DEPARTMENT OF ENERGY

Record of Decision; Waste Isolation Pilot Plant

AGENCY: U.S. Department of Energy (DOE).

ACTION: Record of Decision, Waste Isolation Pilot Plant (WIPP).

SUMMARY: The U.S. Department of Energy (DOE) has decided to continue the phased development of the WIPP to demonstrate the safe disposal of post-1970 transuranic (TRU) waste resulting from the defense activities and programs of the United States by proceeding with the Test Phase. This Test Phase will involve emplacing, in a fully retrievable manner, a limited quantity of TRU waste underground at the WIPP to conduct tests designed to collect data to reduce uncertainties associated with performance assessment predictions that are necessary to determine whether WIPP would comply with Environmental Protection Agency (EPA) disposal standards. Before proceeding with the Test Phase, the prerequisites listed in the Secretary's Decision Plan for WIPP must be satisfactorily completed. The Test Phase also may involve an Operations Demonstration. However, a decision on whether to proceed with an Operations Demonstration as a part of the Test Phase will not be made until, and only if, the DOE has a high level of confidence in complying with the EPA disposal standards for TRU waste, and a determination were made that additional operational experience with waste is required. Prior to a decision on whether to proceed with the Disposal Phase of the WIPP, the DOE will issue another Supplemental Environmental Impact Statement (SEIS). The DOE has prepared this Record of Decision (ROD) pursuant to the regulations of the Council on Environmental Quality (40 CFR part 1505) and the DOE's Guidelines for Compliance with the National Environmental Policy Act (NEPA) (52 FR 47662, December 15, 1987).

FOR FURTHER INFORMATION CONTACT:

For further information on the WIPP, contact:

Mark W. Frei, Office of Environmental Restoration and Waste Management (EM-30), U.S. Department of Energy, Washington, DC 20545, 301/353-9469.

For further information on the NEPA process, contact:

Carol Borgstrom, Office of NEPA Project Assistance (EH-25), U.S. Department of Energy, Washington, DC 20585, 202/586-4600.

Background

The WIPP site is located in Eddy County in southeastern New Mexico. It is 26 miles east of Carlsbad in an area known as Los Medanos ("the dunes"), a relatively flat, sparsely inhabited plateau with little surface water and limited land uses. The land is used mainly for grazing, but other uses in the area include mining for potash, and oil and gas exploration and development.

The WIPP was authorized by Public Law 96–164, the "National Security and Military Applications of Nuclear Energy Act of 1980," to provide a research and development facility for demonstrating the safe disposal of radioactive waste produced by national defense activities. The DOE issued a Final Environmental Impact Statement (FEIS) on the proposed phased development of the WIPP in 1980 (DOE/EIS–0026, October 1980). The DOE's decision to construct the WIPP at a location in southeastern New Mexico was based on the FEIS and was announced in a Record of Decision (ROD) (48 FR 9162, January 28, 1981). The decision called for the phased development of the WIPP for the disposal of post-1970 defense-generated TRU waste. This decision included conducting experiments with small volumes of defense high-level waste. The DOE is no longer planning to conduct high-level waste experiments at the WIPP.

The WIPP is designed to dispose of 6.2 million cubic feet (ft^3) of contact-handled (CH) TRU waste and 250,000 ft^3 of remote-handled (RH) TRU waste in the mined repository over a 25-year operational life. TRU waste, which is waste contaminated with alpha-emitting radionuclides that are heavier than uranium and have half-lives longer than 20 years at concentrations higher than 100 nanocuries per gram or their equivalents, results primarily from defense-related plutonium reprocessing and fabrication, as well as defense-related research and development activities at various DOE facilities. TRU waste is generated and/or stored by 10 DOE defense facilities around the country. The waste exists in a variety of forms ranging from unprocessed laboratory trash (e.g., tools, glassware, and gloves) to solidified sludges from wastewater treatment. A substantial portion (approximately 60 percent) of the post-1970 TRU waste that would be emplaced in WIPP also contains hazardous chemical components. Such TRU waste (i.e., mixed waste) is similar in its physical and radiological characteristics to TRU waste that does not contain these components.

The WIPP includes surface and underground facilities that will support the emplacement of TRU waste in a geologic repository. The major construction activities at the WIPP are nearly complete; surface facilities are essentially complete, and most of the underground rooms for experimentation and for initial waste emplacement have been excavated. The principal surface structure at the WIPP is the Waste Handling Building, in which TRU waste will be received, inspected, and moved to a shaft for transfer underground. The building also contains change rooms, a health-physical laboratory, and equipment for ventilation and filtration. Other surface facilities include a fire and domestic water pumphouse, a sewage-treatment plant, a building for safety and emergency services, a guard and security building, and support buildings. The constructed underground facilities include four shafts, the first panel of the waste disposal area, an experimental area, an equipment and maintenance area, and connecting tunnels. These underground facilities were mined 2,150 feet beneath the land surface, in the Salado Formation, a 3,000-foot-thick bedded salt and anhydrite formation.

Data collected at the WIPP since completing the 1980 FEIS have led to better understanding of the hydrogeologic characteristics of the area and their potential implications for the long-term performance of the WIPP. In addition, there have been changes to the Proposed Action and in the information and assumptions used to analyze the environmental impacts in the FEIS. These changes include: (1) Changes in the composition of the TRU waste inventory, (2) consideration of the hazardous chemical constituents in TRU waste, (3) modification and refinement of the system for the transportation of TRU waste to the WIPP, and (4) modification of the Test Phase. Consistent with the regulations of the Council on Environmental Quality, a Supplement to the Environmental Impact Statement (SEIS) for the WIPP (DOE/EIS–0026–FS, January 1990) was prepared to evaluate the environmental impacts of proceeding with the phased development of the WIPP as modified by changes since 1980 and in light of new information.

In early 1989, the Department met with a variety of State agencies, environmental advocacy groups, representatives of Indian nations, elected officials, and others to inform them of the preparation of the Supplement and to solicit their suggestions regarding issues to be considered. On February 17, 1989, the DOE published in the **Federal Register** a notice of its intent to prepare a Supplement to the 1980 FEIS. The draft SEIS for WIPP (DOE/EIS–0026–DS) was issued and a Notice of Availability was published in the **Federal Register** on April 21, 1989. More than 2,000 copies of the draft SEIS were distributed to members of Congress, State and Federal agencies, and interested individuals. The DOE provided a 90-day public comment period on the draft SEIS between April 21, 1989, and July 20, 1989, that included twelve days of public hearings in nine locations nationwide. The DOE considered and responded to the comments raised by the public and by State and Federal officials during the public comment period by making appropriate changes or additions to Volumes I and II of the draft SEIS and/or by providing detailed responses in a new Volume III, Public Comments and Responses.

A Notice of Availability of the final SEIS was published in the **Federal Register** on February 2, 1990. Comments on the final SEIS were received from the EPA, the DOI, New Mexico's Environmental Evaluation Group, and jointly from the Environmental Defense Fund, Concerned Citizens for Nuclear Safety, the Office of the Texas Attorney General, and the Southwest Research and Information Center, which were subsequently adopted by the Natural Resources Defense Council. These comments were considered in preparing this ROD and were responded to individually. Copies of the comments and responses can be obtained from Mark W. Frei at the above noted address.

Alternatives Considered: A number of alternatives to the phased construction and operation of the WIPP for demonstrating the safe disposal of TRU waste were considered in the 1980 FEIS and in the January 1981 ROD. These included the No Action Alternative, the development of the authorized WIPP facility, the disposal of TRU waste in the first available repository for high-level radioactive waste, and the delayed selection of a site for the WIPP facility in order to consider additional sites. The 1981 ROD documented the DOE's decision to proceed with the phased construction of the WIPP at the Los Medanos site.

In the final SEIS, the DOE has analyzed the Proposed Action, which is to proceed with the Test Phase, and two alternatives.

Proposed Action. The Proposed Action is to continue with a phased approach to the development of the WIPP to demonstrate the safe disposal of post-1970 defense-generated TRU waste by proceeding with the Test Phase.

The Test Phase would involve transportation to and emplacement, in a fully retrievable manner, of a limited quantity of CH TRU waste underground at the WIPP to conduct bin-scale tests and alcove tests designed to provide data to reduce the uncertainties in performance assessment. The bin-scale

tests would be designed to provide information relevant to WIPP's ability to comply with EPA disposal standards for TRU waste, such as data on gas composition, gas generation and depletion rates, and the radiochemical source term. The waste used would be representative of the post-1970 TRU mixed waste inventory. Because of the potential uncertainties inherent in extrapolating from small laboratory or bin-scale results to the performance of the full-scale repository, alcove tests would be conducted in the WIPP as part of the Test Phase to validate gas-generation models and to predict realistic waste-inventory behavior. Some of the alcove tests would include waste modified to simulate the impacts of the actual repository environment on the long-term degradation behavior of the waste.

The second element of the Test Phase analyzed in the final SEIS would involve the conduct of an Operations Demonstration. The purpose of an Operations Demonstration would be to show the ability of the waste management system to safely and efficiently certify and package waste at generator/storage sites, transport waste to the WIPP, and emplace it underground. Testing and monitoring would be done on generating and storage facility operations, the transportation system, and the WIPP facility operations. These testing and monitoring activities would be designed to validate the safety and efficiency of WIPP operations and associated waste management systems under realistic conditions and at shipment rates similar to those expected during disposal operations.

The Test Phase would be conducted in accordance with the requirements of the Resource Conservation and Recovery Act (RCRA), other applicable regulations, and EPA standards for the management and storage of TRU waste (subpart A of 40 CFR part 191). To assure that the impacts for the Test Phase were conservatively assessed, the final SEIS assumed, as an upper bound assumption, that a waste volume of up to 10 percent of the design capacity of the WIPP would be used for the Test Phase.

If, during the Test Phase, there were a significant indication that the WIPP as proposed would not comply with the EPA disposal standards for TRU waste, a number of options would be considered (e.g., waste treatment and/or engineered barrier or design modifications) to facilitate demonstration of compliance with the EPA standards for disposal of TRU waste. If, after considering various options, it were determined ultimately that the WIPP still could not comply with EPA disposal standards or other applicable requirements, the waste emplaced during the Test Phase would be retrieved and placed in storage. The WIPP would be decommissioned as a facility for the demonstration of the safe disposal of TRU waste and potentially put to other uses.

No Action Alternative. Under the No Action Alternative, the DOE would not proceed with the phased development of the WIPP to demonstrate the safe disposal of post-1970 TRU waste. TRU waste would not be shipped to or emplaced in the WIPP for the Test or Disposal Phases. The WIPP would be decommissioned as a facility for the demonstration of the safe disposal of TRU waste and potentially put to other uses. Temporary storage of TRU waste at various DOE sites would continue indefinitely. Over the long-term, these storage sites would be subject to low probability natural disruptive events, as well as human intrusion, with potentially unacceptable environmental impact. Treatment of newly generated mixed waste might be required to avoid conflict with the RCRA Land Disposal Restrictions. Currently, capacity for such treatment does not exist at the DOE or at commercial facilities. The No Action Alternatve would result in the indefinite continuation of extensive TRU waste storage, site monitoring, surveillance, and maintenance.

Alternative Action. This alternative is to conduct the bin-scale tests at locations other than the WIPP underground. There would be no emplacement of TRU waste in the WIPP underground until a determination were made of compliance with the EPA standards for the disposal of TRU waste. The bin-scale tests would be conducted in a specially-engineered aboveground facility that could be constructed for this purpose. The objectives of the bin-scale tests under this alternative would be identical to those described under the Proposed Action. Since the alcove tests could not be performed practically or usefully at a location other than the WIPP underground, the results of the alcove tests would not be available to increase confidence regarding extrapolation from laboratory and bin-scale results to full-scale representative repository loading. Under this alternative, the Operations Demonstration would not be conducted prior to a determination of compliance with the EPA disposal standards for TRU waste.

Environmentally Preferable Alternative: The final SEIS has analyzed the short- and long-term environmental consequences of the No Action, the Alternative Action, and the Proposed Action alternatives. In the short-term, the environmental effects of all alternatives are small. Considering short- and long-term impacts, the DOE believes that continued development of the WIPP is the environmentally preferred alternative.

Under the No Action alternative, TRU waste would continue to be generated and stored at existing storage facilities; no waste would be emplaced in the WIPP underground. The continuation of TRU waste storage would necessitate the construction of additional waste storage and/or treatment facilities. Leaving the waste in surface over the long-term rather than disposing of it in a mined geologic repository could lead to higher radiation exposures to numbers of the general public as a result of natural processes or human intrusion if government control of the storage sites were lost.

Under the Alternative Action, only the bin-scale tests would be conducted. These tests would be conducted in a specially-engineered aboveground facility that would be constructed for this purpose at an existing waste generation and storage site. Basically the same information would be gathered from these tests as with the bin-scale experiments under the Proposed Action. However, the results of the alcove-scale tests would not be available to increase confidence regarding extrapolation of laboratory and bin-scale results to a full-scale representative repository loading. Therefore, the confidence that the performance assessment is an appropriate representation of actual repository behavior would be less than under the Proposed Action, thus lowering the confidence in a timely Disposal Phase decision.

The Proposed Action continued the phased approach to the development of the WIPP to demonstrate the safe disposal of post-1970, defense-generated TRU waste. The Proposed Action, which would include the conduct of both bin-scale and alcove tests at the WIPP, would avoid establishment of comparable facilities at other locations. The facilities needed to organize, instrument, and record the large amounts of required data are already in place at the WIPP. The Proposed Action would allow for the large-scale study of the potential interaction between the

waste (representative of the waste inventory) and the underground environment, and its effect on gas generation and other phenomena. Acquisition of this in situ data would significantly reduce the uncertainties for performance assessment to support an expeditious Disposal Phase decision with minimal environmental risk.

Decision. The DOE, in compliance with NEPA and its implementing regulations, has weighed the need for the WIPP against its environmental and other impacts as updated in the Supplement to the Environmental Impact Statement, and has decided to proceed with the Proposed Action (i.e., continue with the phased development of WIPP by proceeding with the Test Phase). This Test Phase will involve emplacing, in a fully retrievable manner, a limited quantity of TRU waste underground at the WIPP to conduct tests designed to collect data to reduce uncertainties associated with performance assessment predictions that are necessary to determine whether WIPP would comply with EPA disposal standards. Proceeding with the Test Phase is in accord with the original Congressional mandate to develop a facility to demonstrate the safe disposal of radioactive wastes produced by national defense activities. The No Action Alternative is inconsistent with this Congressional intent. The Alternative Action would not provide the same degree of certainty in the data used for conducting performance assessment to determine compliance with EPA disposal standards. This decision to continue with the phased development of the WIPP is consistent with the recently released Environmental Restoration and Waste Management Five-Year Plan (DOE/S-0070), and the DOE goal to move from waste storage to final disposal.

The DOE has considered a variety of means to avoid or minimize environmental impacts from the continued phased development of the WIPP. The DOE is committed to complying with all applicable State and Federal environmental requirements and to evaluating further the potential mitigation measures described in section 6 of the Supplement. Waste emplaced during the Test Phase will be kept to the minimum quantities needed to support the purposes of the Test Phase. The DOE will work with all States through which waste will be transported to establish comprehensive training programs for emergency response personnel. The DOE also will be conducting further studies with regard to the use of rail transport for TRU waste. The DOE will continue to work with and solicit the input of State and Federal agencies, national scientific groups, and other review groups with regard to the operation of the WIPP.

The plans for the Test Phase call for initial emplacement of approximately 0.5 percent by volume of WIPP's design waste capacity for the bin-scale tests and the alcove tests. Before proceeding with the Test Phase, the institutional and technical prerequisites listed in the Secretary's Decision Plan for the WIPP must be satisfactorily completed. Examples of those prerequisites include: land withdrawal, a final decision by EPA on the RCRA no-migration petition for the purposes of testing and experimentation, and completion of the Final Safety Analysis Report (FSAR) and an FSAR Addendum that specifically analyzes safety at the WIPP during the Test Phase.

Review of the April 1989 proposed Operations Demonstration program by the National Academy of Sciences, New Mexico's Environmental Evaluation Group, the EPA, the Blue Ribbon Panel, and the Advisory Committee on Nuclear Facility Safety resulted in a variety of major comments being provided to the DOE. The comments primarily focused on the timing of the proposed program relative to a determination of compliance with the EPA disposal standards for TRU waste, and on the scope (i.e., quantities of waste and the rates at which it is received) relative to the operational experience to be gained from the performance assessment test program. Based on a reevaluation of the proposed Operations Demonstration, the DOE has decided that a decision on whether to proceed with an Operations Demonstration as part of the Test Phase should not be made until a high-level of confidence in complying with the EPA disposal standards has been achieved and a determination is made that additional operational experience with waste is required. The following activities must be completed before DOE can make a decision on the scope of the Operations Demonstration program (i.e., a determination of whether additional operational experience with waste is required):

(1) An evaluation of the feasibility of the EPA recommendation of monitoring the performance of the facility by emplacing waste (approximately 1.5 percent of design capacity) in 2 full-scale, instrumented, backfilled, sealed rooms after a satisfactory demonstrat of retrieval using simulated wastes;

(2) Establishment of systems objectives and criteria for evaluating disposal operations readiness; and,

(3) A preliminary report is issued on operational experience gained from the handling and emplacement of TRU waste for the performance assessment tests and an assessment of this experience relative to the pre-established system objectives and criteria for WIPP disposal operations readiness.

The need for additional NEPA documentation will be evaluated during the Test Phase. Prior to a decision on whether to proceed to the Disposal Phase, the DOE will issue a second SEIS. The second Supplemental EIS will analyze the long-term performance of the WIPP in light of information generated during the Test Phase and will analyze in more detail the impacts of processing and handling TRU waste at each of the generator/storage facilities for shipment to the WIPP for disposal, including the impacts of any proposed waste treatment.

Proceeding with the Test Phase at the WIPP requires the receipt of TRU waste at the WIPP facility. Public Land Order 6403, issued in 1983, under which the DOE is currently developing the WIPP facility, does not allow the receipt of radioactive waste on the site. The DOE would prefer that the withdrawal of the WIPP site lands be made by Congress rather than continuing to acquire use of the lands through administrative means. Accordingly, the DOE submitted on April 3, 1990, a proposed bill to the Congress, which would provide for the withdrawal of the WIPP site lands. However, in order to continue the phased development of the WIPP in a manner consistent with Public Law 96-164, the DOE also is requesting that the Secretary of the Interior support a parallel option of administrative land withdrawal by modifying the current Public Land Order to allow the receipt of waste at the WIPP for the Test Phase in the event that the Congress does not enact land withdrawal legislation.

Issued at Washington, DC this 13th day of June, 1990.

Approved:

James D. Watkins,

Admiral, U.S. Navy (Retired), Secretary of Energy.

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