Population surrounding the site is an element of the human health risks decision criteria.

The mission for ANL-E, a 4,670-employee research and development multipurpose laboratory, is to conduct programs in basic energy and related sciences. ANL-E is an important engineering center for the study of nuclear and nonnuclear energy sources. Thus, ANL's activities form an essential part of DOE's mission, which is mandated by the President and Congress. DOE has no plans to change the mission of the laboratory.

Comment (1507)
DOE should have good jobs at LLNL, but not in weapons research or in treating wastes.

Response
LLNL's major programs include defense and related programs, laser fusion, laser isotope separation, biomedical and environmental research, and environmental restoration and waste management. LLNL employs 11,220 people.

LLNL's activities form an essential part of DOE's mission, which includes national defense as well as waste management. DOE's mission is mandated by the President and Congress. DOE will perform its functions until directed to do otherwise. DOE has no plans to change the multipurpose mission of LLNL.

Comment (1568)
The Nevada Test Site (NTS) is under-utilized. It should be the headquarters for the research and development needed for the transition from fission energy to safer, clean energy sources.

Response
While the WM PEIS is a national study that evaluates alternatives to help DOE make Department-wide decisions on where to treat, store, and dispose of its wastes generated at DOE sites in the United States, this document is not site-specific in nature and does not make decisions. Furthermore, issues related to other missions assigned to DOE by law (e.g., energy policy and research) are outside the scope of the WM PEIS.

As identified in Section 1.8.1 in Volume I of the WM PEIS, DOE has prepared a sitewide EIS, for NTS that addresses the environmental impacts of alternatives for the continued operations of NTS and other DOE activities in the State of Nevada. The EIS analyzes the impacts from DOE programs at NTS, the Tonopah Test Range, portions of the Nellis Air Force Range Complex, the Central Nevada Test Area, and the Project Shoal Area. These programs include ongoing activities for the stewardship of the Nation's nuclear weapons stockpile, management of radioactive waste, nondefense research and

14.4 Other Programs

development, and environmental restoration. The EIS also examines newer programs such as the proposed Solar Enterprise Zone sites at NTS, Dry Lake Valley, Eldorado Valley, and Coyote Spring Valley, in accordance with the NTS mission of demonstrating the capability to provide alternative energy sources, including solar energy, to meet power needs for the southwestern United States. A copy of the NTS EIS can be reviewed at the DOE Nevada Operations Office public reading room located at 2621 Losee Road, Building B-3, Las Vegas, Nevada.

Comment (1930)
Is Brookhaven National Laboratory (BNL) necessary? If it were closed we wouldn't have to worry about nuclear waste.

Response
The mission for BNL, a 3,557-employee site, is to conceive, design, construct, and operate research facilities for fundamental scientific studies and to conduct basic and applied research in the physical, biomedical, and environmental sciences and selected energy technologies. BNL's activities form an essential part of DOE's mission, which is mandated by the President and Congress. Even if DOE facilities were shut down, radioactive wastes would continue to be generated due to environmental restoration and decontamination and decommissioning activities.

Comment (2099)
DOE should reevaluate the 1950's effort to recycle nuclear waste rather than disposing of it (e.g., encapsulate it in silicon); the technology for recycling always existed and recycling is safe.

Response
The WM PEIS is DOE's national study on management alternatives for wastes that generally cannot be recycled, but are managed through safe and efficient storage, treatment, and disposal. Recycling can be a viable practice for small subsets of materials, such as spent fuels. However, those are outside the scope of the WM PEIS and are not addressed in this document.

Comment (3936)
Foreign, commercial, and military spent nuclear fuel is not included in DOE's Draft WM PEIS. The Spent Nuclear Fuel EIS, intended to address spent nuclear fuel in a separate document, does not consider the dangers and adverse impacts of increasing the volume of high-level liquid waste in DOE inventory.

Response
Since the scope of the WM PEIS is restricted to waste management activities, the management of foreign, commercial, and military spent nuclear fuel is not included in the analysis. Spent nuclear fuel is not considered to be waste.

In February 1996, DOE issued the Foreign Research Reactor Spent Nuclear Fuel EIS to evaluate alternatives for managing spent nuclear fuel from foreign research reactors in a manner consistent will United States nuclear weapons nonproliferation policy. The SNF/INEL PEIS, issued in April 1995, evaluates alternatives for managing existing and reasonably foreseeable inventories of U.S. Government-owned spent nuclear fuel through the year 2035. DOE issued a Record of Decision in May 1995. Section 1.8.2 in Volume I of the WM PEIS contains a description of these two NEPA reviews that are related to the WM PEIS. The cumulative impacts analysis in Chapter 11 in Volume I considers impacts from other programs, including the spent nuclear fuel management described in both NEPA reviews.

High-level waste is generated by reprocessing spent nuclear fuel. In the past, DOE reprocessed spent nuclear fuel. However, all of DOE's reprocessing facilities either have ceased to operate or are rapidly phasing out of operations, because continued recycling of plutonium and uranium for weapons production is no longer a national priority. In limited circumstances, some unstable spent nuclear fuel may be reprocessed to help stabilize this material. Thus, DOE anticipates only a small increase in high-level waste inventories. While the WM PEIS analyzes only the impacts of storing vitrified high-level waste, the Yucca Mountain Repository EIS would address disposal of spent nuclear fuel and defense high-level waste in a licensed geologic repository. The Yucca Mountain Repository EIS would include an analysis for the disposal of commercial spent nuclear fuel.

Comment (3937)
DOE does not consider impacts from reprocessing of spent nuclear fuel, even though the agency has had knowledge of United States Enrichment Corporation's (USEC's) intention to reprocess since the Energy Policy Act of 1992, which created USEC and began the privatization of both the Portsmouth Plant and PGDP. Reprocessing of spent nuclear fuel at the Portsmouth Plant and/or PGDP is a foreseeable impact with significant consequences to the human environment, and require DOE to issue an EIS rather than a Finding of No Significant Impact by agreement with NRC on this action.

Response
USEC does not intend to reprocess any spent nuclear fuel; its primary mission is uranium enrichment. In addition, reprocessing of spent nuclear fuel is not feasible with the type of equipment at PGDP. Since high-level waste is generated by reprocessing spent nuclear fuel, useful information can be obtained from the WM PEIS High-Level Waste Technical Report, which is available in the DOE public reading rooms listed in Section 1.9 in Volume I of the Final WM PEIS.

The management of spent nuclear fuel is outside the scope of this PEIS. DOE evaluated alternatives for managing existing and reasonably foreseeable inventories of U.S. Government-owned spent nuclear fuel through the year 2035 in the SNF/INEL EIS, which was issued as a final document in April 1995. DOE issued a Record of Decision in May 1995. The cumulative impacts analysis in Chapter 11 in Volume I of the PEIS considers other actions, such as the management of spent nuclear fuel.

14.5 Past Practices/Credibility

Comment (1511)
DOE has already made the decisions about waste management. DOE is not credible.

Response
While there are ongoing waste management operations at the sites, DOE needs to enhance the management of its current and anticipated volumes of radioactive and hazardous wastes in order to ensure safe and efficient management of these wastes, to comply with all applicable Federal and State laws, and to protect public health and safety and the environment. The WM PEIS is a national planning tool to provide necessary information needed for DOE to make strategies decisions on where to treat, store, and dispose of radioactive and hazardous wastes. Section 1.7.3 in Volume I of the WM PEIS describes the decisions DOE has to make.

Comment (1649)
DOE lied to me about the test I witnessed at NTS in 1993, and I hold it responsible for all my ailments. I am concerned about the others present on that trip, and the effects of that test on them. DOE should not lie to us anymore.

Response
Historically, the primary mission of NTS was to conduct nuclear tests. Since the current moratorium on testing began in October 1992, this mission has changed to maintain a readiness to conduct tests, if so directed, in the future. However, no nuclear tests have been conducted at NTS since the moratorium was declared, and the last nuclear test was conducted on September 23, 1992.

Comment (1684)
A commentor believes insurance companies and health care providers are covering up and helping DOE and subcontractors sweep health problems under the rug, and alleges specific radioactive exposures to SRS workers and charges coverup activities.

Response
The WM PEIS examines potential radiation exposures to offsite populations and site workers resulting from programmatic waste management alternatives. In addition, the WM PEIS contains a cumulative impacts analysis that considers estimates of radiation doses from existing activities and other ongoing site actions. Health effects from previous radiation exposures are not considered in the WM PEIS. DOE has a number of ongoing efforts to address historic site-specific radiation doses and effects, and is working with other Federal and State agencies to study and report on any health-related effects from previous exposures. DOE's policy is to be open with and accountable to the public. This comment was forwarded to the DOE SRS Operations Office.

Comment (3344)
This is the third set of public comments we have submitted to DOE in the past 10 days, and it is truly impossible to do a thorough job. The amount of paperwork generated by DOE--with immense documents full of senseless deceit and vague oversights that try to keep us confused and confounded--jeopardizes thorough public comment. The cumulative impacts of all DOE operations are tragic to the earth, air, water, public health, and economy.

Response

The subject of the WM PEIS is complex. Because of the important waste management decisions DOE must make and the high degree of public interest in these decisions, DOE believes the detailed impacts evaluation and lengthy discussion in the WM PEIS are warranted. The WM PEIS includes the consideration of other programs and actions (see Section 1.8 in Volume I) and in the analysis of cumulative impacts (see Chapter 11 in Volume I). To facilitate public comment on this complex document, DOE held the public comment period open for 150 days. DOE has conformed to NEPA and CEQ regulations in preparing the WM PEIS.

14.6 Public Awareness/Education/Outreach

Comment (386)
Oregonians want a role for the State of Oregon in decisions at Hanford and insist on more than an advisory role to assure their interests are fully taken into account at Hanford.

Response
As a matter of policy, DOE encourages active citizen involvement in such site actions as cleanups, land-use and site planning, and waste management actions. To that end, DOE has established a number of mechanisms for public involvement at Hanford and at other DOE sites. The citizens of Oregon are encouraged to use those mechanisms to ensure that their interests are expressed and communicated to DOE. DOE has worked hard to increase the State of Oregon's voice in Hanford decisions. Through the Hanford Advisory Board, the Oregon Waste Board, and other Oregon environmental groups and stakeholders, DOE believes that Oregon is being heard and has provided valuable input into decisions affecting Hanford. DOE looks forward to continued cooperation with the State of Oregon.

Comment (1615)
Some commentors suggested that the Department should engage in local dialogue on environmental restoration wastes at all sites; others suggested that the Final WM PEIS reflect enhanced public participation on "national environmental restoration issues."

Response
DOE believes that national level decisionmaking is not possible for the Environmental Restoration Program because site cleanup decisions are more properly driven by local site conditions and the concerns of site-specific stakeholders (see Section 1.7.1 in Volume I of the WM PEIS). Appendix A in Volume III of the WM PEIS outlines opportunities for public involvement in planning and decisionmaking for DOE's environmental restoration activities. Also, DOE has enhanced Section 1.8.2 in Volume I to discuss DOE's National Dialogue and Environmental Management Ten Year Plan opportunities for public participation in decisionmaking.

Comment (3800)
DOE needs to educate the public about the difference between a programmatic EIS and a site-specific EIS.

Response
As described in Section 1.8.1 in Volume I of the Final WM PEIS, three levels or "tiers" of NEPA documentation may be prepared: programmatic, sitewide, and project-level. Programmatic documents, such as the WM PEIS, inform decisions on broad agency actions, such as the adoption of future proposed plans, programs, and strategies. The second-tier, sitewide NEPA documents, allow DOE to consider changes in the overall operation of a site, including mission changes, and provide a current environmental baseline for the site, both to support and to simplify project-level NEPA documents. The third-tier, project-level NEPA documents, evaluate the impacts of a specific project proposed for a specific location on a site, and are intended to identify and evaluate alternatives on how the facility should be constructed and operated. Sitewide NEPA documents, which evaluate projects that could be implemented in the near-term at a site, would also include project-level NEPA reviews if sufficient information is available to allow the proposed to be adequately analyzed.

14.6 Public Awareness/Education/Outreach

The public is involved in all three types of NEPA documentation and they are informed regarding the nature of the analyses and anticipated decisions for these NEPA reviews. DOE believes this involvement provides adequate information to members of the public.

14.7 Social Choice

Comment (522)
DOE needs to weigh the potential costs of risk reduction afforded by the alternatives to store, treat, and manage these wastes against the cost of other risk-reducing activities by other Federal programs, such as childrens' immunization programs and transportation safety.

Response
The WM PEIS is a tool to assist DOE in developing a national strategy for the treatment, storage, and disposal of DOE's radioactive and hazardous waste. DOE needs to enhance the management of its waste to comply with applicable laws, and to enhance protection of human health and the environment. The WM PEIS presents risk analyses, for example, in the areas of human health and transportation. The WM PEIS also presents cost estimates for building and operating waste management facilities, and for transportation. Federal programs other than waste management are outside the scope of this document.

Comment (1640)
The problems of nuclear waste transcend the technical issues; they include the realms of ethics, conscience, and spirit.

Response
Thank you for your comment.

Comment (2311)
The delay of the vitrification plant at Hanford might put us at risk; we need to spend the money on cleanup, not on large, indigestible documents.

Response
As described in Section 1.8.2 in Volume I of the WM PEIS, which provides information on other NEPA documents and decisions that are related to the WM PEIS, the Tank Waste Remediation System EIS includes an evaluation of vitrifying high-level waste. Treatment, including vitrification, of high-level waste is outside the scope of the WM PEIS. Decisions regarding vitrification of high-level waste will be made based on the Tank Waste Remediation System EIS.

DOE's Environmental Restoration Program, which is not within the scope of the WM PEIS, was established to address environmental contamination. The Environmental Restoration Program encompasses a wide range of activities, such as stabilizing contaminated soil, treating groundwater, decommissioning process buildings, including nuclear reactors and chemical separations plants, and exhuming buried drums of waste. The extent to which a site is "cleaned up" will depend largely on assumptions regarding future land use. For most sites, the process of determining future site use has just begun.

The WM PEIS was prepared to help DOE develop a Department-wide waste management strategy. Moreover, DOE must comply with the law, in this case the National Environmental Policy Act of 1969. NEPA requires Federal agencies to consider the potential environmental consequences related to their proposed actions before they can be taken and to prepare detailed statements on environmental impacts, alternatives to the proposed action, and measures to avoid or minimize adverse impacts. The WM PEIS was prepared to satisfy the requirements of NEPA. In addition, the WM PEIS provides technical information for use in the future NEPA reviews that would be required prior to specific decisions about facilities, facility locations on sites, and waste management technologies.

14.8 Funding

Comment (490)
Considering the current Federal budget decline and Congressional funding reductions, it seems that the alternatives evaluated in the WM PEIS are the least likely to be funded. If the alternatives are not relevant because budget constraints prevent them from being implemented, the PEIS will have to be redone. DOE should develop strategies for programs to ensure their funding and protect them from politics. DOE must ensure accountability, efficiency, and allocation of funds for high priority items.

Response
The regulations do require DOE to evaluate reasonable alternatives to the proposed action. The alternatives considered in the PEIS encompass reasonable alternatives that DOE could implement. To do this, DOE had to assume that funds would be available to implement any of the alternatives, including no action. As long as DOE is able to implement waste management alternatives within the range of the alternatives presented in the WM PEIS, it would not have to supplement the PEIS.

The Executive and Legislative Branches of the Federal Government play important roles in the implementation of the DOE Waste Management Program, including projects deemed necessary as a result of the WM PEIS. The budget for the program is ultimately controlled by the President (Executive Branch) and Congress (Legislative Branch).

The Executive Branch is required by law to submit annual estimates for operations of its programs and initiatives to the Legislative Branch. This submittal includes funding for DOE and its Waste Management Program. The Legislative Branch develops an annual Appropriations Act to fund Federal programs and initiatives. Preferred alternatives identified in the WM PEIS, and decisions made in subsequent Records of Decision, are contingent on the annual Appropriations Act and the language contained therein. Where the annual appropriations permit flexibility in implementing its provisions, DOE has the flexibility to protect or limit specific programs based on its own discretion and priorities.

15. Out of Scope Comments

Comment (42)
The PEIS needs to include the relationship between (1) ongoing nuclear research and the use of nuclear power and (2) the increase in the number of nuclear weapons and the increased likelihood of their use.

Response
The WM PEIS is a national decisionmaking tool to assist DOE in its strategy to treat, store, and dispose of wastes in a safe and efficient manner that minimizes the impacts associated with waste management. The relationship between (1) nuclear research and the use of nuclear power and (2) the increase in the number of nuclear weapons and the increased likelihood of their use is, therefore, outside the scope of the WM PEIS.

Comment (112)
Several commentors suggested alternatives or provided comments that were meant to be humorous, facetious, or otherwise did not contribute to improving the WM PEIS or the overall Waste Management Program.

Response
DOE recognizes that some members of the public disagree with the alternatives being considered for management of radioactive and hazardous wastes. DOE has made every effort to respond fully to all substantive comments on the WM PEIS, as well as the public's general concerns and questions about DOE's waste generation and management activities. DOE cannot respond to comments that lacked the substance conducive to a response.

Comment (154)
Some commentors oppose nuclear energy development. One commentor stated that nuclear energy is an economic failure; another stated that it is not worth the negative impact on our planet.

Response
Issues relating to nuclear energy development are outside the scope of the WM PEIS.

Comment (188)
Commentors favor development of alternative, renewable energy sources, such as solar energy, because such sources would be safer than nuclear energy.

Response
Issues relating to renewable energy are outside the scope of the WM PEIS.

Comment (198)
Members of the public used the WM PEIS public comment post office box address to submit comments on the Stockpile Stewardship and Management PEIS.

Response
All comments on the Stockpile Stewardship and Management Programmatic EIS have been made available to DOE's Office of Fissile Materials Disposition.

Comment (204)
DOE needs to evaluate stabilized waste forms in the WIPP SEIS-II.

15. Out of Scope Comments

Response
This comment was forwarded to the DOE Carlsbad Area Office.

Comment (223)
Should there be legislation for malicious crimes committed with radioactive material (including wastes)? What guidelines are there for product liability risks if a tool or instrument produces or causes radiation?

Response
Issues relating to malicious crimes committed with radioactive materials and product liability are outside the scope of the WM PEIS.

Comment (274)
A commentor believes that INEL should take all of the non-aluminum clad spent nuclear fuel that can be shipped there. The technology to handle and process this material without contaminating groundwater resources is available.

Response
This comment is outside the scope of the WM PEIS. Processing of spent nuclear fuel at INEL is addressed in the SNF/INEL PEIS and the Foreign Research Reactor Spent Nuclear Fuel EIS.

Comment (314)
The WM PEIS should include an analysis of local and global impacts of the use of various quantities of nuclear weapons under several scenarios.

Response
Issues relating to local and global impacts of the use of nuclear weapons is outside the scope of the WM PEIS.

Comment (1641)
DOE is proposing to build a new production reactor at SRS to produce tritium, even though DOE has great problems with plutonium contamination and there is a question about what DOE will do with all this material.

Response
The production of tritium and the remediation of contamination are outside the scope of the WM PEIS. The Record of Decision for the Tritium Supply and Recycling PEIS does not include a new production reactor at SRS. SRS is considered as a possible site for an accelerator to produce tritium. Plutonium is not used, nor is it generated as a result of the accelerator production of tritium. Remediation of contamination (including any plutonium contamination), is being addressed by site-specific cleanup actions under CERCLA or RCRA.

Comment (1692)
DOE should supply additional information to the Citizens Advisory Board at Rocky Flats Environmental Technology Site (RFETS) on the potential buildup of hydrogen associated with use of the 50-year plutonium canister. The safety of the welding process and the potential reaction of the heat and hydrogen are in question.

Response
This issue is outside the scope of the WM PEIS. This comment has been forwarded to the DOE RFETS Operations Office.

Comment (1695)
One commentor stated that the plutonium at RFETS should be kept onsite and that DOE needs a state-of-the-art treatment facility to process the RFETS plutonium to a nonproliferable form before it is transported. Another commentor expressed concern about the safe storage of plutonium at RFETS, given the site's proximity to the airport, and believes that DOE takes a "cavalier" approach to the storage of plutonium at RFETS in light of the strategic nature of plutonium as a military commodity.

Response
The issues of storage and processing of plutonium at RFETS are outside the scope of the WM PEIS. Plutonium is used in the development and production of nuclear weapons for national defense and, as such, is a special nuclear material as defined by Section 51 of the Atomic Energy Act of 1954. However, DOE has prepared, and is preparing, other NEPA documents that address plutonium at RFETS. These documents, which are identified in Section 1.8.1 in Volume I of the WM PEIS, include the Plutonium Interim Storage EIS for RFETS and the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic EIS. The Records of Decision from these documents should determine issues relating to plutonium storage and processing at RFETS.

Comment (1818)
In the event that the Area 3 or Area 5 disposal sites at NTS are considered for confinement of greater-than-Class-C and special-case wastes, the difficulties associated with meeting the waste acceptance criteria for dissimilar waste types must be addressed. Defense Nuclear Facilities Safety Board Recommendation 94-2 requires that composite effects be evaluated when contiguous burial facilities exist. If DOE proceeds with a co-disposal decision at one of the existing disposal sites on NTS, the problems associated with addressing composite effects will have to be addressed.

Response
As described in Section 1.5.6 in Volume I of the WM PEIS, management of greater-than-Class-C and special-case wastes is outside the scope of the WM PEIS. Greater-than-Class-C and special-case wastes would have to be evaluated in separate NEPA analyses and as part of the cumulative waste management effects analysis if the decision is made, at some future time, that DOE should consider a proposal to dispose of either or both of these wastes at NTS.

Comment (1863)
A commentor requested evaluation of the National Tritium Labeling Facility at Lawrence Berkeley Laboratory; wastes from the facility should not be transported on public roads and they should not be disposed of at Lawrence Livermore National Laboratory (LLNL).

Response
The WM PEIS analyzes programmatic alternatives to manage DOE's waste management complex. The National Tritium Labeling Facility is not part of the waste management complex and, therefore, is not within the scope of this PEIS. However, wastes generated at this facility would be managed within the Waste Management Program. Under most WM PEIS alternatives, these wastes would be treated at the Lawrence Berkeley Laboratory and disposed of either at the Hanford Site or the Nevada Test Site

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(NTS). They would be disposed of at LLNL under the WM PEIS No Action, Decentralized, and Regionalized 1 and 2 Alternatives.

Comment (1897)
Widespread opposition is organized for cleanup of Paducah site, and further contamination is bound to bring the "tree huggers" out in force.

Response
Use of existing facilities or new facilities to dispose of wastes is not projected to result in any significant risk of contamination at the PGDP. As part of implementing DOE-wide waste management strategies, additional studies will identify the precise location, capacity, and design of facilities at individual sites. These additional studies will also include opportunities for members of the public to express their opinions and concerns.

Comment (1943)
Who will get the contract to install the storage containers at Argonne National Laboratory-East (ANL-E)?

Response
Contracting issues are outside the scope of the WM PEIS. If DOE needs to acquire storage containers, it will use standard Government procurement procedures.

Comment (2097)
The public should be notified in the newspapers about unsafe conditions. There are leaking pipes at Portsmouth. The public was told that DOE is not responsible. DOE needs to tell the public who is responsible. The EPA has tested our water and indicated that there are 25 counts of radon in the water. Several counties in Ohio have contaminated drinking water wells. Pike County is not identified. How can this be? We want the water cleaned up. The public is concerned about the rusty, corroding, leaking uranium hexafluoride cylinders at Portsmouth. Remove the cylinders immediately. DOE needs to consider impacts to the cylinders from a severe earthquake. DOE should not cover up the fact that plant operations are killing children and poisoning our water supply.

Response
DOE complies with all applicable regulations regarding public notification of potentially hazardous conditions. Portsmouth has a local stakeholder group established to deal with local issues. The public is invited to attend any local stakeholder group meeting and voice their concerns.

Section 4.4.12 in Volume I of the WM PEIS provides information on the affected environment at the Portsmouth Plant. However, cleanup of contamination caused by past practices is outside the scope of the WM PEIS. These comments have been forwarded to the DOE Portsmouth Plant office.

Uranium hexafluoride is considered a source material, not a waste; consequently, issues pertaining to uranium hexafluoride management are outside the scope of the WM PEIS. DOE is preparing an EIS that will evaluate alternative strategies for long-term management of DOE-owned depleted uranium hexafluoride currently stored at the K-25 Site in Oak Ridge, Tennessee; at the Paducah Gaseous Diffusion Plant (PGDP) in Paducah, Kentucky; and at the Portsmouth Plant, in Ohio. The Notice of

Intent was published in the *Federal Register* on January 25, 1996, and the Draft EIS is scheduled to be available for public review in February 1997.

Comment (2126)
The concept of the internal combustion engine has been obsolete for over 50 years. But because of the oil cartels and the corrupt government regulations, we and the rest of the world have been forced to use gasoline for over 100 years.

Response
Issues pertaining to advances in automotive technologies and government energy policies and laws are not within the scope of the WM PEIS.

Comment (2128)
Big business is primarily responsible for destroying the water we drink, the air we breathe, and the food we eat. They have no care for the world they destroy, only for the money they make in the process. For companies making $10 million a day by dumping lethal, toxic waste into the ocean, it is only good business to continue doing that. We are angry because we are all being chemically and genetically damaged.

Response
Environmental contamination by "big business" is not within the scope of the WM PEIS.

Comment (2134)
DOE should explain why there is a nuclear reactor at BNL.

Response
BNL operates two research reactors that are used by scientists to study metals, ceramics and biological molecules, and to develop new cancer therapies. Both reactors are many times smaller and less powerful than a commercial utility nuclear power reactor. BNL's reactors are also designed for a different purpose than commercial power reactors. Instead of maximizing the amount of heat that can be generated by the reactor core, BNL's research reactors maximize the number of subatomic particles, called neutrons, that can be used by the scientists for their research.

Comment (2158)
DOE needs to do something to stop the hole in the ozone being created by hydrogen fluoride.

Response
DOE is committed to phasing out ozone-depleting substances and will discontinue use of these substances according to EPA phaseout schedules. Other actions related to the use of ozone-depleting substances are outside the scope of the WM PEIS.

Comment (2165)
A commentor stated that workers at PGDP have a high rate of neutron exposure and DOE needs to explain how they are monitoring this.

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Response

Neutrons are produced by a nuclear reaction. PGDP does not have any material that produces a nuclear reaction, or the capability of producing such a reaction. PGDP has not and will not produce nuclear reactions. Therefore, no one has been exposed to neutrons at PGDP.

As part of normal operations, PGDP conducts routine monitoring of all employees who work in or have occasion to be in a radiological area. This monitoring is conducted by the use of small dosimeters worn by each of those employees. These are exchanged quarterly. The removed dosimeters are then analyzed to determine if an employee received a radiation dose. Employees also undergo annual physical examinations, part of which check for radiation dosage.

Comment (2226)

In-place treatment of high-level waste in the tanks at Hanford is unacceptable.

Response

Treatment of high-level waste is outside the scope of the WM PEIS. Although Section 1.7.4 in Volume I of the PEIS mentions that treatment of some high-level waste is being privatized at the Hanford Site, the potential environmental impacts of high-level waste treatment are examined in sitewide or project-level NEPA documents and safety assessments, including the Hanford Tank Waste Remediation System EIS described in Volume I, Sections 1.8.1 and 9.1.2.1.

Comment (2233)

We are particularly concerned about the capping and ignoring of monitoring wells at PGDP that showed plutonium in the groundwater. This is dishonest and stupid.

Response

DOE, in accordance with State laws and regulations, abandons monitoring wells that are no longer needed or that are no longer are in good operating condition. In addition, at its own expense, DOE locked and capped about 100 residential wells near PGDP, and is providing these residents with municipal water. This action was taken due to offsite contamination of the groundwater primarily with trichloroethylene and technetium-99.

However, no monitoring wells were abandoned and ignored because of plutonium. Plutonium was found in one well at concentrations slightly above the detection limit. However, followup sampling activities by DOE and the Commonwealth of Kentucky found no plutonium. Thus, the one event was determined to be invalid.

Comment (2251)

The U.S. engages in too much duplicity about international treaties on nuclear arms. More international monitoring is needed.

Response

Compliance with international nuclear treaties is outside the scope of the WM PEIS.

Comment (2257)

A commentor believes ANL-E should remain a research facility.

Response
The WM PEIS addresses the environmental impacts of alternative waste management strategies. Some of the waste produced at DOE sites originates from research activities, so research sites must also manage the wastes they generate, even if those wastes are disposed of offsite. ANL-E will remain a multi-purpose site, and its missions will include energy research and waste management.

Comment (2259)
We are very concerned about the attempt of the ANL-E facility to obtain City of Chicago water, since most people in the area draw on the local aquifer for drinking water. Why does ANL-E need Chicago city water? Water that is good enough for the rest of the community should be good enough for ANL-E, too.

Response
During the summer of 1996, ANL-E began to use Lake Michigan water. Previously, ANL-E used well water, which it treated and softened. As a consequence of the softening process, the site's water had high concentrations of dissolved solids. Transferring to Lake Michigan water, which was offered to ANL-E by the DuPage County Water Commission, avoids this problem. ANL-E's discontinuation of use of well water will reduce the demand on the aquifer.

Comment (2316)
DOE should restore Hanford Advisory Board funding; enhance education and involvement; establish a special committee to integrate/coordinate; and not have a piecemeal approach.

Response
DOE is taking steps to improve the coordination and integration of its decisionmaking processes. These steps include providing briefings to groups such as the chairpersons of the Site-Specific Advisory Boards (including the Hanford Advisory Board) on upcoming DOE decision processes and how they might interrelate. Other groups include the national-level Environmental Management Advisory Board, the National Governors Association, and the State and Tribal Government Working Group. Part of the goal of such briefings is to provide a clearer picture of how actions at one DOE facility or site could affect another, as well as to identify the cumulative effects of several contemplated actions at an individual site. Input is also being sought from these groups on how DOE can enhance education and involvement and which decision processes the groups feel would most benefit from greater coordination or integration. Adequate funding for advisory boards is outside the scope of the WM PEIS.

Comment (2631)
Moving radioactive waste and plutonium through Puget Sound ports should be strongly opposed because of (1) the impacts of shipping such hazardous material through the sensitive waters of the Sound are unknown, especially considering that foreign freighters may not meet the stricter registry rules for U.S. vessels; (2) the dangers involved with unloading and shipping the materials to Hanford; and (3) Hanford has enough problems funding cleanup efforts without adding additional waste materials.

Response
The WM PEIS does not analyze shipment of any hazardous waste, transuranic waste, low-level waste, low-level mixed waste, or high-level waste through Puget Sound, with the exception of minor volumes of low-level mixed waste generated at the Puget Sound Naval Shipyard. Further, the WM PEIS does

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not consider spent nuclear fuel issues. Details on spent nuclear fuel and alternatives with potential Puget Sound implications can be obtained from the SNF/INEL PEIS and the Foreign Research Reactor Spent Nuclear Fuel EIS. The cumulative impact analysis in Chapter 11 in Volume I of the WM PEIS does consider site-specific programs, for example, at the Hanford Site.

Comment (2701)
A commentor opposes the production of tritium.

Response
Section 1.8.2 in Volume I of the WM PEIS contains a description of NEPA reviews that are related to the WM PEIS, including the Tritium Supply and Recycling PEIS.

Comment (2702)
One commentor opposed bringing radioactive rods to the Savannah River Site (SRS). Another commentor suggested that DOE not store spent fuel rods at SRS, but that they be stored "somewhere else and use what we [SRS] do have to generate electricity at reasonable rates."

Response
The scope of this WM PEIS is restricted to waste management activities on a programmatic level. Issues relating to electricity generation and to the management of radioactive rods at SRS is not covered by this document. In February 1996, DOE issued the Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel EIS to address management of spent nuclear fuel from foreign research reactors. The Record of Decision was published in the *Federal Register* on May 13, 1996. The Record of Decision identified that the foreign research reactor spent nuclear fuel would be accepted into the U.S. and that the aluminum-based fuel would be managed at SRS, and that the TRIGA fuel would be managed at INEL. In April 1995, DOE issued the SNF/INEL EIS, which evaluates alternatives for managing existing and reasonably foreseeable inventories of U.S. Government-owned spent nuclear fuel; a Record of Decision was issued in May 1995. Site-specific waste management activities for SRS were analyzed in the SRS Waste Management EIS of July 1995. Section 1.8.2 in Volume I of the WM PEIS contains descriptions of these NEPA reviews. The cumulative impacts analysis in Chapter 11 in Volume I of the WM PEIS considers impacts from other programs such as the management of spent nuclear fuel.

Comment (2775)
DOE should consider changing the location of research that generates waste to one or two locations in the country, away from populated areas, and then not have to worry about disposing of the waste in highly populated areas or transporting the waste through areas that are highly populated.

Response
The configuration of DOE research facilities is outside the scope of the WM PEIS.

Comment (2989)
If the Oak Ridge Reservation (ORR) is selected as a center for treatment of offsite wastes, ORR wastes should be treated first.

Response
The order in which waste is treated at a regional treatment center is outside the scope of the WM PEIS.

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Comment (3324)
Why weren't the Manhattan Project scientists put in charge of the Atomic Energy Commission at its inception? Why were politicians directing the advance of Atomic Energy?

Response
The Atomic Energy Commission was established by the Atomic Energy Act of 1946 as the successor to the Manhattan Engineer District. The Commission was composed of five members appointed by the President with the advice and consent of the Senate. Among the early chairmen of the Atomic Energy Commission were scientists from the Manhattan Project.

Comment (3412)
Many members of the public submitted comments related to the *Draft Environmental Impact Statement on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel*. The commentors were adamantly opposed to the use of Puget Sound and the ports of Tacoma, Washington, and Seattle, Washington, as a point of entry for receipt of foreign research reactor spent nuclear fuel.

Response
These comments relating to the acceptance of foreign research reactor spent nuclear fuel into the United States are outside the scope of the WM PEIS. This issue was the subject of the Foreign Research Reactor Spent Nuclear Fuel EIS, which was issued in February 1996. The Record of Decision was published in the *Federal Register* on May 13, 1996. The Record of Decision identified the Charleston Naval Weapons Station in South Carolina and the Concord Naval Weapons Station in California as the ports of entry for receipt of the foreign research reactor spent nuclear fuel.

Comment (3426)
Many commentors provided comments on Hanford and the Storage and Disposition of Weapons Usable Fissile Materials Draft Programmatic Environmental Impact Statement. Comments included the following: weapons plutonium should be turned into reactor fuel at Hanford, not vitrified; the reprocessing of plutonium is too dangerous (and, therefore, commentors are opposed to it); weapons plutonium should not be turned into reactor fuel at Hanford, it should be vitrified; weapons plutonium should be vitrified with high-level nuclear waste so that it is hard to recover and can be disposed of; vitrification is the best option for weapons plutonium and should be pursued far more aggressively; whether weapons plutonium should be vitrified with high-level waste so that it is hard to recover and can be disposed of or turned into reactor fuel depends on the relative cost and cost-benefit effects of each.

Response
Decisions related to plutonium reprocessing or vitrification and the Storage and Disposition of Weapons Usable Fissile Materials Draft Programmatic EIS are outside the scope of the WM PEIS. The WM PEIS does not address weapons-grade nuclear material, which is not classified as waste. Section 1.8.2 in Volume I describes the WM PEIS relationship to other NEPA documents, including the Storage and Disposal of Weapons-Usable Fissile Materials PEIS and Section 11.6 includes the impacts identified in that PEIS for the Hanford Site. Any waste resulting from actions taken from the Fissile Materials PEIS would be stored, treated, or disposed of in accordance with the decisions for that waste type resulting from the WM PEIS.

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Comment (3524)
DOE should adopt the following system to solve the fundamental flaws in the current waste management siting method and maximize social welfare, take full account of social and environmental costs, and still achieve fairness: (1) reduce waste disposal requirements to a minimum, primarily through price incentives and eliminating bidder subsidies for waste generation; (2) consider all waste streams together (as opposed to having separate regulations for different waste streams); (3) have the Federal Government decide how much disposal capacity and how many facilities are needed, after available means of waste minimization have been exhausted; (4) have the Federal Government, through a new Federal Waste Disposal Commission (modeled after the Base Closure Commission), assign to States capacity allocations by considering geological and other physical requirements of a facility, the amount and kinds of waste generated within the State's borders, and whether the State is already a net importer or exporter of waste; (5) give the State the responsibility for finding a home within its borders for that waste by encouraging volunteer communities using a compensation auction (e.g., technical assistance grants); (6) have interested volunteer municipalities conduct a public referendum on the site, which must meet minimum technical criteria (e.g., depth to bedrock, distance from population centers, no siting in floodplains, etc.); (7) upon favorable outcome of the referendum, site the facility at the community; and (8) sanction States that do not meet their responsibilities by a cutoff (i.e., allow other States to close their borders to that State's waste).

Response
Thank you for your comment. However, the thrust of the comment is outside the scope of DOE's mission, under the current regulatory framework.

Comment (3664)
How does DOE calculate in the migration of the waste to the Pecos River in a short amount of time, the contamination of the Rio Grande and the seven rivers which flow from the Rio Grande into Mexico?

Does the Mexican Government have concerns about the possible contamination of their water supplies from WIPP? Has the DOE consulted with the Mexican Government on any type of environmental international agreements that will have to be met in regards to potential impacts of the WIPP site?

Response
Disposal of transuranic waste at the Waste Isolation Pilot Plant (WIPP) is outside the scope of the WM PEIS. The disposal impacts from operating WIPP as a transuranic waste repository are addressed in the WIPP SEIS-II.

Comment (3678)
The "disposal" of high-level waste is not an issue where the public, as well as the States and Native Nations, will sit back and wait for DOE or any facet of the Federal Government to make top-down decisions.

Response
The impacts of disposing of high-level waste in a repository are not within the scope of the WM PEIS, but will be analyzed in a subsequent DOE NEPA document relating to a geologic repository.

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Comment (3683)
Why is the nuclear age not utilizing this ultimate science determining the environmental applications for remediation. Is not all matter comprised of atoms?

Response
Due to their site-specific nature, environmental restoration and remediation activities are outside the scope of the WM PEIS, which is an analysis of alternatives for managing, at a programmatic level, wastes generated by DOE operations. Environmental restoration and remediation actions are conducted by the DOE Environmental Restoration Program, and are governed primarily by the provisions of CERCLA and RCRA.

Comment (3888)
DOE needs to use solar energy or recycle nuclear energy.

Response
Issues relating to energy research are outside the scope of this WM PEIS, which is a programmatic study on waste management options.

Comment (3952)
DOE transfer [to the United States Enrichment Corporation] of the Portsmouth Plant and PGDP, its sister facility in Paducah, Kentucky, was a major Federal action with direct and foreseeable significant impacts on the human environment issued a Finding of No Significant Impact. Privatization and commercialization of the Portsmouth and Paducah facilities to United States Enrichment Corporation (USEC) and Nuclear Regulatory Commission oversight of USEC operations was an action mandated by Congress in Energy Policy Act of 1992. The DOE decision to issue a Finding of No Significant Impact rather than an EIS was both inappropriate and misleading.

Response
DOE believes that the level of NEPA review on the transfer of PGDP and the Portsmouth Plant to the United States Enrichment Corporation was appropriate. The transfer is outside the scope of the WM PEIS.

Comment (4030)
The PEIS does not provide an adequate public health justification for the proposed action. The Draft WM PEIS contemplates a massive expenditure of discretionary funds - between $30 and $40 billion - over the life cycle of the project. These funds will be applied to transportation and custodial storage of hundreds of thousands of cubic meters of radioactive waste, as well as the construction of significant new infrastructure in existing and new waste management facilities. In the current budgetary regime, these funds will be drawn away from other programs that also impact public health. Yet the WM PEIS devotes little space to examining the public health justifications that presumably drive the project, and the public is given no basis for comparison between the direct impacts of the project (such as transportation accidents) and the human health threats sought to be mitigated by DOE's waste management and "disposal" efforts. Instead, the WM PEIS only evaluates direct impacts and risks from waste management activities themselves, not from the programs that generate the waste, the stockpiles of inventoried wastes, or from contaminated facilities.

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Response
With respect to the human health risk/cost trade-offs within DOE's waste management responsibility, one of the waste management alternatives considered in the WM PEIS is the No Action Alternative. The No Action Alternative provides an estimate of health effects and costs if DOE continues with current activities that generate waste and continues with current waste management strategies and activities. The comparison of alternatives in each waste-type chapter shows how the No Action Alternative compares with the range of possible action alternatives in terms of cost and public and worker risk. The human health and environmental impacts of individual DOE programs and projects have been or will be analyzed in separate NEPA reviews. Section 1.8.1 in Volume I summarizes these NEPA reviews and discusses their relationship with the WM PEIS.

With respect to the broader issue raised by the commentor, including DOE's wide range of responsibilities, analysis of the public health justification for spending public funds on waste management instead of other public health threats is not within the scope of the WM PEIS because DOE is required by law to manage its wastes. DOE is required by the Atomic Energy Act (42 USC 2011 *et seq.*) to manage the radioactive wastes that it generates. Low-level mixed waste, low-level waste, transuranic waste, and high-level waste have radioactive component. In addition, DOE needs to make waste management decisions concerning hazardous waste and hazardous components in mixed wastes (waste that is both hazardous and radioactive) in order to comply fully with RCRA (42 USC 6901 *et seq.*). RCRA sets forth requirements for managing hazardous waste including mixed waste. Low-level mixed waste, some high-level waste, and some transuranic waste are mixed wastes and might be subject to RCRA. RCRA requires EPA to issue land disposal restrictions (40 CFR 268), which prohibit storage of hazardous and mixed wastes, except to facilitate proper recovery, treatment, and disposal. The Federal Facility Compliance Act (42 USC 6961 *et seq.*) amended RCRA to allow EPA and individual States to impose fines and penalties on Federal facilities for RCRA violations.

Decisions about expenditures of Federal funds to address public health threats are made by Congress, which presumably considers such cost/benefit trade-offs as the commentor has noted. On its part, DOE has begun a "National Dialogue" initiative to provide a means for comprehensive discussion with government officials, regulatory authorities, and other interested organizations and public regarding the major materials, waste management, and cleanup decisions, DOE needs to make over the next few years. This dialogue, which is described in Volume I, Section 1.8.2, of the WM PEIS, will include public participation and input on national environmental restoration issues.

Comment (4034)
A true no action benchmark analysis would require DOE to acknowledge that the continued development, testing, and fabrication of nuclear weapons involves adding greater quantities of extremely dangerous materials that presently have no permanent disposal options, will remain dangerous for thousands of years, and will cause environmental, public health, and economic impacts.

Response
While the WM PEIS analyzes alternatives related to waste management activities, the Stockpile Stewardship and Management PEIS, which is described in Section 1.8.1 in Volume I of the WM PEIS, analyzes the potential consequences to the environment if certain changes to the Nuclear Weapons Complex are implemented.

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Comment (4067)
In order to find real alternatives to "business as usual," DOE should analyze the impacts of radioactive waste that has been dumped into oceans to determine the effects on living creatures; this could be useful for long-term disposal plans.

Response
NEPA and CEQ regulations require Federal agencies to include in an EIS a discussion of reasonable alternatives to the proposed action. Agencies must provide sufficient information for each alternative to permit reviewers to evaluate the comparative merits of those alternatives. The NEPA process does not generally include an analysis of past actions. Rather, reasonable alternatives for proposed actions are considered.

Ocean disposal is not an option that DOE is considering for this WM PEIS, and effects of ocean disposal of radionuclides on marine organisms, if any, is outside the scope of this PEIS.

Comment (4071)
DOE should end all production, distribution, and promotion of "agents of death." "A basic humanist view of ethics will prevent another tragedy like Hiroshima...Because you do not respect the earth and life, many bad things manifest as people [lose] respect for life too." Domestic violence increases when people copy the "power trips" of their government leaders.

Response
The policies of the United States with regard to defense are set by Acts of Congress and Presidential authority. Issues related to defense policy and domestic violence are not within the scope of the WM PEIS. DOE is analyzing alternatives for achieving a downsized nuclear weapons complex (see the Stockpile Stewardship and Management PEIS described in Section 1.8.1).

Comment (4277)
Production and use of plutonium should be stopped, because the government cannot account for what is around now.

Response
Policy decisions regarding production and use of plutonium production and use are outside the scope of the WM PEIS. Plutonium is not considered a waste. Decisions relating to plutonium would be based on the Storage and Disposition of Weapons-Usable Fissile Materials PEIS described in Section 1.8.1 in Volume I of the WM PEIS. In addition, since plutonium is a special nuclear material, the DOE Safeguards and Security Program, described in Section 4.3.12 (Volume I), is used to protect and account for the amount in DOE's inventory.

Comment (4402)
DOE analyzes foreign wastes (from commercial power plants and/or defense wastes from around the world that will be managed by and within the United States by DOE) as a tangential matter and not as an integral part of DOE's waste management scheme, thus minimizing health risks and impacts on humans and the environment. DOE must concurrently analyze the management and impacts of foreign nuclear wastes with domestic DOE nuclear waste inventories in a new WM PEIS.

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Response
DOE does not accept wastes from foreign commercial power plants or defense wastes from "around the world." DOE does accept spent nuclear fuel from foreign research reactors.

Comments relating to the acceptance of foreign research reactor spent nuclear fuel into the United States are outside the scope of the WM PEIS. DOE issued the Final Foreign Research Reactor Spent Nuclear Fuel EIS in February 1996 (DOE/EIS-0218F). Answers to the above questions can be found in that document. The Record of Decision was issued on May 13, 1996, and identified the Charleston Naval Weapons Station in South Carolina and the Concord Naval Weapons Station in California as the ports of entry for receipt of the foreign research reactor spent nuclear fuel.

Comment (4431)
A former employee of a DOE contractor asserted that he was terminated from working on the preparation of the WM PEIS due to his disclosures and efforts to include in the Draft PEIS certain environmental impacts at some DOE sites, environmental impacts of high-level waste treatment, and uncertainties in available information on these impacts.

The commentor suggested that DOE:

- Publicly acknowledge the inaccuracies in the WM PEIS and terminate whatever is left of the contract with META/Berger;

- Hold new WM PEIS public hearings in Washington, D.C., so local interested parties will have an opportunity to participate without excessive travel costs;

- Consider having the WM PEIS revisions administered by a widely respected institution independent of Argonne National Laboratory and, preferably, independent of DOE;

- If the PEIS is to be restricted to waste management, republish it as a Draft PEIS, and not as a Final PEIS, to provide adequate opportunity for external review of the draft document;

- Use new contractors and DOE personnel (who have been screened to ensure that they would be unlikely to tolerate coverups) to revise the Draft WM PEIS (or preferably create a PEIS for all of DOE) who understand models, uncertainties, and the information needed by administrators to make wise decisions;

- Consider instituting an environmental security clearance procedure for all persons in DOE and on the staff of DOE contractors who have environmentally sensitive positions to screen out those who are likely to tolerate or institute coverups from positions where they may have an opportunity to behave in this way;

- Offer backpay, expenses and secure, full-time employment to those who were working on the PEIS but were terminated for trying to prevent misleading characterizations of impacts;

- Provide adequate funding, authority, resources and staff to the Secretary of Energy, the Assistant Secretary for Environmental Management, the Office of Contractor Employee Protection, and others in DOE who have responsibilities involving the prevention of coverups and misleading characterizations of impacts by DOE, e.g., contractors and the protection of those who reveal coverups.

Response
As required by NEPA, public involvement plays a major role in the process that culminates in the issuance of a final EIS. It constitutes a major driver in delineating the scope of an EIS and in moving from a draft to a Final EIS, and serves as a vehicle of control and revision of inaccuracies where they occur. DOE views public response and acknowledgment of errors as part of its commitment to openness.

Regarding the commentor's suggestions on how DOE should deal with its contractors, DOE supervises and provides guidance to its contractors to ensure that the final document is sound. As the Federal action agency, DOE is required by NEPA to retain ownership of the EIS process. Thus, DOE will apply the supervision and guidance aspect referred to in the comment to any organization it enlists to support its efforts.

DOE believes that the Draft WM PEIS met the requirements of the CEQ regulations and NEPA. Therefore, it is not necessary to revise and reissue the Draft WM PEIS for public comment. Substantial changes were made to the PEIS in response to public comments to improve the analysis and correct factual errors.

The DOE Office of Contractor Protection is addressing the commentor's contention of wrongful termination. In addition to a DOE investigation, EPA conducted an independent investigation of the allegations made against DOE and its contractors, including META and Louis A. Berger and Associates, Inc., and determined that there was no evidence of a coverup or deliberate misrepresentation of data. META and Louis A. Berger and Associates, Inc., remain integral parts of the WM PEIS project team.

Comment (4493)
The human health impacts associated with DOE and EPA standards should have been summarized in Section 4.3 of the Draft WM PEIS. With a 70-year exposure at 100 mrem (the DOE standard), the lifetime probability of an individual contracting cancer would be 1%. A 70-year exposure at 10 millirem (the EPA standard) would cause a 0.1% chance of cancer. Both values exceed the 1 in 10,000 risk limit in CERCLA and RCRA regulations and guidelines, and exceed limits that would be acceptable to many members of the public.

DOE should evaluate the possibility of changing its limit for multimedia exposure for the MEI, from 100 mrem to 1 mrem, a value that would be consistent with a 1 in 10,000 cancer risk limit in EPA regulations and guidelines, as well as the (CERCLA) national Contingency Plan. In addition, using a multimedia exposure of 0.01 mrem to the MEI as a point of departure indicating a need for further reduction in exposure should be considered. A 0.01 mrem exposure over a lifetime would cause a one in one million risk of cancer and be consistent with the one in one million goal in the Clean Air Act of 1990 and CERCLA rules and guidelines. These exposure limits should be considered in the WM PEIS, along with alternative timetables for compliance.

15. Out of Scope Comments

Response

It is not the purpose of the WM PEIS to evaluate EPA and DOE standards, or to evaluate the acceptability of health risks resulting from current conditions at DOE sites. Rather, the purpose of the WM PEIS is to show, on a relative basis, the impacts, including health risks, resulting from the proposed waste management alternatives.

References

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GUIDE TO COMMENTS AND RESPONSES

Individuals	Comment/Response Index Location(s)
Abbate, Kathleen A.	3.5.1 (209)
Abell, Thomas L.	3.5.1 (209)
Adamo, James A.	3.5.1 (209)
Adle, Dorothy R.	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
Ahouse, Loretta	3.3 (141), 4.2 (395), 5.2 (14), 6.4 (396), 11.3 (397), 11.3 (398), 12.2 (206), 12.2 (363), 12.2 (365), 12.2 (1484)
Ahouse, Loretta	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (3411), 5.11 (4133), 6.6 (4148), 8.1 (3424), 8.3 (3423), 9.3 (3422), 11.3 (4140), 12. (152), 15. (3412), 15. (3426)
Alletta, Marian	3.5.1 (209)
Amrein, Polly	3.5.7 (123), 6.7 (25)
Anderson, Joan	3.1 (1937), 8.1.2 (1938), 8.3.3 (1940), 8.3.3 (3742), 15. (1943)
Anonymous, Lynn	3.5.2 (541), 4.2 (451)
Anonymous	11.6 (1877)
Arsenault, Gwendolyn M.	3.5.1 (209)
Arsenault, Robert J.	3.5.1 (209)
Arsenault, Robert J.	3.5.1 (209)
Auclair, Janet M.	3.4.1 (71)
Baker, Gloria	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 9.1 (276)
Baldwin, Mary K.	3.5.1 (209)
Ball, Eldon L.	14.1 (2374), 15. (3412)
Balle, Sally A.	3.5.1 (209)
Banks, Paula S.	3.5.1 (209)
Baran, Kenneth	3.5.1 (209)
Bardorzi, Margaret	3.5.1 (209)
Baron, Robert L.	3.5.1 (209)
Barton, Mary	3.5.15 (1682), 9.1 (1685), 14.5 (1684), 15. (2702)
Baum, Bonnie F.	3.5.1 (209)
Beasley, Patsy T.	3.5.10 (369)
Bechina, Joseph	3.5.1 (209)
Bechina, Margaret	3.5.1 (209)
Bedayn, Janice	3.1 (487), 4.2 (483), 5.2 (481)
Belford, Joan	3.5.1 (209)
Beranek, Joellen	3.5.1 (209)
Bernardi, Gene	3.5.7 (123), 5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.3 (22), 6.7 (25), 11. (24), 15. (1863)

GUIDE TO COMMENTS AND RESPONSES

Individuals	Comment/Response Index Location(s)
Bierschenk, Bert	3.5.1 (209), 12. (152)
Blachowicz, Natalie A.	3.5.1 (209)
Blachowicz, Natalie	3.3 (141), 3.5.1 (209)
Blesy, Harold H.	3.5.1 (209)
Blesy, Harold H.	3.5.1 (209)
Bloomberg, Miriam	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
Boije, Hope	3.1 (1288), 5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.7 (25), 8.3 (1286), 8.3 (1287), 11. (24),
Bomicino, Sandra	3.5.1 (209)
Bonavolonta, Albert	3.5.1 (209)
Boragudi, Rosemary	3.5.1 (209)
Borgersen, R.	5.2 (156), 14.3 (157), 15. (154)
Borowiak, Linda	3.5.1 (209)
Boyce, Mary C.	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
Boyce, Sally	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (3411), 5.11 (4133), 6.6 (4148), 8.1 (3424), 8.3.1 (4235), 9.3 (3422), 12. (152), 13.1 (4236), 15. (3412), 15. (3426)
Boyd, Betty	3.5.10 (369)
Brandt, Howard	3.5.1 (209)
Brandt, Jolene	3.5.1 (209)
Brandt, Robert R.	3.5.1 (209)
Brechin, Vernon J.	2. (3539), 3.4.2 (520), 4.1 (1554), 4.2 (3531), 4.3 (3533), 4.3 (3535), 8.1 (3528), 8.1 (3530), 8.1.4 (3537), 9.2 (207), 11.2 (3527), 11.2 (3538)
Broida, Janet	3.5.1 (209)
Brooking, Mary Ellen	3.5.10 (369)
Brown, Elizabeth	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
Brown, Rachel	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (4133), 6.6 (4148), 8.1 (3424), 8.3.1 (4235), 9.3 (3422), 12. (152), 13.1 (4236), 15. (3412), 15. (3426)
Bryer, Elizabeth	3.5.4 (1952), 6.6 (3272), 12. (152), 15. (3412)
Bucic, George	3.5.1 (209)
Bucic, Margaret	3.5.1 (209)

Individuals	Comment/Response Index Location(s)
Burkhardt, Leonard	14.2 (588)
Buxton, Michelle	6.7 (25)
Calamia, Carolyn	3.5.1 (209), 12. (152), 12.2 (254)
Campo, Jeannette E.	3.5.1 (209)
Carmichael, Jean	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
Carnevale, Marilyn	3.5.1 (209)
Carr, Kathy	3.5.1 (209)
Cartwright, Karen	3.5.1 (209), 12.2 (254)
Chembryl, Fzoul	15. (112)
Christensen, Neil	3.5.1 (209)
Claffey, Jocelyn D.	3.5.1 (209)
Cloutier, Richard E.	3.5.1 (209)
Cohen, Arlene G.	3.3 (141)
Conner, Phoebe	3.5.4 (1952), 6.6 (1954), 10.2 (2634)
Coots, Lou	3.5.10 (369), 4.1 (3404), 8.3 (2674), 12. (2687)
Copeland, Paul	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24), 14.1 (371)
Corcoran, Mary	3.5.1 (209), 6.7 (25), 8.3.2 (438)
Cornett, C. Lawrence	3.1 (4442), 3.2.3 (3212), 4.2 (4433), 4.2 (4490), 4.2 (4492), 4.2 (4494), 4.2 (4495), 4.2 (4506), 4.2 (4512), 4.2 (4513), 5.1 (4425), 5.1 (4514), 5.2 (4417), 5.2 (4419), 5.2 (4426), 5.2 (4432), 5.2 (4443), 5.2 (4454), 5.2 (4468), 5.2 (4474), 5.2 (4483), 5.2 (4488), 5.2 (4520), 5.2 (4521), 5.2 (4526), 5.2 (4528), 5.2 (4530), 5.2 (4531), 5.2 (4532), 5.2 (4533), 5.2 (4534), 5.2 (4535), 5.2 (4536), 5.2 (4537), 5.2 (4538), 5.2 (4539), 5.2 (4540), 5.2 (4547), 5.2.1 (4469), 5.2.2 (4445), 5.2.2 (4473), 5.2.2 (4524), 5.2.2 (4525), 5.2.2 (4544), 5.2.2 (4545), 5.2.3 (4446), 5.2.3 (4476), 5.2.3 (4486), 5.3 (4450), 5.3 (4455), 5.3 (4461), 5.3 (4516), 5.3 (4542), 5.3 (4543), 5.3 (4549), 5.4 (4451), 5.4.1 (4491), 5.4.1 (4519), 5.4.2 (4527), 5.4.2 (4529), 5.11 (4415), 5.11 (4471), 5.11 (4553), 5.11 (4554), 5.11 (4557), 5.11 (4558), 5.12 (4452), 5.12 (4550), 6.2 (4448), 6.4 (4556), 6.6 (1670), 6.6 (4453), 6.6 (4475), 7. (4435), 7. (4456), 7. (4560), 7. (4561), 7. (4562), 7. (4563), 8.1 (4457), 8.1 (4515), 8.1.4 (4423), 8.1.4 (4465), 8.3 (4481), 8.3.1 (4460), 8.3.1 (4467), 9.2 (207), 9.2 (4436), 9.2 (4439), 9.2 (4458), 10.2 (4466),

GUIDE TO COMMENTS AND RESPONSES

Individuals	Comment/Response Index Location(s)
Cornett, C. Lawrence	11.1 (4421), 11.1 (4437), 11.2 (4463), 11.2 (4546), 11.4 (1138), 11.4 (4464), 11.6 (4413), 12. (4427), 13.1 (4440), 15. (4431), 15. (4493)
Curcio, John L.	3.5.1 (209), 12. (152), 12.2 (254)
Daly, John	3.5.1 (209)
Dastillung, Vicky	8.1 (1087), 11.4 (1138), 11.4 (2710), 14.6 (1615)
Data, Joseph R.	3.5.1 (209)
DeLuca, Lydia J.	3.5.1 (209)
DeVoy, Tiffany	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (3411), 5.11 (4133), 5.11 (4375), 6.6 (4148), 8.1 (3424), 8.3.1 (4235), 9.3 (3422), 12. (152), 13.1 (4236), 15. (112), 15. (3412), 15. (3426)
DeVoy, Tiffany, Hearing	3.6 (2215), 8.3.2 (2214), 12.2 (254), 12.2 (1484), 12.2 (2217), 12.2 (2218)
Deen-Freemire, Joanne	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
Degelman, Norman	3.5.7 (123), 6.7 (25)
DelBarba, Connie	3.5.1 (209)
DelBarba, Kris	3.5.1 (209)
Dellamaria, Anne	3.5.1 (209)
Deutscher, Ludell	5.2 (14), 5.2 (16), 5.2 (17), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 8.3.1 (2651), 14.1 (371),
DiPietro, Frank S.	3.5.1 (209)
Dian, Rudolph F.	3.5.1 (209)
Dillard, Kirk W.	3.5.1 (209)
Donahoo, Judy E.	3.5.1 (209), 15. (2257), 15. (2259)
Dorfman, Kari	3.5.7 (123), 11.3 (237), 14.2 (588)
Dortch, Jotilley	3.5.10 (369), 5.1 (1159), 5.2 (1168), 12. (152), 13.2 (1164)
Dostillung, Vicky	11.4 (160), 13.1 (158)
Dulany, Susan S.	14.1 (371), 15. (2701), 15. (2702)
Dunn, Pamela	3.5.3 (1761), 8.1 (1087), 8.1.2 (3964), 9.2 (207), 9.3 (3969), 9.3 (3976), 9.3 (3978),
Dybala, Richard J.	3.5.1 (209)
Dyson, Jessica, Hearing	3.3 (141), 11. (2206), 12. (152), 12.2 (363), 12.2 (1484)
Eagan, James L.	3.1 (220), 5.8 (219), 10.1 (221), 10.1 (222), 15. (223)
Ebins, Nancy	5.4 (1323)
Edsall, Jane	3.5.2 (541)
Edwards-Cotter, Anne	3.5.1 (209), 12.2 (206)
Ehlers, Betsy	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122),

Individuals	Comment/Response Index Location(s)
Ehlers, Betsy	6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
Eldredge, Fran	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
Ellington, Cletus M.	6.4 (396), 15. (112)
Engelsman, Donna	3.5.1 (209)
Englund, Charles	3.1 (2655), 3.5.1 (209), 3.5.1 (2650), 3.5.1 (2654), 8.3.1 (2651)
Ericson, Stephanie	3.5.7 (123), 6.7 (25), 12. (152), 12.2 (206)
Fabilli, Virginia	6.7 (25), 8.3.1 (2651), 11.3 (237), 15. (198)
Falotico, Pamela	3.5.1 (209)
Fauci, Joanie	3.3 (141)
Featherstone, John	3.5.1 (209)
Fein, Anna	3.5.1 (209)
Feldman, Edith W.	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
Fields, Sharon	3.5.10 (369), 12.2 (206)
Filer, William	3.4.1 (71), 3.5.1 (209), 6.1 (23)
Fleming, Jack W.	3.5.7 (123), 8.3.1 (176)
Forbes, Pam	3.5.10 (369)
Forcella, Lauren S.	6.7 (25), 8.3.1 (2651), 8.3.2 (194), 14.3 (157), 15. (154), 15. (188), 15. (198),
Foreman, Shelby	3.5.1 (209), 6.3 (22), 12.2 (206)
Foss, Louise	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 8.3.3 (1020), 11. (24)
Foulk, Robert	3.4.1 (71), 3.5.1 (209)
Fraser, Jane	3.5.1 (209)
Fratieola, Karen	3.5.1 (209)
Freeman, Jennifer	6.7 (25), 8.3.1 (2651), 11.3 (237)
Freund, George A.	11.1 (4421), 11.4 (2689), 14.2 (2690)
Giambrone, Dominic	3.5.1 (209), 12.2 (206), 12.2 (254)
Gillespie, Gretchen	3.5.1 (209)
Graber, Jean W.	3.5.10 (369), 14.1 (371)
Graffenius, Robert	3.5.1 (209)
Gray, Barbara B.	3.4.1 (71), 3.5.10 (369)
Gray, Dean	3.5.1 (209)
Greco, Armando	3.5.1 (209), 12.2 (254)
Green, Patricia	3.5.7 (123), 5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84),

Individuals	Comment/Response Index Location(s)
Green, Patricia	6.3 (22), 6.7 (25), 11. (24)
Greenfield, Rebecca L.	3.5.1 (209)
Grganto, Milan	3.4.1 (71), 3.5.1 (209)
Gross, Ingrid	3.5.1 (209)
Grove, Marjorie	6.4 (396), 9.1 (2610), 15. (3412)
Guglietta, Peter	3.4.1 (1926), 3.5.1 (209)
Gurka, Becky	3.3 (141), 3.3 (2345), 3.5.3 (2339), 3.5.8 (2337), 5.6 (2346), 5.6 (2351), 6.5 (2338), 8.1.2 (2341), 8.1.3 (2343), 8.1.5 (2352), 8.3.1 (2340), 11. (531), 11.2 (2347), 11.2 (2354),
Gurley, Worth	10.2 (2634), 15. (2631)
Gustafson, Eric	3.5.1 (209), 5.2 (2777), 8.1 (1830), 15. (2775)
Hagon, Cindie	3.5.1 (209)
Hahn, Dixie	6.3 (22)
Hamilton, Ellie	3.1 (36), 3.2.3 (39), 3.2.5 (41), 4.3 (40), 5.2 (34), 5.3 (37), 8.3.1 (7), 8.3.1 (8), 8.3.1 (10), 8.3.1 (11), 8.3.1 (33), 8.3.1 (35), 11.2 (2), 11.2 (3), 11.2 (6)
Harmon, Ann	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24),
Hauge, Rosemarie	3.5.1 (209)
Hayden, James E.	3.5.10 (369), 12. (152)
Herbert, Patricia	3.1 (197), 6.7 (25), 6.8 (189), 6.8 (191), 8.1 (195), 8.3 (185), 8.3.1 (2651), 8.3.3 (199)
Hermer, Leonard	3.5.1 (209)
Herrick, Nancy A.	6.7 (25), 8.3.1 (2651), 11.3 (237), 15. (198)
Hickey, Patricia	3.5.1 (209)
Hinkelman, Daena	3.5.1 (209)
Ho, Esther	6.7 (25), 8.3.1 (2651), 11.3 (237)
Holmgren, Rod	5.2 (14), 5.2 (16), 5.5 (19), 5.5 (100), 5.11 (122), 6.7 (25), 9.1 (265),
Hostetler, Greg	3.5.4 (1952), 5.11 (3411), 5.11 (4133), 6.6 (4148), 15. (3412)
Hoye, Evelyn	6.7 (25), 8.3.1 (2651)
Huebsch, Jeffrey B.	3.5.1 (209)
Hurd, Margaret	3.5.10 (369)
Hynes, Vivian	3.5.1 (209)
Iazzetto, Ross J.	3.5.1 (209)
Illegible, Carlel	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (4133), 6.6 (4148), 8.3.1 (4235), 9.3 (3422), 12. (152), 13.1 (4236), 15. (3412), 15. (3426)
Illegible	3.5.1 (209)
Inderbitzer, Margaret	3.1 (13), 8.1 (4044)

Individuals	Comment/Response Index Location(s)
Irwin, Shirley	11.5 (3780)
Ivancevic, Dan	3.5.1 (209)
Izett, Mary W.	5.2 (14), 5.2 (16), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.3 (22), 6.7 (25), 11. (24),
Jacobs, Sharon K.	3.5.1 (209)
Janicijevic, Alexander	3.5.1 (209)
Jeffers, Dawn J.	3.5.1 (209)
Johnson, Betty G.	3.5.10 (369)
Johnston, Sarah	3.5.10 (369)
Jones, Francis R.	8.1.2 (1929)
Jones, Frank E.	5.2 (14), 5.2 (16), 5.2 (17), 5.2 (583), 5.5 (19), 5.5 (100), 5.10 (20), 5.11 (122), 6.1 (23), 6.2 (84), 6.7 (25),
Jones, Gerry	3.5.10 (369), 3.5.10 (4570)
Jones, Jeffrey W.	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.2 (84), 6.3 (22), 6.7 (25), 15. (188),
Jones, Lori	3.5.1 (209)
Kalisik, Amelia	3.5.1 (209)
Kanner, Pamela	3.5.1 (209)
Kapustka, Dennis W.	3.5.1 (209)
Kassl, Sharon	3.5.1 (209)
Katsaros, John A.	3.5.1 (209), 12.2 (254)
Kearney, Tim	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (3411), 5.11 (4133), 6.6 (4148), 8.1 (3424), 8.3 (3423), 9.3 (3422), 12. (152), 15. (3412), 15. (3426)
Keiser, LeRoy H.	3.5.1 (209), 12.2 (254)
Kelly, Del	3.5.1 (209)
Kelly, Gerald W.	3.5.1 (209)
Kelly, Stephen S.	5.2 (14), 5.2 (16), 5.2 (17), 5.2 (619), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24), 12. (152), 15. (188)
Kennerley, Peggy	3.5.10 (369)
Keplinger, Erin	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (3411), 5.11 (4133), 6.6 (4148), 6.7 (4354), 8.1 (3424), 9.3 (3422), 12. (152), 15. (3412), 15. (3426)
Kerrigan, Rosemary	3.5.1 (209)
Kilchenman, Candace	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 5.12 (689), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 6.8 (189), 8.3.1 (2651), 8.3.3 (691), 11. (24)
King, Joan O.	3.6 (143), 6.7 (25), 6.7 (4572),

Individuals	Comment/Response Index Location(s)
King, Joan O.	14.1 (371)
Klafeta, Lynn	3.5.1 (209)
Kluglein, June	3.5.2 (541), 14.4 (1930)
Konrad, Colin	3.5.1 (209), 12.2 (206)
Koss, Ginny	3.5.1 (1066)
Kozak, John W.	5.2 (14), 5.2 (16), 5.2 (17), 5.2 (583), 5.5 (19), 5.10 (20), 5.11 (122), 6.1 (23), 6.3 (22), 6.7 (25)
Kramp, Geraldine A.	3.4.1 (71), 3.5.1 (209)
Kramp, Geri	3.4.1 (71), 3.5.1 (209)
Krefft, Robert	3.5.1 (209)
Kudelka, Linda	3.5.1 (209)
Kurley, Michael L.	3.5.1 (209)
Laird, Jeanne	3.5.1 (209)
Lamar, E. K.	3.5.10 (369)
Lamb, Lorene	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
Lamb, Ronald	12.2 (254)
Larsen-Beville, Sherry	3.5.7 (123), 12.2 (254)
Latvala, L. F.	8.3.3 (57), 11.5 (56)
LeNeave, Billie J.	3.5.10 (369)
LeTourneau, Edward A.	3.5.1 (209)
Lee, James	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (4133), 6.6 (4148), 8.1 (3424), 8.3 (3423), 9.3 (3422), 12. (152), 15. (3412), 15. (3426)
Lela, John	3.5.1 (209)
Levigne, Joseph J.	3.5.1 (209)
Levitt, Alda	3.5.1 (209)
Lewis, George B.	3.5.10 (369), 15. (112)
Lewis, Tommy	3.5.10 (369), 15. (112)
Lindsay, Dorothy E.	3.5.1 (209)
LoVirolo-Bhurhan, Judith	6.7 (25)
Longo, Alice	15. (3412)
Losey, David C.	11.3 (2718)
Lukaszewski, Leon	5.2 (14), 5.2 (17), 5.5 (19), 5.10 (20), 5.11 (122), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24), 12. (152)
Maalem, Angelique	3.5.1 (1295)
MacDonald, A.	8.3.1 (2651)
Maciolek, Michelle	4.2 (483), 5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.3 (22), 6.7 (25), 11. (24),
Mack, Mary	3.5.10 (369)
Mahler, Andy	3.5.10 (369)
Malloy, Maureen	3.5.1 (209)

Individuals	Comment/Response Index Location(s)
Mannhaupt, Jean E.	12.2 (254)
Mannhaupt, Jean E.	1. (3331), 3.1 (3332), 5.2 (3329), 5.2 (3682), 8.1 (3328), 8.1 (3685), 8.3.1 (3330), 11.4 (1138), 14.1 (3325), 14.1 (3681), 14.1 (3687), 14.1 (3688), 14.4 (2099), 15. (3324), 15. (3683),
Mareci, Norman V.	3.5.1 (209)
Masters, Gwen	3.5.1 (209)
Mateski, Andreja L.	3.5.1 (209)
Mayka, Linda S.	3.5.1 (209)
Mazzelle, Anne	3.5.1 (209)
McDade, Elinor	3.5.2 (541)
McDarnell, Cindy	3.5.1 (209)
McGowan, Joan	3.5.1 (209)
McGreal, Angela	3.5.1 (209)
McKinney-Smith, Sarah	3.5.10 (369)
Medek, Karen	3.5.1 (209)
Menendez, Patrick	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (3411), 5.11 (4133), 6.6 (4148), 8.1 (3424), 8.3 (3423), 9.3 (3422), 12. (152), 15. (3412), 15. (3426)
Mengarelli, Marcia	3.5.1 (209)
Michels, Jeanne	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.10 (20), 5.11 (122), 6.1 (23), 6.3 (22), 6.7 (25), 11. (24)
Migas, Frances	3.5.1 (209)
Miklos, Alison B.	3.5.1 (209)
Mikolajczyk, Thomas F.	3.5.1 (209)
Miller, Jane E.	3.5.10 (369)
Miller, Shirley	3.5.1 (209)
Miller, Shirley	3.5.1 (209)
Mitchell, Adele	3.5.1 (209)
Moore, Jennifer	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (3411), 5.11 (4133), 6.6 (4148), 8.1 (3424), 8.3 (3423), 12. (152), 15. (3412), 15. (3426)
Moravik, Robert S.	3.5.1 (209)
Morgan, Nick	5.2 (14), 5.10 (20), 5.11 (122), 6.3 (22), 6.7 (25), 8.1.5 (255), 12.2 (254),
Moutvic, Charles	4.1 (251), 6.3 (22), 12.2 (206)
Mueggenborg, Donald	3.5.1 (209)
Mueller, Robert	3.5.1 (209)
Muerto, Rolando	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24), 15. (154)
Muszalski, James R.	3.4.1 (71), 11.3 (1527)
Naso, Joseph C.	3.5.1 (209)
Nelson, Paul	3.5.4 (1952), 3.5.4 (3421),

Individuals	Comment/Response Index Location(s)
Nelson, Paul	5.11 (4133), 12. (152), 15. (3412)
Newsome, Susan	5.2.3 (1182), 15. (3412)
Nix, Martin E.	15. (188)
Novak, Richard F.	3.5.1 (209)
Nurmela, Lillian	3.3 (141), 5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
O'Brien, Raymond J.	5.2 (14), 5.2 (17), 5.5 (19), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.3 (22), 6.6 (344), 6.7 (25)
O'Connor, Timothy R.	3.5.7 (123), 5.2 (14), 5.2 (16), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 6.2 (84), 6.7 (25), 11. (24), 14.1 (371), 14.2 (588)
O'Shea, Michael	3.4.1 (1869), 3.5.1 (209)
Obryk, Joseph E.	3.5.1 (209), 12. (152), 12.2 (254)
Olanoff, Samuel	11.2 (1), 11.2 (2), 11.2 (3), 14.2 (4)
Olson	3.5.10 (369)
Orednick, J. P.	3.5.1 (209)
Pardue, William M.	8.1 (27)
Parisi, MaryAnn	3.5.2 (541), 5.4 (410), 12.2 (206), 14.1 (371)
Patten, Jeff	3.5.1 (209), 12.2 (254)
Patten, Vern	3.5.1 (209), 12.2 (254)
Paull, A.	3.3 (1899), 12. (152), 15. (1897)
Paulsen-Yackle, Julie	3.5.1 (209)
Pawlak, John M.	3.3 (141), 3.5.8 (225), 8.3 (227), 12.2 (206)
Pekich, Bob	15. (112)
Penicka, Jaromir M.	3.4.1 (71), 3.5.1 (209), 4.1 (3754), 5.2 (2327), 8.1 (1830), 14.1 (2324)
Perisho, Darrell	3.5.10 (369)
Perkins, Ellen	3.5.10 (369)
Pilisuk, Phyllis E.	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.3 (22), 6.7 (25), 11. (24), 14.1 (371),
Pittman, L. B.	3.5.10 (369)
Polivka, Richard	3.5.1 (209)
Polk, David	3.5.10 (369)
Poteraske, John	3.5.1 (209)
Potersake, S.	3.5.1 (209), 12.2 (206)
Pratt, Paul W.	3.5.1 (209)
Prochut, Dianna	3.5.1 (209)
Puckett, A. B.	3.5.10 (369)
Puckett, Alfred B.	3.5.10 (369)
Puckett, Alfred B.	11.5 (3780)
Ray, Betty	3.5.10 (369), 4.1 (2138), 5.2 (881),

Individuals	Comment/Response Index Location(s)
Ray, Betty	8.3.1 (2651)
Rees, Dianne	3.5.1 (209)
Reeves, Florence P.	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25)
Rick, Doreen	3.5.1 (209)
Ridenow, Brenda	3.5.1 (209)
Righton, Walter C.	3.5.1 (209), 12. (152), 12.2 (206)
Robbins, Don H.	5.5 (1796), 5.5 (1797), 8.3.1 (1798), 8.3.3 (1793)
Roberts, Mary L.	3.5.10 (369)
Rogers, Les	5.2 (14), 5.2 (16), 5.2 (17), 5.2 (180), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
Russell, May	3.5.1 (209)
Salisbury, Diana	3.2.3 (3212), 3.6 (3931), 3.6 (3940), 4.1 (3400), 4.1 (3949), 4.1 (3950), 4.1 (3960), 4.1 (3961), 4.1 (3972), 4.1 (3977), 4.2 (3962), 4.2 (3963), 5.1 (3956), 5.2 (3942), 5.2 (3991), 5.2.1 (3992), 5.2.2 (3393), 5.2.2 (3945), 5.2.2 (3982), 5.2.3 (3993), 5.2.3 (4006), 5.2.4 (4002), 5.8 (3947), 5.9 (3984), 5.9 (3985), 5.11 (3986), 5.11 (3999), 5.12 (3944), 5.12 (3946), 5.12 (3965), 5.12 (3968), 5.12 (3970), 5.12 (4000), 6.3 (22), 6.5 (4005), 6.6 (3948), 6.6 (3981), 6.8 (3955), 8.1 (3746), 8.1 (3934), 8.1.1 (3987), 8.1.1 (3988), 8.1.1 (3989), 8.1.3 (3941), 8.1.3 (3995), 8.3.1 (3954), 8.3.1 (3990), 8.3.1 (4003), 9.3 (3994), 11.3 (4018), 14.1 (4007), 14.4 (3936), 14.4 (3937), 15. (3952)
Salisbury, Diana	5.2 (4004), 11.6 (4001)
Sarnecki, Nancy L.	3.5.1 (209), 12. (152), 12.2 (254)
Sarvey, Robert	3.5.7 (123), 5.2 (14), 5.2 (16), 5.5 (19), 5.5 (100), 5.10 (20), 6.3 (22),
Sasso, Joseph T.	3.5.1 (209)
Schlueter, Timothy	3.5.1 (209)
Schott, Beatrice	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (3411), 5.11 (4133), 6.6 (4148), 8.1 (3424), 8.1.4 (4304), 8.3.1 (4235), 9.3 (3422), 13.1 (4236), 14.2 (1639), 15. (3412), 15. (3426),
Schott, Ernest	3.5.4 (1952), 3.5.4 (3421), 5.11 (3411), 5.11 (4133), 6.6 (4148), 8.1 (3424), 8.3 (3423), 9.3 (3422), 12. (152), 15. (3412), 15. (3426)
Schroeder, A. E.	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25),

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Individuals	Comment/Response Index Location(s)
Schroeder, A. E.	11. (24)
Schultz, Shirley	3.5.1 (209)
Scott, Doug	3.5.2 (541)
Senauke, Laurie	6.7 (25), 8.3.1 (2651), 11.3 (237)
Seske, Helen	3.5.1 (209)
Seyfert, Debra	3.5.1 (209)
Sharka, Rodney E.	3.5.1 (209)
Shepherd, Thomas	3.5.10 (369)
Silvestri, Laurence A.	3.5.1 (1934)
Simester, Anita	3.5.1 (209)
Simms, Lynn	3.1 (2317), 11.6 (425), 12. (152), 14.1 (2374), 15. (2316)
Simon, Ilyse	3.5.7 (123), 6.7 (25), 8.3.1 (2651), 8.3.2 (2381)
Simon, Ilyse	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (3411), 5.11 (4133), 6.6 (4148), 8.1 (3424), 8.3 (3423), 8.3.1 (4235), 9.3 (3422), 11.3 (4020), 12. (152), 15. (3412), 15. (3426), 15. (4277)
Simone, Chris	6.7 (25)
Sitasz, John S.	3.5.1 (209), 5.5 (4574)
Smith, Alan W.	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (3411), 5.11 (4133), 6.6 (4148), 8.1 (3424), 8.3 (3423), 9.3 (3422), 15. (3412), 15. (3426)
Smith, Claire	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (4133), 6.6 (4148), 8.1 (3424), 8.3 (3423), 12. (152), 15. (3412), 15. (3426),
Smith, Diane J.	3.5.1 (209)
Smith, William J.	5.2 (17), 5.5 (100), 5.11 (315), 6.7 (25), 15. (314)
Snortum, Beth	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.3 (22), 6.7 (25)
Sobotka, Frank	3.5.1 (209)
Stavropoulos	3.5.1 (209), 12. (152), 12.2 (254)
Stevens, Nancy	3.5.1 (209)
Strong, Susan C.	3.5.7 (123), 6.7 (25), 14.1 (371)
Sulhowski, Maureen	3.5.1 (209)
Sullivan, Robert G.	3.5.1 (209), 11.3 (1864), 12.2 (206)
Swada, Gary	3.5.1 (209)
Swires, Edmund B.	3.5.1 (209)
Syphers, Grant	5.2 (14), 5.2 (16), 5.2 (17), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (49), 6.2 (84), 6.7 (25), 15. (42)
Szela, Beth	3.5.1 (209)
Szila, Michael G.	3.5.1 (209)
Szymanski, Edward J.	3.5.1 (209)

Individuals	Comment/Response Index Location(s)
Tackett, Elaine	3.5.12 (2715)
Takaro, Tim	3.5.4 (1952), 3.5.4 (3421), 5.11 (4133), 8.1 (3424), 8.3 (3423), 9.3 (3422), 12. (152)
Thomas, Dennis	5.1 (724), 5.2 (14), 5.2 (16), 5.2 (17), 5.2 (727), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24), 14.1 (371)
Thompson, Kevin	3.5.1 (209), 12.2 (206), 14.1 (371)
Thurlow, Andrew J.	3.2.3 (3212), 3.6 (3931), 6.6 (1783), 12. (152)
Tichman, Nadya	3.5.7 (123), 6.7 (25), 8.3.1 (2651), 11.3 (237)
Toms-Trend, Zimya	3.5.4 (1952), 3.5.4 (3421), 5.11 (3173), 5.11 (3411), 5.11 (4133), 6.6 (4148), 6.6 (4324), 8.1 (3424), 8.3.1 (4235), 9.3 (3422), 12. (152), 13.1 (4236), 15. (3412), 15. (3426),
Treacy, Terri	3.5.10 (369), 15. (112)
Tsutsui, Michelle	5.2 (16), 5.2 (17), 5.10 (20), 5.11 (122), 6.7 (25), 11. (24)
Uemura, Ruth	3.5.4 (1952), 3.5.4 (3421), 5.11 (3411), 5.11 (4133), 6.6 (4148), 9.3 (3422), 12. (152), 13.1 (4236), 14.1 (371), 15. (3412),
Uhler, Anne	3.5.1 (209)
Valek, Arlene F.	3.5.1 (209)
Vasvery, Mary L.	3.5.1 (209), 5.2 (2327), 12. (152), 12.2 (254)
Vavruska, Joseph R.	3.5.1 (209)
Viereck, Jennifer	5.2 (14), 5.2 (16), 5.2 (17), 5.5 (19), 5.5 (100), 5.9 (96), 5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.3 (22), 6.7 (25), 11. (24)
Wagner, Carol	3.5.7 (123), 14.1 (371)
Waitley, David W.	3.5.1 (209)
Wall, Kristine	3.5.1 (209)
Wallis, David A.	3.5.1 (209), 12.2 (206)
Wallrich, Paula J.	3.5.1 (209)
Ward, Hilda J.	3.5.10 (369)
Warton, Kathleen	3.5.1 (209)
Weeren, Herman	5.4 (166), 8.1 (164), 8.1 (476), 11.2 (168)
Weidner, Kathleen	3.5.1 (209)
Weiss, Mary	3.5.1 (209)
Wenzel, Frances	3.5.1 (209)
Westart, Mary A.	3.5.1 (209), 12.2 (206)
Weyers, John	3.5.10 (369)
Whayne, Sue	3.5.10 (369)

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Individuals	Comment/Response Index Location(s)
Wheeler, Norma S.	3.5.10 (369)
White, C. E.	15. (274)
Wiggins, Georgia D.	3.5.10 (369)
Wiltjer, Linda	3.5.1 (209), 3.5.1 (2654)
Winn, Judy	3.5.10 (369)
Wyszynski, Paul	3.5.1 (209), 12.2 (206), 15. (112)
Yuan, Lynn C.	3.5.17 (555), 5.1 (543), 5.2 (562), 5.2.2 (544), 5.2.2 (546), 5.2.2 (548), 5.2.2 (549), 5.2.2 (550), 5.2.2 (551), 5.2.2 (553), 5.2.2 (556), 5.2.2 (557), 5.2.2 (558), 5.2.3 (563), 5.2.3 (564), 5.2.3 (565), 5.2.3 (566), 5.2.3 (570), 5.2.4 (568), 5.2.4 (569), 5.2.4 (572)
Zawacki, Edwardine	3.5.8 (109), 15. (112)
Zizek, J.	3.5.1 (209)
Zmrhal, Joan	3.5.1 (209)

Organizations and Agencies	Comment/Response Index Location(s)
AFL-CIO; Oil, Chemical & Atomic Workers	3.3 (141)
Affiliated Brookhaven Civic Association	3.4.1 (2105), 3.5.2 (400), 3.5.2 (541)
Allstate	3.5.2 (541)
Brookeridge Homeowners Association	3.5.1 (209)
Brookeridge Park District Board of Commissioners	3.5.1 (209)
Brookhaven, NY, Town of; Off. of the Super.	3.2.5 (2860), 3.3 (141), 3.4.2 (520), 3.5.2 (541), 3.5.2 (2813), 3.5.2 (2815), 3.5.2 (2850), 3.5.2 (2856), 3.5.2 (2869), 3.5.2 (2965), 4.1 (2078), 4.1 (2871), 4.1 (2876), 4.1 (2878), 4.1 (2880), 4.1 (2892), 4.1 (2898), 4.1 (2901), 4.1 (2906), 4.1 (2907), 4.1 (2908), 4.1 (2909), 4.1 (2915), 4.1 (2916), 4.1 (2928), 4.1 (2948), 4.1 (2958), 4.2 (2873), 4.2 (2911), 4.2 (4019), 5.2 (2817), 5.2 (2862), 5.2 (2938), 5.2.2 (2800), 5.2.2 (2830), 5.2.2 (2936), 5.3 (2904), 5.3 (2996), 5.4 (2864), 5.4 (2940), 5.4 (2950), 5.4 (2951), 5.4 (2980), 5.4.1 (2935), 5.4.1 (2944), 5.4.1 (2981), 5.4.1 (2983), 5.4.1 (2984), 5.4.2 (2802), 5.4.2 (2946), 5.5 (2954), 5.5 (2956), 5.5 (2987), 5.7 (2819), 5.7 (2895), 5.11 (2820), 5.11 (2829), 6.1 (2930), 8.1 (2807), 8.1.2 (2783), 8.1.3 (2780), 8.3 (2274), 9.3 (2782), 9.3 (2814), 9.3 (2826), 9.3 (3011), 9.3 (3012), 9.3 (3013), 10.1 (2795), 10.1 (2796), 10.1 (2797), 10.2 (2842), 11. (2127), 11.2 (2845), 11.2 (2846), 11.2 (2849), 11.2 (2852), 11.2 (2903), 11.2 (2964), 11.2 (2967), 11.2 (2972), 11.2 (2991), 11.2 (2993)
Bueno Los Alamos Surveillance Team (BLAST)	3.1 (3338), 3.6 (1140), 3.6 (3333), 5.4 (3345), 5.11 (3337), 5.11 (3343), 5.11 (4070), 8.1 (3342), 8.1.2 (4069), 9.1 (3346), 11. (3336), 11. (3341), 11.6 (4068), 12.2 (3334), 14.1 (3340), 14.1 (3347), 14.3 (3339), 14.5 (3344), 15. (4067), 15. (4071)
Burr Ridge, IL, Village of; Board of Trustees	3.5.1 (209), 3.5.1 (1885), 12.2 (254)
CA, State of; EPA, Dept. of Toxic Substances Cntrl	3.4.2 (1665), 10.2 (1999), 10.2 (4058)
CA, State of; Energy Commission	3.4.2 (3243), 3.5.7 (123), 5.2 (3248), 5.2 (3252), 5.2 (3257), 5.11 (1134), 6.6 (3239), 8.1.3 (3254), 9.3 (3247)
CA; Pombo, Richard W.; U.S. Congress	3.5.7 (123), 5.2 (180), 5.4.1 (179), 5.7 (177)
CA; State of; Water Resour. Cntrl. Brd.	10.1 (2297)
Carriage Way West Homeowners Assoc., Inc.	3.5.1 (209)
Citizen Alert Native American Program	3.2.3 (3212), 3.6 (3931), 5.9 (511), 8.2 (1108), 8.3.1 (3990), 11. (4032), 11.3 (4018), 11.3 (4020), 11.3 (4025), 11.3 (4027)
Citizens Against Ruining the Environment	3.5.1 (209)
Citizens Opposing a Polluted Environment	4.3 (2029), 5.2 (14), 5.2 (16), 5.2 (17), 5.2.4 (2031), 5.5 (19), 5.5 (100),

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Organizations and Agencies	Comment/Response Index Location(s)
Citizens Opposing a Polluted Environment	5.10 (20), 5.11 (122), 6.1 (23), 6.1 (49), 6.2 (84), 6.7 (25), 8.3.1 (2026), 8.3.1 (2651), 11. (24), 15. (198)
Clark Cnty, NV, Dept. of Comp. Planning	4.1 (3269), 6.4 (396), 6.6 (3272)
Clipper Exxpress Company	3.5.1 (209)
Clipper Exxpress Company	3.5.1 (209), 12.2 (254)
Coalition for Health Concerns	8.3 (2674), 14.1 (2374), 15. (188)
Coalition for Health Concerns	3.5.10 (369), 3.5.10 (2228), 8.3.1 (2175), 8.3.1 (2651), 15. (2233)
DE, State of; Dept. of Nat. Res. & Env. Cntrl.	3.2.3 (915), 3.3 (141), 3.4.1 (917), 6.7 (25), 6.7 (904), 6.8 (918)
Darien, IL, City of	3.5.1 (209)
Desert Citizens Against Pollution	5.2.2 (3255), 5.2.4 (3258), 6.7 (3249), 8.3.3 (3253), 9.3 (3256), 11.4 (1138)
Diversified Scientific Services, Inc.	6.8 (191)
Downers Grove,IL, Township of;	3.5.1 (209)
DuPage Cnty., IL, Hlth. Dept., Brd. of Hlth.	3.5.1 (209)
Dupage Cnty., IL; Cnty. Brd., Solid Wst. Mng.	3.5.1 (209)
Egan & Associates, P.C.	5.2.3 (3693), 5.2.3 (3695), 5.2.3 (3698), 6.5 (3699), 6.6 (3696), 10.1 (3694),
Energy Communities Alliance	5.2.3 (3304), 5.7 (3299), 6.1 (49), 6.5 (3288), 6.5 (3307), 6.6 (3309), 6.7 (3291), 7. (3293), 8.3.1 (3294), 9.3 (1100), 9.3 (3282), 12. (3297), 12. (3308), 13.1 (3306)
Envirocare of Utah, Inc.	6.8 (191)
Equestrian Estates Homeowners Assoc.	3.5.1 (209)
Fernald Atomic Trades and Labor Council	9.1 (1107)
Fernald Citizens Task Force	3.5.3 (1761)
Friends of Oak Ridge National Laboratory	3.3 (2328), 8.1 (2329), 8.1 (2332), 8.1 (2336), 8.3.1 (2333), 10.1 (2331), 12. (2310), 12. (2334)
Grupe Communities, Inc.	3.4.1 (71), 3.5.7 (123), 5.2 (180), 5.2.1 (67)
HI, State of; Benjamin J. Cayetano, Gov.	3.3 (141)
Hampton Roads, VA, Planning District Comm.	3.4.1 (30), 3.4.1 (31), 6.1 (1819)
Hanford Advisory Board	3.5.4 (3166), 4.3 (3158), 5.11 (3167), 8.3.2 (3161), 11.4 (3169), 13.2 (3170)
Hanford Advisory Board, Hearing	3.2.4 (2256), 3.3 (2258), 3.5.4 (2260), 11.4 (2244), 11.4 (2255)
Hanford Watch, Hearing	3.1 (2306), 3.6 (4045), 5.2 (2290), 5.2 (2293), 5.2 (2300), 5.11 (2296), 6.5 (3139), 8.1 (1652), 8.1.4 (2303), 8.3.2 (2302), 10.1 (2287), 10.1 (2297), 11. (2288), 12.2 (206), 13.1 (2304), 14.8 (490)
Heart of America Northwest	3.5.4 (1952), 3.5.4 (2181), 3.5.4 (3421), 3.5.4 (3715), 3.5.4 (3743), 5.7 (3724), 5.11 (3411), 5.11 (3736), 8.1 (3746), 8.3.1 (3738), 8.3.1 (3745), 9.2 (207), 9.3 (3729),

Organizations and Agencies	Comment/Response Index Location(s)
ID, State of; Oversight Prog., INEL	5.3 (2549), 5.3 (2550), 5.3 (2556), 5.3 (2557), 5.3 (2558), 5.3 (2559), 5.3 (2560), 5.3 (2574), 5.3 (2597), 5.4 (2528), 5.4 (2940), 5.4.1 (2449), 5.4.1 (2537), 5.4.1 (2562), 5.4.1 (2564), 5.4.2 (2526), 5.4.2 (2527), 5.6 (2473), 5.6 (2474), 5.6 (2475), 5.6 (2479), 5.6 (2488), 5.6 (2498), 5.7 (2489), 5.7 (2529), 5.7 (2888), 5.8 (2877), 5.11 (2477), 5.11 (2547), 5.11 (2594), 5.11 (2595), 5.11 (2624), 5.11 (2879), 5.12 (2544), 5.12 (3590), 6.5 (2602), 6.6 (2653), 6.6 (2659), 6.6 (3397), 6.7 (2568), 6.8 (191), 7. (2423), 8.1 (1830), 8.1 (2431), 8.1 (2434), 8.1 (2439), 8.1.1 (2421), 8.1.1 (2500), 8.1.2 (2440), 8.1.3 (2441), 8.1.3 (2575), 8.1.3 (2576), 8.1.5 (2587), 8.2 (2422), 8.3 (2274), 8.3.1 (2446), 8.3.1 (2552), 8.3.1 (2555), 8.3.1 (2570), 8.3.1 (2581), 8.3.1 (2589), 8.3.1 (2605), 8.3.1 (2606), 8.3.2 (2540), 8.3.3 (2445), 9.1 (1107), 9.2 (207), 9.2 (2415), 9.3 (2427), 9.3 (2437), 9.3 (2607), 9.3 (2629), 10.1 (2438), 10.1 (2548), 10.1 (2584), 10.1 (2652), 10.2 (1485), 10.2 (2426), 10.2 (4058), 11.2 (2543), 11.2 (2545), 11.2 (2551), 11.2 (2569), 11.2 (2620), 11.2 (2665), 11.2 (2682), 11.2 (2872), 11.2 (3368), 11.2 (3386), 11.2 (3408), 11.2 (3409), 11.2 (3410), 11.3 (2412), 11.3 (2718), 11.4 (2425), 11.4 (2428), 11.4 (2571), 11.4 (2591), 11.4 (3690), 14.3 (2891)
IL, State of; Dept. of Nuclear Safety	3.4.1 (1826), 3.4.2 (520), 3.5.1 (1831), 3.5.1 (1835), 3.5.1 (1838), 4.1 (1829), 8.1 (1830)
IL, State of; Office of the Senate President	3.5.1 (209)
IL; Meyer, Jim; St. Rep., 82nd Dist.	12.2 (254)
Inland Real Estate Investment Corp.	3.5.1 (209)
Island Closeup News Service	12.2 (206)
KY, Commonwealth of; Dept. of Environ. Prot.	3.3 (141), 3.3 (3201), 3.5.10 (3180), 4.1 (3199), 4.2 (3193), 5.3 (3192), 6.8 (2171), 8.1.1 (3189), 9.2 (3183), 9.3 (3185), 10.2 (3195),
Kingery East Citizens Advisory Committee	3.5.1 (209)
Kingery East Community Association	3.5.1 (2760), 6.1 (23), 8.3.3 (2759)
Kwanitewk NATIVE Resource/Network	3.2.3 (3212), 3.2.3 (3609), 3.2.3 (3620), 3.2.3 (3633), 3.5.4 (1952), 3.6 (3599), 4.3 (3603), 5.1 (3618), 5.1 (3650), 5.2 (3574), 5.2 (3577), 5.2 (3584), 5.2 (3596), 5.2 (3635), 5.2 (3636), 5.2 (3637), 5.2 (3639), 5.2 (3642), 5.2 (3645), 5.2 (3646), 5.2 (3647), 5.2 (3648), 5.2 (3649), 5.2.2 (3644), 5.2.3 (3566), 5.2.3 (3578), 5.2.3 (3579), 5.2.3 (3595), 5.2.3 (3612), 5.2.3 (3634), 5.2.3 (3666),

Organizations and Agencies	Comment/Response Index Location(s)
Kwanitewk NATIVE Resource/Network	5.2.3 (3668), 5.2.3 (3669), 5.2.3 (3670), 5.2.3 (3671), 5.2.3 (3673), 5.2.3 (3675), 5.2.4 (3674), 5.4 (3593), 5.9 (511), 5.11 (3571), 5.11 (3573), 5.11 (3575), 5.11 (3691), 5.12 (3567), 5.12 (3576), 5.12 (3582), 5.12 (3585), 5.12 (3586), 5.12 (3587), 5.12 (3588), 5.12 (3590), 5.12 (3591), 5.12 (3592), 5.12 (3594), 5.12 (3662), 6.3 (22), 6.5 (3619), 6.6 (3613), 6.6 (3615), 6.6 (3616), 6.6 (3667), 6.6 (3672), 6.6 (3676), 7. (3658), 8.1.3 (3597), 8.1.3 (3598), 8.1.3 (3601), 8.1.3 (3602), 8.1.3 (3605), 8.1.3 (3606), 8.1.3 (3608), 8.1.3 (3614), 8.1.3 (3622), 8.1.3 (3623), 8.1.3 (3624), 8.1.3 (3625), 8.1.3 (3632), 8.1.3 (3995), 8.1.4 (3692), 8.3.1 (3611), 8.3.1 (3640), 9.1 (3652), 9.2 (3656), 9.3 (3655), 11. (3661), 11. (3677), 11.1 (3654), 11.2 (3610), 11.2 (3638), 11.2 (3641), 11.3 (3617), 11.3 (3689), 11.4 (3680), 11.4 (3690), 13.2 (3659), 15. (3664), 15. (3678), 15. (4034)
Kwanitewk NATIVE Resource/Network	5.9 (511), 5.11 (4400), 8.2 (1108), 8.3.1 (3990), 9.2 (207), 9.2 (4458), 11. (4032), 11. (4410), 11.1 (4408), 11.3 (4018), 11.4 (3925), 11.4 (4403), 11.4 (4407), 12. (4412), 15. (4402),
Laywood Alliance	3.3 (141), 3.5.2 (541)
League of Women Voters of Washington, Hearing	6.4 (396), 9.1 (2250), 14.1 (4007), 14.2 (1639), 15. (2251)
Lemont Township	3.5.1 (209), 4.3 (1177), 5.2 (384), 14.4 (1176)
Lemont, IL, Village of	3.5.1 (209)
Lemont, IL, Village of; Off. of the Mayor	3.4.1 (71), 3.5.1 (209)
MD, State of; Dept. of the Environ., WM Admin.	13.1 (552), 13.2 (554)
Manorville Taxpayers Association, Inc.	3.3 (141)
Mastic Acres Civic Assoc.	3.5.2 (541)
Military Production Network	3.6 (1140), 5.11 (1134), 10.1 (1146), 11.1 (4421), 11.4 (1138), 14.8 (490)
NC, State of; Wildlife Resources Commission	3.1 (1147), 3.3 (141), 3.5.4 (1148)
NJ, State of; Dept. of Environ. Protection	5.11 (1360), 5.11 (1361), 8.1.2 (1358)
NM, State of; Environment Department	3.1 (3552), 3.3 (3556), 3.3 (3557), 3.3 (3559), 3.3 (3958), 9.3 (3282), 11.2 (3550), 11.4 (3553)
NTS Community Advisory Board	6.4 (396), 6.6 (2309), 11.4 (2301), 12. (2310), 13.2 (2305), 14.2 (1639)
NV, Risk Assessment/Management Prog.	3.2.2 (1672), 6.6 (1670), 8.3.3 (1674), 9.3 (1664), 10.1 (1673), 11.4 (1662), 11.4 (1667), 12. (152), 13.1 (1668)
NV, State of; Dept. of Admin.	3.3 (141), 3.5.8 (1803), 5.2.3 (1807), 5.11 (1811), 6.3 (22), 6.4 (396), 8.2 (1108), 10.1 (1816), 10.2 (1817), 10.2 (1999), 15. (1818),

GUIDE TO COMMENTS AND RESPONSES

Organizations and Agencies	Comment/Response Index Location(s)
NY, State of; Dept. of Env. Consv.	3.5.2 (541), 4.2 (4017), 4.2 (4019), 5.11 (4021), 8.1 (4015)
NY; Forbes, Michael P.; U.S. Congress	3.3 (141), 3.5.2 (541)
National Assn. of Atomic Veterans	3.2.3 (3212), 3.6 (3931), 5.9 (511), 8.1.4 (3929), 8.2 (1108), 8.3.1 (3990), 9.3 (3930), 11. (4032), 11.3 (4018), 11.4 (3925)
National Congress of American Indians	5.9 (511), 5.9 (4014), 5.12 (4008), 5.12 (4010), 6.3 (22), 10.3 (4009)
Nye Cnty., NV, Nuclear Waste Repository Proj. Off	3.5.8 (3311), 5.2 (3287), 5.2.3 (3304), 5.8 (3301), 5.8 (3302), 5.12 (3295), 6.4 (396), 6.5 (3288), 6.5 (3307), 6.6 (3309), 6.7 (3291), 9.3 (1100), 9.3 (3282), 11.2 (3285), 12. (3308), 13.1 (3861)
OH, State of; EPA	3.2.1 (3017), 4.1 (3003), 4.1 (3008), 4.1 (3038), 4.2 (3005), 4.2 (3007), 5.1 (3060), 5.2 (3016), 5.2.2 (3018), 6.8 (191), 9.3 (3019), 11.2 (3015)
OR, State of; Dept. of Energy	3.5.4 (3166), 6.4 (396), 8.3.3 (389), 10.1 (392), 10.1 (2297), 11.4 (2318), 14.1 (379), 14.6 (386)
OR, State of; Dept. of Energy	3.5.4 (1952), 3.5.4 (3166), 4.1 (3196), 4.1 (3200), 4.1 (3204), 4.2 (3194), 4.2 (3197), 4.2 (3225), 5.2 (3229), 5.2 (3231), 5.2.2 (3182), 5.2.2 (3235), 5.2.2 (3246), 5.2.3 (3126), 5.2.3 (3128), 5.2.3 (3206), 5.2.3 (3208), 5.2.3 (3210), 5.2.3 (3215), 5.5 (3177), 5.7 (3242), 5.8 (3238), 5.9 (511), 5.9 (3226), 5.9 (3230), 5.11 (1134), 5.11 (3173), 6.6 (3209), 6.6 (3217), 6.6 (3221), 7. (2270), 7. (3203), 9.2 (3183), 9.3 (3244), 10.1 (3187), 11. (4410), 11.4 (2318), 11.4 (3174), 12. (152), 12.1 (3172), 12.2 (3186),
OR, State of; Dept. of Energy, Hearing	3.3 (141), 3.4.2 (2240), 3.5.4 (2238), 4.1 (3196), 5.2.3 (2230), 5.9 (511), 5.11 (3411), 5.12 (2236), 10.1 (392), 11. (1113), 11.4 (2244), 11.4 (2245), 11.4 (2318), 12.2 (365), 14.1 (379), 14.6 (386), 15. (2226)
ORR Local Oversight Comm., Inc.	3.4.1 (2949), 3.5.9 (1871), 5.1 (2914), 5.1 (2929), 5.2 (2900), 5.2 (2921), 5.2 (2924), 5.2.2 (2941), 5.2.2 (2947), 5.11 (2595), 6.5 (2927), 6.5 (2931), 6.5 (2939), 8.1 (2905), 8.1 (2910), 8.1 (2937), 8.1.1 (2953), 8.1.3 (2957), 8.2 (1108), 8.3 (2926), 8.3.3 (2913), 9.3 (3282), 10.1 (2297), 10.1 (2923), 11.2 (2919), 11.4 (133), 12. (152), 13.1 (2966), 13.1 (2974), 13.1 (2975), 13.1 (2985), 13.1 (2992), 13.2 (2969), 13.2 (2971), 13.2 (2990), 13.2 (2995), 15. (2989)
Phoenix Environmental Corporation	11.4 (133)
Physicians for Social Responsibility, Hearing	7. (2270), 8.1 (2269), 8.2 (2267),

Organizations and Agencies	Comment/Response Index Location(s)
Physicians for Social Responsibility, Hearing	8.3 (2274), 8.3.1 (2272), 11.3 (2261), 11.3 (2263), 11.4 (2264)
Reg. Assoc. of Concerned Environmentalists	2. (3352), 3.1 (3349), 3.1 (3350), 3.1 (3351), 3.5.10 (369), 4.1 (2138), 4.1 (3374), 4.1 (3375), 4.1 (3379), 4.1 (3398), 4.1 (3399), 4.1 (3400), 4.1 (3404), 4.2 (3403), 5.2 (3357), 5.2 (3362), 5.2 (3363), 5.2 (3377), 5.4.2 (3364), 5.5 (3366), 5.11 (3353), 5.11 (3354), 5.11 (3355), 5.11 (3356), 5.11 (3376), 6.3 (3371), 6.6 (3402), 9.1 (3359), 9.2 (207), 11.2 (2), 11.4 (1138),
Rocky Flats Citizens Advisory Board	3.1 (3268), 3.2.3 (3212), 3.5.13 (3260), 3.5.13 (3267), 4.1 (3265), 8.1 (3262), 8.3 (3270), 8.3.2 (3271), 9.3 (3282), 11.2 (2), 11.4 (3276), 12. (152)
Rocky Mountain Peace Center	3.2.3 (3212), 3.5.13 (3218), 3.6 (3214), 6.5 (3227), 8.1 (3262), 8.1.3 (1758), 8.3 (3222), 11. (3228), 14.2 (1639), 14.2 (1784),
SC, State of; Off. of the Gov.; Grant Services	3.1 (542)
SRS Citizens Advisory Board	3.2.3 (2385), 3.2.3 (2405), 3.2.4 (2407), 4.1 (2387), 5.2 (2386), 5.2 (2388), 5.2 (2398), 5.2 (2400), 5.2.2 (2393), 5.11 (1134), 5.11 (2391), 5.12 (2384), 6.7 (2390), 8.1 (2392), 8.1.4 (2406), 8.1.5 (2404), 11.2 (2), 11.2 (2410), 11.3 (2403), 11.3 (2409), 12. (2402)
Save Our World	3.5.2 (541), 15. (188)
Sawmill Creek Homeowners Association	3.5.1 (209)
Southwest Research and Information Center	3.2.3 (3146), 3.2.3 (3148), 3.2.3 (3150), 4.1 (3153), 5.2.1 (3151), 5.2.2 (3147), 5.11 (1134), 5.11 (3143), 5.11 (3154), 5.11 (3155), 5.11 (3548), 8.1.4 (3145), 8.3.1 (3149), 10.1 (3152), 11.1 (4421)
Southwest Riverview Homeowners Civic Assoc.	3.5.1 (209), 12.2 (254)
Southwest Riverview Homeowners Civic Assoc.	3.5.1 (209)
Stone Environmental Engineering Services, Inc.	6.8 (191)
Suffolk Cnty., NY; Water Authority	3.3 (141), 3.5.2 (541)
Suffolk Cnty., NY; Off. of the Cnty. Legislature	3.4.1 (71), 3.5.2 (541), 4.1 (2078), 5.3 (579), 5.4.1 (577), 5.11 (122), 12.2 (254),
TN; State of; Dept. of Environ. & Conservation	3.4.2 (1744), 3.5.9 (1693), 3.5.9 (1697), 3.5.9 (1871), 4.1 (1718), 4.1 (1726), 4.1 (1729), 4.2 (1710), 4.2 (1724), 5.2 (1735), 5.2.1 (1702), 5.2.2 (1675), 5.2.2 (1678), 5.2.2 (1680), 5.2.2 (1681), 5.2.2 (1706), 5.2.2 (1733), 5.2.2 (1736), 5.2.2 (1738), 5.3 (1720), 5.3 (1745), 5.3 (1750), 5.4 (2940), 5.4.1 (1746), 5.6 (1722), 5.11 (1361), 5.11 (1737), 5.11 (1751), 5.11 (1874), 5.12 (1714), 6.8 (191), 8.1.1 (1688), 8.1.2 (1747), 8.1.3 (1748), 8.1.5 (1749), 8.3 (1743), 10.2 (1999), 11.2 (1687),

Organizations and Agencies	Comment/Response Index Location(s)
TN; State of; Dept. of Environ. & Conservation	11.2 (1716), 11.4 (1690)
TN; State of; Don Sunquist, Gov.	3.5.9 (1871), 5.2.2 (1675), 5.11 (1874)
TX, State of; Office of the Governor	3.5.11 (3236)
Tartan Ridge of Burr Ridge Community Assoc.	3.5.1 (209)
The Lake-in-the-Woods, CAM	3.5.1 (209)
The Woodlands of Darien Condominium Assoc.	3.5.1 (209)
Tracy, CA, City of; City Manager's Office	3.5.7 (123), 5.4.1 (179), 6.6 (344)
U.S. Dept. of Hlth & Human Serv., Pub. Hlth. Serv.	5.2 (892)
U.S. EPA, Office of Federal Activities	3.2.5 (2034), 3.2.5 (2036), 3.2.5 (2039), 3.2.5 (2040), 3.4.1 (1986), 3.5.2 (2090), 5.1 (2056), 5.2 (2072), 5.2.1 (1985), 5.2.2 (3393), 5.4.1 (2064), 5.4.2 (2085), 5.5 (2077), 5.11 (2082), 5.12 (3594), 6.5 (2032), 6.7 (25), 8.1 (2079), 8.1.1 (2002), 8.1.1 (2003), 8.1.5 (2038), 8.3.1 (2011), 8.3.1 (2014), 8.3.1 (2016), 10.1 (2061), 10.1 (2063), 10.2 (1999), 11.2 (2055)
U.S. EPA, Region X	3.4.1 (2847), 5.2 (2816), 5.2 (2827), 5.2 (2831), 5.2 (2833), 5.2 (2834), 5.2 (2836), 5.2 (2838), 5.2.2 (2835), 5.2.2 (3393), 5.3 (2818), 5.3 (2844), 5.5 (2851), 5.5 (2853), 5.7 (2812), 6.5 (2821), 6.8 (191), 8.1 (2823), 8.1.5 (2855), 8.3.1 (2848), 9.3 (2809), 11.2 (1716), 11.2 (2840), 14.3 (2825)
VA, Commonwealth of; Dept. of Environ. Qlty.	3.3 (141), 5.3 (1824), 5.4 (1822), 6.1 (1819), 10.1 (1821)
W. Shoshone Nat. Council, Nuc. Waste Prog.	10.3 (1643), 10.3 (3315)
WA, State of: Dept. of Fish and Wildlife	4.1 (3041), 4.1 (3043), 4.1 (3048), 4.1 (3053), 4.1 (3077), 4.1 (3544), 5.5 (2954), 5.5 (3095), 5.5 (3564), 5.7 (3085), 5.7 (3554), 5.11 (3093), 5.11 (3411), 5.11 (3548), 11.2 (3057),
WA, State of; Dept. of Ecology	1. (3036), 3.5.4 (3088), 4.1 (1554), 4.1 (3038), 4.1 (3040), 4.1 (3041), 4.1 (3043), 4.1 (3046), 4.1 (3047), 4.1 (3048), 4.1 (3052), 4.1 (3053), 4.1 (3072), 4.1 (3077), 4.1 (3115), 4.1 (3116), 4.1 (3117), 4.1 (3120), 4.1 (3544), 4.2 (3039), 4.2 (3050), 5.1 (3027), 5.1 (3033), 5.1 (3060), 5.1 (3102), 5.1 (3108), 5.1 (3650), 5.2 (3026), 5.2 (3029), 5.2 (3073), 5.2.2 (3068), 5.2.2 (3080), 5.2.3 (3110), 5.2.3 (3121), 5.2.3 (3122), 5.2.3 (3125), 5.2.3 (3126), 5.2.3 (3128), 5.2.3 (3130), 5.2.3 (3131), 5.2.3 (3140), 5.2.4 (3081), 5.3 (3025), 5.3 (3061), 5.3 (3103), 5.3 (3104), 5.4 (3106), 5.4 (3107), 5.4 (3109), 5.4.1 (3075), 5.4.1 (3084), 5.5 (2954), 5.5 (3069), 5.5 (3112), 5.5 (3366), 5.6 (3113), 5.7 (3067), 5.7 (3071), 5.7 (3085), 5.7 (3554),

Organizations and Agencies	Comment/Response Index Location(s)
WA, State of; Dept. of Ecology	5.8 (3044), 5.9 (3083), 5.9 (3087), 5.9 (3089), 5.9 (3114), 5.9 (3118), 5.9 (3119), 5.11 (1134), 5.11 (3093), 5.11 (3411), 5.11 (3548), 5.12 (3138), 5.12 (4010), 6.1 (3129), 6.5 (3066), 6.5 (3139), 6.6 (3123), 6.6 (3124), 6.6 (3127), 6.6 (3217), 6.8 (191), 6.8 (3063), 7. (3094), 8.1 (3032), 8.1 (3079), 8.3.1 (3133), 8.3.1 (3134), 8.3.1 (3135), 8.3.1 (3136), 8.3.1 (3137), 9.2 (207), 9.2 (3183), 9.3 (3082), 9.3 (3096), 9.3 (3097), 9.3 (3098), 9.3 (3099), 9.3 (3100), 9.3 (3422), 10.1 (2297), 11. (3023), 11. (3035), 11.2 (3042), 11.2 (3057), 11.2 (3058), 11.2 (3062), 11.4 (3034), 11.4 (4339), 13.1 (3028), 13.2 (4335), 14.2 (1639)
WA, State of; Dept. of Health	5.3 (1775), 10.1 (2297), 11. (1773), 13.1 (1772)
Western States Legal Foundation/Tri-Valley CAREs	3.1 (4053), 3.5.7 (123), 3.5.7 (4048), 3.5.7 (4062), 3.6 (4045), 5.2 (4033), 5.2 (4039), 5.7 (4061), 6.7 (25), 8.1 (4038), 8.1 (4044), 8.1 (4046), 8.1 (4065), 9.2 (4047), 9.3 (3247), 9.3 (3282), 10.2 (4058), 11. (4052), 11.3 (1527), 11.4 (1138), 11.4 (4028), 11.4 (4037), 11.4 (4051), 12. (4054), 14.1 (4035), 14.1 (4036), 15. (4030), 15. (4034)
Women's Internat. League for Peace and Freedom	14.3 (1577)

Hearings	Comment/Response Index Location(s)
Aiken, SC	3.2.3 (190), 3.3 (141), 3.5.15 (182), 3.6 (196), 3.6 (1140), 6.5 (200), 8.3.1 (186), 8.3.1 (202), 9.2 (207), 15. (204)
Argonne, IL, 1/24/96	3.3 (141), 3.4.1 (71), 3.4.1 (3782), 3.4.2 (520), 3.4.2 (3921), 3.5.1 (209), 3.5.1 (1833), 3.5.1 (3752), 3.5.1 (3915), 4.1 (3727), 4.1 (3754), 4.1 (3763), 4.1 (3910), 4.2 (3757), 4.2 (3781), 4.2 (3787), 4.2 (3859), 4.2 (3876), 4.2 (3913), 5. (3785), 5.1 (3804), 5.2 (3755), 5.2 (3758), 5.2 (3776), 5.2 (3802), 5.2 (3880), 5.2 (3881), 5.2 (3884), 5.2 (3902), 5.2 (3905), 5.2 (3906), 5.2.2 (3783), 5.2.4 (3779), 5.2.4 (3909), 5.3 (3857), 6.1 (49), 6.1 (3711), 6.1 (3897), 6.1 (3919), 6.2 (3716), 6.3 (22), 6.6 (3872), 6.7 (2568), 8.1 (1830), 8.1 (3740), 8.1.1 (3761), 8.1.2 (3796), 8.1.3 (3808), 8.1.3 (3923), 8.3 (2274), 8.3.1 (3773), 8.3.1 (3775), 8.3.1 (3912), 8.3.3 (3741), 8.3.3 (3742), 8.3.3 (3771), 9.1 (3807), 9.1 (3856), 9.2 (3717), 10.1 (3784), 11. (2222), 11.2 (3767), 11.2 (3822), 11.2 (3875), 11.2 (3917), 11.3 (3766), 11.5 (3780), 12. (3886), 12.2 (3774), 12.2 (3797), 12.2 (3914), 13.1 (3786), 13.1 (3799), 13.1 (3861), 13.1 (3901), 13.1 (3922), 13.2 (3770), 13.2 (3794), 13.2 (3795), 13.2 (3801), 13.2 (3805), 13.2 (3908), 13.3 (3789), 13.3 (3792), 14.1 (4007), 14.2 (3850), 14.2 (3854), 14.2 (3862), 14.2 (3900), 14.6 (3800), 15. (3888)
Argonne, IL, 10/26/95	3.1 (391), 3.3 (141), 3.4.2 (520), 3.5.1 (209), 3.5.1 (458), 3.5.1 (465), 3.5.1 (471), 5.2 (384), 6.3 (22), 6.7 (25), 8.1 (1830), 8.3.1 (467), 12. (152), 12.2 (206), 13.2 (466), 14.8 (490)
Arvada, CO	3.1 (1762), 3.3 (141), 3.3 (1760), 3.5.8 (1759), 3.5.13 (1764), 3.5.13 (1778), 3.5.13 (3218), 4.2 (1707), 4.2 (1780), 4.3 (1731), 5.2 (1728), 5.2 (1752), 5.2.1 (1723), 5.2.2 (1713), 5.2.2 (1753), 5.4.1 (1727), 6.7 (25), 8.1 (1652), 8.1.3 (1758), 8.3 (1725), 8.3 (1769), 8.3 (1774), 8.3 (1788), 8.3.1 (1523), 8.3.1 (1694), 8.3.1 (1721), 8.3.1 (2651), 8.3.2 (1782), 8.3.3 (1730), 8.3.3 (1754), 9.1 (2146), 9.3 (1689), 9.3 (1696), 11. (531), 11.2 (1719), 11.3 (1755), 12. (152), 12. (2310), 12.2 (206), 12.2 (254), 12.2 (1484), 13.3 (1756), 14.2 (1784), 14.2 (1791), 14.2 (1794), 15. (1692), 15. (1695)
Brookhaven, NY	3.1 (2113), 3.2.2 (2048), 3.3 (141), 3.4.1 (71), 3.4.1 (2105), 3.5.2 (541), 3.5.2 (2109), 3.5.17 (4444), 4.1 (2078), 4.1 (2909), 4.2 (2102),

Hearings	Comment/Response Index Location(s)
Brookhaven, NY	4.3 (2129), 5.2 (2095), 5.2 (2938), 5.2.4 (2136), 5.4 (374), 5.8 (219), 5.11 (2091), 5.12 (2087), 5.12 (2144), 6.6 (2054), 6.7 (25), 6.7 (2045), 8.1 (2140), 8.1 (2142), 8.1.5 (2118), 8.3.1 (2117), 9.1 (2121), 9.2 (2059), 10.1 (2297), 10.2 (1485), 11. (2127), 11.4 (2147), 11.5 (3780), 11.6 (2149), 12. (2151), 12.2 (206), 14.1 (371), 14.1 (2131), 14.2 (2068), 15. (2134)
Fernald, OH	3.4.2 (520), 8.1 (1087), 8.1 (1105), 8.1.2 (1089), 8.2 (1108), 8.3.1 (1117), 9.1 (1107), 9.3 (1100), 11. (1113), 11. (1114), 11.3 (1109), 11.3 (1112), 11.3 (1116), 11.4 (133), 11.4 (1103), 12.2 (206), 13.2 (1115)
Idaho and Boise, ID	3.3 (141), 3.3 (530), 3.4.1 (528), 3.5.5 (537), 5.7 (523), 5.9 (511), 5.9 (532), 6.2 (534), 6.8 (191), 8.3.1 (525), 9.3 (517), 11. (531), 11.2 (2), 11.2 (519), 11.3 (398), 11.4 (509), 12.2 (1484), 13.2 (536), 13.2 (538),
Las Vegas, NV	3.1 (1570), 3.1 (1638), 3.4.1 (1650), 3.5.8 (225), 3.5.8 (1588), 3.5.8 (1627), 3.6 (1621), 3.6 (1636), 4.1 (1644), 4.2 (1626), 5.2 (1613), 5.2.1 (1583), 5.9 (511), 5.9 (532), 6.6 (1607), 6.6 (1618), 6.6 (1624), 6.6 (1629), 6.6 (1645), 6.6 (1647), 6.6 (1651), 6.6 (1670), 6.6 (3272), 6.7 (25), 6.7 (1608), 8.1 (1584), 8.1 (1652), 8.3.2 (1646), 9.2 (207), 10.3 (1643), 11.4 (133), 11.4 (1611), 11.4 (1614), 11.6 (1632), 11.6 (1648), 12. (152), 12.2 (254), 12.2 (1576), 12.2 (4568), 13.1 (1605), 13.1 (1633), 13.1 (1634), 13.2 (1578), 13.2 (1630), 14.1 (371), 14.1 (1620), 14.1 (1623), 14.2 (1639), 14.4 (1568), 14.5 (1649), 14.6 (1615), 14.7 (1640), 15. (1641)
Oak Ridge, TN	3.4.2 (520), 5. (499), 5.2 (494), 5.2.1 (493), 5.2.2 (478), 5.2.2 (498), 5.3 (512), 5.4.2 (474), 5.11 (1361), 6.5 (505), 6.5 (3139), 6.7 (25), 6.8 (191), 8.1 (476), 8.1 (2910), 8.1.2 (495), 8.2 (1108), 8.3.1 (507), 8.3.1 (514), 8.3.3 (506), 9.2 (207), 9.3 (488), 11.2 (3550), 11.4 (489), 11.4 (508), 14.7 (522), 14.8 (490),
Paducah, KY, and Portsmouth, OH	3.1 (1147), 3.1 (2148), 3.4.2 (520), 3.5.10 (369), 3.5.10 (2180), 3.5.12 (2076), 3.5.12 (2093), 4.1 (2130), 4.1 (2138), 4.1 (2216), 4.2 (2101), 4.2 (2145), 4.2 (2192), 4.2 (2212), 5.1 (2197), 5.2 (1752), 5.2 (2135), 5.2 (2161), 5.2 (2163), 5.2 (2168), 5.2 (3377), 5.2.1 (2137), 5.2.2 (2106), 5.4.2 (2202), 5.5 (2199), 5.6 (2086), 5.11 (2194), 6.2 (2084), 6.7 (25), 6.8 (2171), 8.1 (2154), 8.1 (2155), 8.1.1 (2074), 8.1.2 (2080),

Hearings	Comment/Response Index Location(s)
Paducah, KY, and Portsmouth, OH	8.1.3 (2071), 8.3.1 (2110), 8.3.1 (2175), 8.3.1 (2651), 9.1 (2096), 9.1 (2146), 9.3 (2190), 11. (531), 11. (2222), 11.4 (2189), 11.5 (2157), 11.6 (2160), 12. (2187), 12. (2310), 12.2 (206), 12.2 (254), 13.3 (1756), 13.3 (2208), 14.1 (2374), 14.1 (4007), 14.2 (2114), 15. (188), 15. (2097), 15. (2126), 15. (2128), 15. (2158), 15. (2165),
Pendleton/Portland, OR; Lacey/Pasco/Seattle, WA	3.1 (2306), 3.1 (2317), 3.2.4 (2256), 3.3 (141), 3.3 (2258), 3.4.1 (2193), 3.4.2 (2240), 3.5.4 (2181), 3.5.4 (2238), 3.5.4 (2260), 3.6 (2215), 3.6 (4045), 4.1 (3196), 4.3 (2201), 5.2 (2191), 5.2 (2290), 5.2 (2293), 5.2 (2300), 5.2 (2315), 5.2.1 (2307), 5.2.3 (2177), 5.2.3 (2196), 5.2.3 (2230), 5.2.3 (2313), 5.2.4 (2203), 5.5 (2077), 5.7 (2188), 5.7 (2319), 5.9 (511), 5.11 (2296), 5.11 (3411), 5.11 (4375), 5.12 (2236), 6.1 (2314), 6.4 (396), 6.5 (3139), 6.8 (2195), 7. (2270), 8.1 (1652), 8.1 (2172), 8.1 (2269), 8.1.2 (2200), 8.1.4 (2198), 8.1.4 (2303), 8.2 (1108), 8.2 (2267), 8.3 (2274), 8.3.1 (2272), 8.3.2 (2214), 8.3.2 (2302), 9.1 (2250), 9.3 (3422), 10.1 (392), 10.1 (2287), 10.1 (2297), 10.2 (2184), 11. (1113), 11. (2206), 11. (2288), 11.3 (2164), 11.3 (2174), 11.3 (2261), 11.3 (2263), 11.4 (2244), 11.4 (2245), 11.4 (2255), 11.4 (2264), 11.4 (2318), 12. (152), 12.2 (206), 12.2 (254), 12.2 (363), 12.2 (365), 12.2 (1484), 12.2 (2217), 12.2 (2218), 12.2 (4571), 13.1 (2304), 14.1 (379), 14.1 (4007), 14.2 (1639), 14.6 (386), 14.7 (2311), 14.8 (490), 15. (2226), 15. (2251), 15. (2316)
Santa Fe, NM	3.2.3 (1564), 3.3 (141), 3.5.6 (1488), 3.5.6 (1490), 3.5.6 (1566), 3.6 (1140), 3.6 (1513), 4.2 (1574), 4.3 (1560), 5.2 (17), 5.2.1 (1486), 5.2.4 (1550), 5.3 (1553), 5.4 (1323), 5.4.2 (3364), 5.5 (1559), 5.6 (1510), 5.9 (1561), 5.12 (1504), 5.12 (1506), 5.12 (1508), 5.12 (1528), 6.3 (22), 6.7 (25), 8.3.1 (1523), 8.3.3 (1565), 9.2 (207), 10.2 (4058), 12. (152), 12. (4054), 12.2 (1484), 12.2 (1567), 13.1 (1525), 13.1 (1541), 13.1 (1542), 13.1 (1545), 13.1 (1547), 14.2 (1515), 14.2 (1516), 14.3 (1577), 14.5 (1511)
Tracy, CA	3.3 (141), 3.4.1 (71), 3.5.7 (123), 3.5.7 (1597), 3.5.7 (1603), 3.5.8 (1551), 4.1 (1554), 4.2 (1558), 4.2 (1604), 5.2 (180), 5.2 (1505), 5.2 (1514), 5.4.1 (179), 5.4.1 (1556), 5.4.2 (1598), 5.10 (20), 5.11 (1520), 6.3 (22), 6.6 (1487), 6.7 (25), 8.1 (1530), 8.1 (1652), 8.1 (2154), 8.1.2 (1498), 8.1.5 (255), 8.3.2 (1540),

Hearings	Comment/Response Index Location(s)
Tracy, CA	9.2 (4047), 10.1 (1509), 10.2 (1485), 11.3 (1527), 11.3 (1529), 11.4 (133), 11.4 (1517), 11.5 (1524), 12.2 (206), 12.2 (254), 13.1 (1535), 13.2 (1595), 14.4 (1507)