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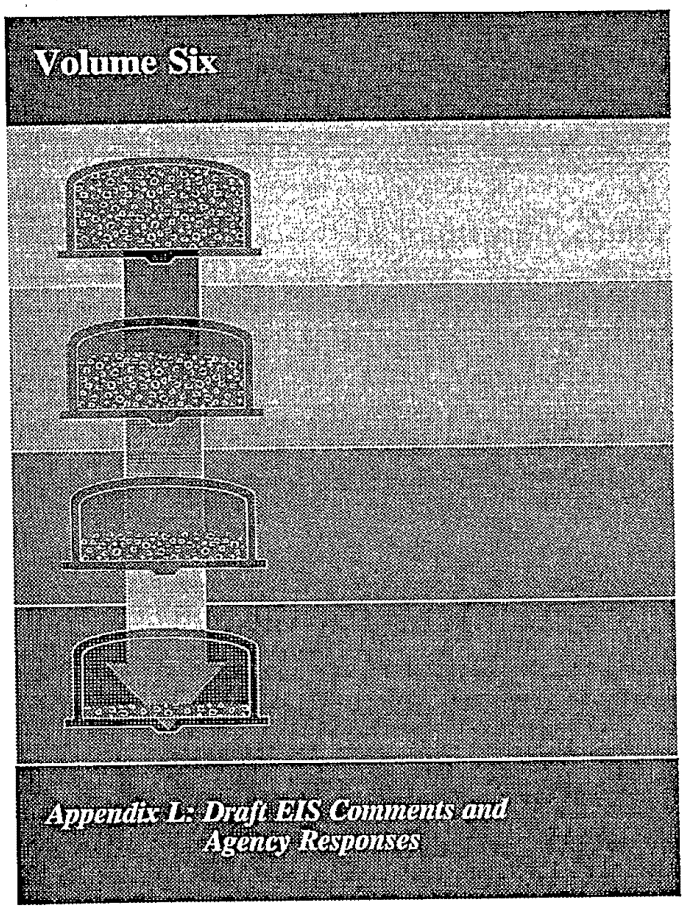
DOE/EIS-0189

Tank Waste Remediation System, Hanford Site, Richland, Washington, Final Environmental Impact Statement



Prepared by:

U.S. Department of Energy
and
Washington State Department of Ecology

August 1996

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ACRONYMS AND ABBREVIATIONS

1995 TSLCC	1995 Analysis of Total System Life Cycle Cost
ARF	airborne release fraction
ARR	airborne release rate
ASIL	Acceptable Source Impact Level
CAP-88	Clean Air Assessment Package - 1988
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLUP	Comprehensive Land Use Plan
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
DHHS	Department of Health and Human Services
DOE	U.S. Department of Energy
DOE-HQ	U.S. Department of Energy, Headquarters
DOE-RL	U.S. Department of Energy, Richland Operations Office
DST	double-shell tank
Ecology	Washington State Department of Ecology
EDTA	ethylenediaminetetraacetic acid
EIS	Environmental Impact Statement
eMTHM	equivalent Metric Tons Heavy Metal
EPA	U.S. Environmental Protection Agency
ERWM	Environmental Restoration and Waste Management
FFTF	Fast-Flux Test Facility
FR	Federal Register
HAB	Hanford Advisory Board
HEAL	Hanford Education Action League
HEDTA	hydroxyethylenediaminetriacetic acid
HEPA	high-efficiency particulate air
HFSUWG	Hanford Future Site Uses Working Group
HI	hazard index
HLW	high-level waste
HMPC	Hanford Multi-Purpose Canister
HOA	Heart of America
HRA	Hanford Remedial Action
HSRAM	Hanford Site Baseline Risk Assessment Methodology
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
ISCM	Industrial Source Complex Model
ISV	in situ vitrification
LAW	low-activity waste

ACRONYMS AND ABBREVIATIONS (cont'd)

LCF	latent cancer fatality
LLW	low-level waste
MEI	maximally-exposed individual
MUST	miscellaneous underground storage tank
NCRP	National Council on Radiation Protection and Measurements
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standard for Hazardous Air Pollutants
NRC	Nuclear Regulatory Commission
OCRWM	Office of Civilian Radioactive Waste Management
ODOE	Oregon Department of Energy
PM	particulate matter
PM-10	Particulate matter nominally less than 10(μ) microns
PNL	Pacific Northwest National Laboratory
PUREX	Plutonium Uranium Extraction
RCRA	Resource Conservation and Recovery Act
RDS	risk data sheet
RF	respirable fraction
RFP	request for proposal
ROD	Record of Decision
SEPA	Washington State Environmental Policy Act
SIS	Safe Interim Storage
SNF	spent nuclear fuel
SRR	Systems Requirements Review
SST	single-shell tank
TRIDEC	Tri-Cities Industrial Development Council
TRU	transuranic
TWRS	Tank Waste Remediation System
USDOC	U.S. Department of Commerce
USDOI	U.S. Department of the Interior
WAC	Washington Administrative Code
WDFW	Washington State Department of Fish and Wildlife
WDOH	Washington State Department of Health
WESF	Waste Encapsulation and Storage Facility
WHC	Westinghouse Hanford Company

APPENDIX L
TWRS DRAFT EIS COMMENTS AND AGENCY RESPONSES

INTRODUCTION

The U.S. Department Of Energy and the Washington State Department of Ecology added Appendix L, Response to Public Comments, to the Tank Waste Remediation System (TWRS) Environmental Impact Statement (EIS) to fully address and respond to public comments on the Draft EIS. In addition, DOE considered public comments, along with other factors such as programmatic need, short- and long-term impacts, technical feasibility, and cost, in arriving at DOE's preferred alternative. During the public comment period for the Draft EIS, more than 350 individuals, agencies, Tribal Nations, and organizations provided comments. This volume represents a broad spectrum of private citizens; businesses; local, State, and Federal officials; Tribal Nations; and public interest groups.

Appendix L contains the comments on the EIS received during the public comment period and DOE and Ecology responses to those comments. Frequently, identical or similar comments were provided by more than one individual, and in such cases, DOE and Ecology grouped the comments and prepared an in-depth response for each group. These responses are included as the response to the first comment. Subsequent similar comments refer the reader to the initial response. In compliance with the provisions of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations [40 CFR 1502.14(e)], and Washington State Environmental Policy Act (SEPA) Rules (WAC 197-11) public comments on the Draft EIS were assessed and considered both individually and collectively by DOE and Ecology. Some comments resulted in modifications to the EIS. Other responses contained an explanation of the reasons that the comments did not warrant any further response or modification to the EIS. The final decision on which alternative to implement will be made following publication of the Final EIS and will be documented in a Record of Decision (ROD). The public comments on the Draft EIS will be considered when making the final decision. The ROD will be published no sooner than 30 days after the publication of a Notice of Availability for the Final EIS in the Federal Register.

HOW DOE AND ECOLOGY CONSIDERED PUBLIC COMMENTS IN THE NEPA PROCESS

As required in the CEQ regulations, the Final EIS identifies DOE's and Ecology's preferred alternatives. The preferred alternatives were identified based on consideration of environmental impacts, regulatory compliance, DOE and Waste Management programmatic missions, public comments, and DOE policy. Public input considered in DOE's and Ecology's identification of preferred alternatives included concerns, preferences, and opinions regarding the activities addressed in the EIS, as well as expectations of DOE in making the decisions on environmental restoration and waste management programs at the Hanford Site.

CHANGES TO THE EIS RESULTING FROM PUBLIC COMMENTS

A major purpose of NEPA and SEPA is to promote efforts that will prevent or reduce damage to the environment by ensuring informed decision making on major Federal actions that significantly affect the quality of the human environment. Consideration of public comments on the Draft EIS helps

ensure that the EIS is an adequate decision making tool; accordingly, this EIS has been enhanced, as appropriate, in response to public comments. Based on review of public comments, along with with consultations held with commenting agencies, State and Tribal governments, primary EIS enhancements include the following.

- Discussion and analysis associated with the disposal of high-level waste at the potential national geologic repository were reviewed, clarified by separating the discussion and analysis from other components of the alternatives, and current data and formulas for calculating costs were added to Volumes One and Two, as appropriate.
- The option of longer interim onsite storage of high-level immobilized waste pending availability of an offsite geologic repository was included in the Final EIS.
- In Volume One, Section 5.11 and Volume Three, DOE revised the risk analysis to include a Native American subsistence user scenario. This analysis compared impacts of each alternative to a future population of individuals who would reside on the Hanford Site and subsist in a traditional lifestyle. This scenario was developed in consultation with affected Tribal Nations.
- Additional consultation with the affected Tribal Nations is reflected in the environmental justice analysis and throughout the EIS, as appropriate.

As committed to in the Draft EIS, a discussion of emerging data regarding vadose zone contamination beneath the tanks resulting from past leaks has been added to the Final EIS in Volume One, Sections 4.2 and 5.2, Appendix F, and Appendix K. The data were unavailable for inclusion in the EIS at the time the Draft EIS was published. Much of the data presented in the Final EIS are based on preliminary analysis of the vadose zone contamination, and thus the EIS presents several scenarios that are currently under review by DOE regarding the cause, nature, and extent of the contamination.

The Draft EIS contained an analysis of uncertainties for each relevant component of the environment (e.g., risk, waste inventory, groundwater migration) in the applicable section of the EIS. For the Final EIS, the evaluation and discussion of uncertainties was expanded and presented together in Volume Six, Appendix K.

Other enhancements to the EIS included modifying Phase 2 of the Phased Implementation alternative to include construction and operation of two waste treatment facilities. Accident discussions and analysis were reviewed, and emerging data were added to Volume One, Section 5.12 and Appendix E. The EIS was also revised to reflect 1995 Site environmental monitoring and reporting. Finally, DOE expanded the EIS analysis of a variation to the Ex Situ/In Situ Combination alternative (known as Ex Situ/In Situ Combination 1 alternative in the Final EIS) presented in the Draft EIS. This alternative was described in the Draft EIS in the cover letter and preface to Volume One and is called the Ex Situ/In Situ Combination 2 alternative in the Final EIS. The discussion and analysis for this alternative are presented in Volume One and Appendix B. DOE added an expanded discussion and analysis of uncertainties to the Final EIS.

Editorial changes were made to the EIS to correct errors, none of which were considered substantive, and to clarify discussions.

HOW TO USE APPENDIX L TO LOCATE RESPONSES

Three indices, Tables L.1, L.2, and L.3, are provided as cross references for specific comments and corresponding section number in Appendix L. Table L.1 is organized by individual or organization providing comment, listed alphabetically; date the comment was provided, if the same individual or organization submitted multiple comments; comment document number assigned and method used to submit the comment, whether written or verbal; comment number, and corresponding Appendix L section number. Individuals providing comments by postcard will find the associated response section by locating "Postcard Correspondence" in column 1 (Individual/Organization [Date Submitted]). Individuals who provided comments by means of the public interest group survey may find the compiled results of the survey, along with references to other Appendix L sections, in Section L.3.9. Table L.2 is organized by section number in Appendix L, page number, and associated comment numbers. Table L.3 lists comment numbers along with their section number and page number.

To find a response to a specific or group of comments, please use the following procedure.

1. Turn to Table L.1 and locate the individual or organization listed in Column 1, and note the response section number(s) assigned to that comment document in Column 4.
2. Following the section number, the page number is listed in Column 5 for the page on which comment and response are listed in numerical order.
3. Turn to the appropriate page(s) to find a response to the comment.

Use the same process to find comments provided by other individuals and organizations. Throughout the appendix, when responses to a particular comment are related to responses to other similar comments, the comment number of the similar comment or comments is provided. To locate the similar comments and associated responses, refer to Table L.3, which lists the comments numerically and the corresponding page number. In an effort to be as complete as possible and address all issues and concerns, each written comment or transcript of an oral comment was reviewed for specific concerns or recommendations. Each concern or recommendation was given a specific comment number and assigned to a specific number in Volume Six, Appendix L most closely corresponding to the nature of the comment. If your comment document contains more than one comment, repeat steps 2 and 3 for each comment because each response could fall under a different response section.

HOW TO FIND REFERENCE DOCUMENTS

Technical references and other supporting documentation cited in Appendix L are available in the DOE Reading Rooms and Information Repositories listed at the end of the Summary and in Volume One, Section 8.0.

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Table L.1 Appendix L Individual/Organization Index

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Ahouse, Loretta	0047 (W)	0047.01	L.3.4.1.1	L-62
Ahouse, Loretta	0047 (W)	0047.02	L.3.4.1.1	L-62
Ahouse, Loretta	0047 (W)	0047.03	L.6.2	L-325
Ahouse, Loretta	0047 (W)	0047.04	L.3.4.12	L-183
Bartholomew, Dale C.	0029 (W)	0029.01	L.3.4.1.1	L-53
Bartholomew, Dale C.	0029 (W)	0029.02	L.3.5.1.1	L-186
Bell, Robert C.	0001 (W)	0001.01	L.3.4.1.1	L-46
Belsey, Richard (5-7-96)	0034 (O)	0034.01	L.5.21	L-319
Belsey, Richard (5-7-96)	0034 (O)	0034.02	L.3.5.1.2	L-67
Belsey, Richard (5-7-96)	0034 (O)	0034.03	L.3.5.1.2	L-68
Belsey, Richard (5-7-96)	0034 (O)	0034.04	L.3.5.1.2	L-68
Belsey, Richard (5-7-96)	0034 (O)	0034.05	L.9.4	L-346
Belsey, Richard (5-7-96)	0034 (O)	0034.06	L.3.4.1.2	L-69
Belsey, Richard (5-2-96)	0054 (O)	0054.01	L.3.9	L-209
Berry, Bill	0041 (W)	0041.01	L.1.1.1	L-2
Berry, Bill	0041 (W)	0041.02	L.5.11.2	L-291
Berry, Bill	0041 (W)	0041.03	L.5.11.2	L-291
Betancourt, Julia	0090 (W)	Postcard Correspondence	*	
Billett, John	0031 (O)	0031.01	L.9.7	L-359
Billett, John	0031 (O)	0031.02	L.9.7	L-359
Bishin, Addie and Bill	0090 (W)	Postcard Correspondence	*	
Bissell, D. Anne	0090 (W)	Postcard Correspondence	*	
Blazek, Mary Lou (4-29-96)	0026 (W)	0026.01	L.3.4.1.2	L-65
Blazek, Mary Lou (4-29-96)	0026 (W)	0026.02	L.3.4.1.2	L-66
Blazek, Mary Lou (4-29-96)	0026 (W)	0026.03	L.3.4.1.2	L-66
Blazek, Mary Lou (4-29-96)	0026 (W)	0026.04	L.3.4.1.2	L-67
Blazek, Mary Lou (5-9-96)	0076 (O)	0076.01	L.3.4.1.1	L-60
Blazek, Mary Lou (5-9-96)	0076 (O)	0076.02	L.3.4.1.1	L-61
Blazek, Mary Lou (5-9-96)	0076 (O)	0076.03	L.3.4.1.2	L-80
Blazek, Mary Lou (5-9-96)	0076 (O)	0076.04	L.9.3	L-343
Bloome, Mark	0090 (W)	Postcard Correspondence	*	
Boldt, A.L. (5-11-96)	0004 (W)	0004.01	L.3.4.2.1	L-89
Boldt, A.L. (5-2-96)	0050 (O)	0050.01	L.3.4.2.1	L-98
Boldt, A.L. (Exhibit) (5-2-96)	0051 (W)	0051.01		
Bonamy, Lance	0090 (W)	Postcard Correspondence	*	
Bove, Richard M.	0090 (W)	Postcard Correspondence	*	
Boyd, Dan E.	0090 (W)	Postcard Correspondence	*	
Britton-Simmons, Mary	0090 (W)	Postcard Correspondence	*	
Broadie, Rosemary	0090 (W)	Postcard Correspondence	*	
Broderick, John J.	0009 (W)	0009.01	L.9.4	L-346
Broderick, John J.	0009 (W)	0009.02	L.5.11.2	L-288
Broderick, John J.	0009 (W)	0009.03	L.3.4.1.2	L-63

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Broderick, John J.	0009 (W)	0009.04	L.3.4.1.2	L-64
Broderick, John J.	0009 (W)	0009.05	L.3.4.1.1	L-49
Broderick, John J.	0009 (W)	0009.06	L.3.4.1.1	L-50
Broderick, John J.	0009 (W)	0009.07	L.3.4.1.1	L-44
Broderick, John J.	0009 (W)	0009.08	L.3.4.1.1	L-44
Broderick, John J.	0009 (W)	0009.09	L.3.4.1.1	L-45
Broderick, John J.	0009 (W)	0009.10	L.3.4.1.1	L-50
Broderick, John J.	0009 (W)	0009.11	L.3.4.1.1	L-45
Broderick, John J.	0009 (W)	0009.12	L.3.4.1.1	L-50
Broderick, John J.	0009 (W)	0009.13	L.6.4	L-331
Broderick, John J.	0009 (W)	0009.14	L.9.6	L-354
Broderick, John J.	0009 (W)	0009.15	L.3.4.1.1	L-51
Broderick, John J.	0009 (W)	0009.16	L.3.4.1.1	L-46
Broderick, John J.	0009 (W)	0009.17	L.3.4.1.1	L-51
Broderick, John J.	0009 (W)	0009.18	L.3.4.1.1	L-52
Broderick, John J.	0009 (W)	0009.19	L.3.4.1.1	L-52
Broughton, Betty L.	0090 (W)	Postcard Correspondence	*	
Brown, E. L.	0025 (W)	Survey Respondant	L.3.9	
Brown, Norma L.	0025 (W)	Survey Respondant	L.3.9	
Browning, Joe	0067 (O)	0067.01	L.9.3	L-339
Bruce, Gloria	0090 (W)	Postcard Correspondence	*	
Buell, Sally	0090 (W)	Postcard Correspondence	*	
Bullington, Darryl C. (5-22-96)	0014 (W)	0014.01	L.3.4.6	L-132
Bullington, Darryl C. (5-22-96)	0014 (W)	0014.02	L.9.5	L-351
Bullington, Darryl C. (5-22-96)	0014 (W)	0014.03	L.3.4.1.2	L-64
Bullington, Darryl C. (5-22-96)	0014 (W)	0014.04	L.3.4.1.2	L-72
Bullington, Darryl C. (5-22-96)	0014 (W)	0014.05	L.9.7	L-357
Bullington, Darryl C. (5-22-96)	0014 (W)	0014.06	L.9.7	L-357
Bullington, Darryl C. (5-22-96)	0103 (W)	No new comments identified.		
Burden, Dan and Greta	0090 (W)	Postcard Correspondence	*	
Burden, James M.	0090 (W)	Postcard Correspondence	*	
Bush, J. and W.	0090 (W)	Postcard Correspondence	*	
Calderon, Jeanette	0090 (W)	Postcard Correspondence	*	
Canfield, Kerry	0090 (W)	Postcard Correspondence	*	
Carey, David L.	0025 (W)	Survey Respondant	L.3.9	
Carey, David L.	0090 (W)	Postcard Correspondence	*	
Carpenter, Shelly	0090 (W)	Postcard Correspondence	*	
Carpenter, Tom	0053 (O)	0053.01	L.10.3	L-376
Carpenter, Tom	0053 (O)	0053.02	L.5.13	L-313
Carpenter, Tom	0053 (O)	0053.03	L.4.2.2	L-211
Carpenter, Tom	0053 (O)	0053.04	L.10.3	L-377
Carter, Mary and Gene	0090 (W)	Postcard Correspondence	*	

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Cavitt, Jan	0090 (W)	Postcard Correspondence	*	
Chernick, Barry E.	0090 (W)	Postcard Correspondence	*	
Childs-Gowell, Elaine	0090 (W)	Postcard Correspondence	*	
Christianson, Pat H.	0090 (W)	Postcard Correspondence	*	
Cicehillo, Livia	0090 (W)	Postcard Correspondence	*	
Clark, Patricia	0090 (W)	Postcard Correspondence	*	
Clifton, Linda J.	0090 (W)	Postcard Correspondence	*	
Coad, Tom	0090 (W)	Postcard Correspondence	*	
Coallion, K.	0025 (W)	Survey Respondant	L.3.9	
Coberly, Mary M.	0090 (W)	Postcard Correspondence	*	
Cole, Dixie	0090 (W)	Postcard Correspondence	*	
Coles, David M.	0090 (W)	Postcard Correspondence	*	
Cook, Louise P.	0090 (W)	Postcard Correspondence	*	
Cork, Cecilia	0090 (W)	Postcard Correspondence	*	
Cressey, L. and C.	0090 (W)	Postcard Correspondence	*	
Crivello, Marilee	0090 (W)	Postcard Correspondence	*	
CTUIR (5-23-96)	0013 (W)	0013.01	L.9.9	L-366
CTUIR (5-23-96)	0013 (W)	0013.02	L.9.9	L-367
CTUIR (5-3-96)	0003 (W)	0003.01	L.9.9	L-365
CTUIR (6-3-96)	0072 (W)	0072.01	L.9.5	L-353
CTUIR (6-3-96)	0072 (W)	0072.02	L.6.1	L-323
CTUIR (6-3-96)	0072 (W)	0072.03	L.6.1	L-324
CTUIR (6-3-96)	0072 (W)	0072.04	L.6.1	L-324
CTUIR (6-3-96)	0072 (W)	0072.05	L.3.3.1	L-34
CTUIR (6-3-96)	0072 (W)	0072.06	L.5.20	L-319
CTUIR (6-3-96)	0072 (W)	0072.07	L.3.2.1	L-21
CTUIR (6-3-96)	0072 (W)	0072.08	L.3.3.1	L-36
CTUIR (6-3-96)	0072 (W)	0072.09	L.9.3	L-340
CTUIR (6-3-96)	0072 (W)	0072.10	L.3.4.1.2	L-80
CTUIR (6-3-96)	0072 (W)	0072.11	L.3.4.1.1	L-48
CTUIR (6-3-96)	0072 (W)	0072.12	L.9.6	L-356
CTUIR (6-3-96)	0072 (W)	0072.13	L.9.6	L-356
CTUIR (6-3-96)	0072 (W)	0072.14	L.3.2.1	L-21
CTUIR (6-3-96)	0072 (W)	0072.15	L.3.9	L-203
CTUIR (6-3-96)	0072 (W)	0072.16	L.3.4.1.2	L-80
CTUIR (6-3-96)	0072 (W)	0072.17	L.5.11.1	L-284
CTUIR (6-3-96)	0072 (W)	0072.18	L.5.11.2	L-294
CTUIR (6-3-96)	0072 (W)	0072.19	L.5.11.2	L-294
CTUIR (6-3-96)	0072 (W)	0072.20	L.5.11.2	L-294
CTUIR (6-3-96)	0072 (W)	0072.21	L.5.11.2	L-295
CTUIR (6-3-96)	0072 (W)	0072.22	L.5.11.2	L-295
CTUIR (6-3-96)	0072 (W)	0072.23	L.5.11.2	L-296

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
CTUIR (6-3-96)	0072 (W)	0072.24	L.5.11.2	L-296
CTUIR (6-3-96)	0072 (W)	0072.25	L.5.12.1	L-306
CTUIR (6-3-96)	0072 (W)	0072.26	L.5.12.1	L-307
CTUIR (6-3-96)	0072 (W)	0072.27	L.5.12.2	L-311
CTUIR (6-3-96)	0072 (W)	0072.28	L.5.3	L-256
CTUIR (6-3-96)	0072 (W)	0072.29	L.5.3	L-256
CTUIR (6-3-96)	0072 (W)	0072.30	L.5.3	L-257
CTUIR (6-3-96)	0072 (W)	0072.31	L.5.3	L-257
CTUIR (6-3-96)	0072 (W)	0072.32	L.5.3	L-257
CTUIR (6-3-96)	0072 (W)	0072.33	L.5.6	L-269
CTUIR (6-3-96)	0072 (W)	0072.34	L.5.6	L-270
CTUIR (6-3-96)	0072 (W)	0072.35	L.5.6	L-270
CTUIR (6-3-96)	0072 (W)	0072.36	L.5.6	L-271
CTUIR (6-3-96)	0072 (W)	0072.37	L.4.5	L-222
CTUIR (6-3-96)	0072 (W)	0072.38	L.4.5	L-223
CTUIR (6-3-96)	0072 (W)	0072.39	L.4.5	L-223
CTUIR (6-3-96)	0072 (W)	0072.40	L.4.5	L-223
CTUIR (6-3-96)	0072 (W)	0072.41	L.1.1.1	L-2
CTUIR (6-3-96)	0072 (W)	0072.42	L.1.1.2	L-4
CTUIR (6-3-96)	0072 (W)	0072.43	L.1.1.1	L-2
CTUIR (6-3-96)	0072 (W)	0072.44	L.1.1.3	L-6
CTUIR (6-3-96)	0072 (W)	0072.45	L.1.1.2	L-4
CTUIR (6-3-96)	0072 (W)	0072.46	L.9.3	L-340
CTUIR (6-3-96)	0072 (W)	0072.47	L.9.3	L-341
CTUIR (6-3-96)	0072 (W)	0072.48	L.9.3	L-341
CTUIR (6-3-96)	0072 (W)	0072.49	L.9.3	L-341
CTUIR (6-3-96)	0072 (W)	0072.50	L.3.3.1	L-38
CTUIR (6-3-96)	0072 (W)	0072.51	L.3.3.1	L-38
CTUIR (6-3-96)	0072 (W)	0072.52	L.6.2	L-327
CTUIR (6-3-96)	0072 (W)	0072.53	L.5.19	L-314
CTUIR (6-3-96)	0072 (W)	0072.54	L.5.11.2	L-297
CTUIR (6-3-96)	0072 (W)	0072.55	L.1.1.5	L-7
CTUIR (6-3-96)	0072 (W)	0072.56	L.1.1.6	L-10
CTUIR (6-3-96)	0072 (W)	0072.57	L.1.1.5	L-8
CTUIR (6-3-96)	0072 (W)	0072.58	L.1.1.6	L-11
CTUIR (6-3-96)	0072 (W)	0072.59	L.1.1.2	L-5
CTUIR (6-3-96)	0072 (W)	0072.60	L.1.1.5	L-8
CTUIR (6-3-96)	0072 (W)	0072.61	L.1.2.3	L-15
CTUIR (6-3-96)	0072 (W)	0072.62	L.1.2.3	L-15
CTUIR (6-3-96)	0072 (W)	0072.63	L.1.2.3	L-16
CTUIR (6-3-96)	0072 (W)	0072.64	L.1.2.2	L-14
CTUIR (6-3-96)	0072 (W)	0072.65	L.1.2.4	L-17

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
CTUIR (6-3-96)	0072 (W)	0072.66	L.1.2.4	L-17
CTUIR (6-3-96)	0072 (W)	0072.67	L.3.2.1	L-22
CTUIR (6-3-96)	0072 (W)	0072.68	L.3.2.1	L-22
CTUIR (6-3-96)	0072 (W)	0072.69	L.3.2.1	L-23
CTUIR (6-3-96)	0072 (W)	0072.70	L.3.2.1	L-23
CTUIR (6-3-96)	0072 (W)	0072.71	L.3.2.1	L-24
CTUIR (6-3-96)	0072 (W)	0072.72	L.3.2.1	L-24
CTUIR (6-3-96)	0072 (W)	0072.73	L.3.2.1	L-24
CTUIR (6-3-96)	0072 (W)	0072.74	L.3.2.1	L-25
CTUIR (6-3-96)	0072 (W)	0072.75	L.3.3.1	L-38
CTUIR (6-3-96)	0072 (W)	0072.76	L.3.3.1	L-39
CTUIR (6-3-96)	0072 (W)	0072.77	L.3.3.1	L-39
CTUIR (6-3-96)	0072 (W)	0072.78	L.3.3.1	L-39
CTUIR (6-3-96)	0072 (W)	0072.79	L.3.3.1	L-40
CTUIR (6-3-96)	0072 (W)	0072.80	L.3.2.1	L-26
CTUIR (6-3-96)	0072 (W)	0072.81	L.3.2.1	L-27
CTUIR (6-3-96)	0072 (W)	0072.82	L.3.4.2.4	L-126
CTUIR (6-3-96)	0072 (W)	0072.83	L.3.4.2.4	L-126
CTUIR (6-3-96)	0072 (W)	0072.84	L.3.4.2.1	L-102
CTUIR (6-3-96)	0072 (W)	0072.85	L.3.4.2.3	L-120
CTUIR (6-3-96)	0072 (W)	0072.86	L.3.4.2.3	L-121
CTUIR (6-3-96)	0072 (W)	0072.87	L.3.4.2.4	L-127
CTUIR (6-3-96)	0072 (W)	0072.88	L.3.4.2.3	L-121
CTUIR (6-3-96)	0072 (W)	0072.89	L.3.4.2.3	L-122
CTUIR (6-3-96)	0072 (W)	0072.90	L.3.4.2.3	L-122
CTUIR (6-3-96)	0072 (W)	0072.91	L.3.4.2.4	L-127
CTUIR (6-3-96)	0072 (W)	0072.92	L.3.4.2.2	L-110
CTUIR (6-3-96)	0072 (W)	0072.93	L.3.4.2.2	L-110
CTUIR (6-3-96)	0072 (W)	0072.94	L.3.4.3	L-129
CTUIR (6-3-96)	0072 (W)	0072.95	L.3.4.4	L-131
CTUIR (6-3-96)	0072 (W)	0072.96	L.3.4.4	L-131
CTUIR (6-3-96)	0072 (W)	0072.97	L.3.4.6	L-146
CTUIR (6-3-96)	0072 (W)	0072.98	L.3.4.6	L-147
CTUIR (6-3-96)	0072 (W)	0072.99	L.3.4.6	L-147
CTUIR (6-3-96)	0072 (W)	0072.100	L.3.4.7	L-152
CTUIR (6-3-96)	0072 (W)	0072.101	L.3.4.7	L-152
CTUIR (6-3-96)	0072 (W)	0072.102	L.3.4.7	L-153
CTUIR (6-3-96)	0072 (W)	0072.103	L.3.4.7	L-154
CTUIR (6-3-96)	0072 (W)	0072.104	L.3.4.7	L-154
CTUIR (6-3-96)	0072 (W)	0072.105	L.3.4.7	L-155
CTUIR (6-3-96)	0072 (W)	0072.106	L.3.4.7	L-155
CTUIR (6-3-96)	0072 (W)	0072.107	L.3.4.7	L-155

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
CTUIR (6-3-96)	0072 (W)	0072.108	L.3.4.7	L-156
CTUIR (6-3-96)	0072 (W)	0072.109	L.3.4.7	L-156
CTUIR (6-3-96)	0072 (W)	0072.110	L.3.4.7	L-157
CTUIR (6-3-96)	0072 (W)	0072.111	L.3.4.7	L-158
CTUIR (6-3-96)	0072 (W)	0072.112	L.3.4.8	L-162
CTUIR (6-3-96)	0072 (W)	0072.113	L.3.4.8	L-162
CTUIR (6-3-96)	0072 (W)	0072.114	L.3.4.8	L-163
CTUIR (6-3-96)	0072 (W)	0072.115	L.3.4.8	L-163
CTUIR (6-3-96)	0072 (W)	0072.116	L.3.4.8	L-163
CTUIR (6-3-96)	0072 (W)	0072.117	L.3.4.9	L-166
CTUIR (6-3-96)	0072 (W)	0072.118	L.3.4.9	L-166
CTUIR (6-3-96)	0072 (W)	0072.119	L.3.4.9	L-167
CTUIR (6-3-96)	0072 (W)	0072.120	L.3.4.10	L-168
CTUIR (6-3-96)	0072 (W)	0072.121	L.3.4.10	L-181
CTUIR (6-3-96)	0072 (W)	0072.122	L.3.4.11	L-181
CTUIR (6-3-96)	0072 (W)	0072.123	L.3.6	L-190
CTUIR (6-3-96)	0072 (W)	0072.124	L.4.1	L-205
CTUIR (6-3-96)	0072 (W)	0072.125	L.4.1	L-206
CTUIR (6-3-96)	0072 (W)	0072.126	L.4.1	L-206
CTUIR (6-3-96)	0072 (W)	0072.127	L.4.1	L-206
CTUIR (6-3-96)	0072 (W)	0072.128	L.4.1	L-206
CTUIR (6-3-96)	0072 (W)	0072.129	L.4.1	L-206
CTUIR (6-3-96)	0072 (W)	0072.130	L.4.1	L-207
CTUIR (6-3-96)	0072 (W)	0072.131	L.4.2	L-207
CTUIR (6-3-96)	0072 (W)	0072.132	L.4.2	L-208
CTUIR (6-3-96)	0072 (W)	0072.133	L.4.2	L-208
CTUIR (6-3-96)	0072 (W)	0072.134	L.4.2	L-208
CTUIR (6-3-96)	0072 (W)	0072.135	L.4.2	L-209
CTUIR (6-3-96)	0072 (W)	0072.136	L.4.2	L-209
CTUIR (6-3-96)	0072 (W)	0072.137	L.4.2	L-209
CTUIR (6-3-96)	0072 (W)	0072.138	L.4.2	L-209
CTUIR (6-3-96)	0072 (W)	0072.139	L.4.2	L-210
CTUIR (6-3-96)	0072 (W)	0072.140	L.4.3	L-213
CTUIR (6-3-96)	0072 (W)	0072.141	L.4.4	L-217
CTUIR (6-3-96)	0072 (W)	0072.142	L.4.4	L-217
CTUIR (6-3-96)	0072 (W)	0072.143	L.4.4	L-217
CTUIR (6-3-96)	0072 (W)	0072.144	L.4.4	L-218
CTUIR (6-3-96)	0072 (W)	0072.145	L.4.4	L-218
CTUIR (6-3-96)	0072 (W)	0072.146	L.4.4	L-218
CTUIR (6-3-96)	0072 (W)	0072.147	L.4.4	L-218
CTUIR (6-3-96)	0072 (W)	0072.148	L.4.4	L-219
CTUIR (6-3-96)	0072 (W)	0072.149	L.4.4	L-219

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
CTUIR (6-3-96)	0072 (W)	0072.150	L.4.4	L-221
CTUIR (6-3-96)	0072 (W)	0072.151	L.4.5	L-224
CTUIR (6-3-96)	0072 (W)	0072.152	L.4.5	L-224
CTUIR (6-3-96)	0072 (W)	0072.153	L.4.5	L-224
CTUIR (6-3-96)	0072 (W)	0072.154	L.4.5	L-225
CTUIR (6-3-96)	0072 (W)	0072.155	L.4.6	L-228
CTUIR (6-3-96)	0072 (W)	0072.156	L.4.6	L-228
CTUIR (6-3-96)	0072 (W)	0072.157	L.4.6	L-229
CTUIR (6-3-96)	0072 (W)	0072.158	L.4.7	L-232
CTUIR (6-3-96)	0072 (W)	0072.159	L.4.7	L-232
CTUIR (6-3-96)	0072 (W)	0072.160	L.4.8	L-236
CTUIR (6-3-96)	0072 (W)	0072.161	L.4.9	L-237
CTUIR (6-3-96)	0072 (W)	0072.162	L.4.11	L-238
CTUIR (6-3-96)	0072 (W)	0072.163	L.4.11	L-238
CTUIR (6-3-96)	0072 (W)	0072.164	L.5.21	L-320
CTUIR (6-3-96)	0072 (W)	0072.165	L.5.2.1	L-250
CTUIR (6-3-96)	0072 (W)	0072.166	L.5.2.1	L-250
CTUIR (6-3-96)	0072 (W)	0072.167	L.5.2.1	L-250
CTUIR (6-3-96)	0072 (W)	0072.168	L.3.2.1	L-27
CTUIR (6-3-96)	0072 (W)	0072.169	L.3.2.1	L-27
CTUIR (6-3-96)	0072 (W)	0072.170	L.3.2.1	L-28
CTUIR (6-3-96)	0072 (W)	0072.171	L.3.2.1	L-28
CTUIR (6-3-96)	0072 (W)	0072.172	L.3.2.1	L-28
CTUIR (6-3-96)	0072 (W)	0072.173	L.3.2.1	L-28
CTUIR (6-3-96)	0072 (W)	0072.174	L.3.2.1	L-29
CTUIR (6-3-96)	0072 (W)	0072.175	L.3.2.1	L-29
CTUIR (6-3-96)	0072 (W)	0072.176	L.3.2.1	L-30
CTUIR (6-3-96)	0072 (W)	0072.177	L.3.3.1	L-40
CTUIR (6-3-96)	0072 (W)	0072.178	L.3.4.2.3	L-122
CTUIR (6-3-96)	0072 (W)	0072.179	L.3.4.2.3	L-123
CTUIR (6-3-96)	0072 (W)	0072.180	L.3.4.2.4	L-128
CTUIR (6-3-96)	0072 (W)	0072.181	L.3.4.3	L-129
CTUIR (6-3-96)	0072 (W)	0072.182	L.3.4.3	L-129
CTUIR (6-3-96)	0072 (W)	0072.183	L.3.4.4	L-131
CTUIR (6-3-96)	0072 (W)	0072.184	L.3.4.5	L-132
CTUIR (6-3-96)	0072 (W)	0072.185	L.3.4.6	L-148
CTUIR (6-3-96)	0072 (W)	0072.186	L.3.4.7	L-159
CTUIR (6-3-96)	0072 (W)	0072.187	L.3.4.7	L-160
CTUIR (6-3-96)	0072 (W)	0072.188	L.3.4.7	L-160
CTUIR (6-3-96)	0072 (W)	0072.189	L.3.4.7	L-160
CTUIR (6-3-96)	0072 (W)	0072.190	L.3.4.9	L-167
CTUIR (6-3-96)	0072 (W)	0072.191	L.3.4.9	L-167

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
CTUIR (6-3-96)	0072 (W)	0072.192	L.3.4.10	L-169
CTUIR (6-3-96)	0072 (W)	0072.193	L.3.4.11	L-181
CTUIR (6-3-96)	0072 (W)	0072.194	L.3.4.2.3	L-123
CTUIR (6-3-96)	0072 (W)	0072.195	L.3.4.2.3	L-124
CTUIR (6-3-96)	0072 (W)	0072.196	L.3.9	L-203
CTUIR (6-3-96)	0072 (W)	0072.197	L.5.11	L-278
CTUIR (6-3-96)	0072 (W)	0072.198	L.5.11	L-278
CTUIR (6-3-96)	0072 (W)	0072.199	L.5.11	L-279
CTUIR (6-3-96)	0072 (W)	0072.200	L.5.11	L-279
CTUIR (6-3-96)	0072 (W)	0072.201	L.5.11	L-280
CTUIR (6-3-96)	0072 (W)	0072.202	L.5.11	L-280
CTUIR (6-3-96)	0072 (W)	0072.203	L.5.11	L-280
CTUIR (6-3-96)	0072 (W)	0072.204	L.5.11	L-280
CTUIR (6-3-96)	0072 (W)	0072.205	L.5.11	L-280
CTUIR (6-3-96)	0072 (W)	0072.206	L.5.11	L-281
CTUIR (6-3-96)	0072 (W)	0072.207	L.5.11.1	L-284
CTUIR (6-3-96)	0072 (W)	0072.208	L.5.11.1	L-285
CTUIR (6-3-96)	0072 (W)	0072.209	L.5.11.1	L-285
CTUIR (6-3-96)	0072 (W)	0072.210	L.5.11.1	L-286
CTUIR (6-3-96)	0072 (W)	0072.211	L.5.11.1	L-286
CTUIR (6-3-96)	0072 (W)	0072.212	L.5.11.1	L-286
CTUIR (6-3-96)	0072 (W)	0072.213	L.5.11.1	L-287
CTUIR (6-3-96)	0072 (W)	0072.214	L.5.11.1	L-287
CTUIR (6-3-96)	0072 (W)	0072.215	L.5.11.2	L-297
CTUIR (6-3-96)	0072 (W)	0072.216	L.5.11.2	L-297
CTUIR (6-3-96)	0072 (W)	0072.217	L.5.11.2	L-297
CTUIR (6-3-96)	0072 (W)	0072.218	L.5.11.2	L-298
CTUIR (6-3-96)	0072 (W)	0072.219	L.5.11.2	L-298
CTUIR (6-3-96)	0072 (W)	0072.220	L.5.11.2	L-298
CTUIR (6-3-96)	0072 (W)	0072.221	L.5.11.2	L-298
CTUIR (6-3-96)	0072 (W)	0072.222	L.5.11.2	L-299
CTUIR (6-3-96)	0072 (W)	0072.223	L.5.11.2	L-299
CTUIR (6-3-96)	0072 (W)	0072.224	L.5.11.2	L-300
CTUIR (6-3-96)	0072 (W)	0072.225	L.5.12	L-302
CTUIR (6-3-96)	0072 (W)	0072.226	L.5.12	L-303
CTUIR (6-3-96)	0072 (W)	0072.227	L.5.12	L-304
CTUIR (6-3-96)	0072 (W)	0072.228	L.5.12	L-304
CTUIR (6-3-96)	0072 (W)	0072.229	L.5.12	L-305
CTUIR (6-3-96)	0072 (W)	0072.230	L.5.12	L-305
CTUIR (6-3-96)	0072 (W)	0072.231	L.5.12	L-305
CTUIR (6-3-96)	0072 (W)	0072.232	L.5.12	L-305
CTUIR (6-3-96)	0072 (W)	0072.233	L.5.12	L-306

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CTUIR (6-3-96)	0072 (W)	0072.234	L.5.12.1	L-307
CTUIR (6-3-96)	0072 (W)	0072.235	L.5.12.1	L-308
CTUIR (6-3-96)	0072 (W)	0072.236	L.5.12.1	L-204
CTUIR (6-3-96)	0072 (W)	0072.237	L.5.2.1	L-250
CTUIR (6-3-96)	0072 (W)	0072.238	L.5.2.1	L-251
CTUIR (6-3-96)	0072 (W)	0072.239	L.5.3	L-258
CTUIR (6-3-96)	0072 (W)	0072.240	L.5.3	L-259
CTUIR (6-3-96)	0072 (W)	0072.241	L.5.3	L-259
CTUIR (6-3-96)	0072 (W)	0072.242	L.5.3	L-259
CTUIR (6-3-96)	0072 (W)	0072.243	L.5.3	L-260
CTUIR (6-3-96)	0072 (W)	0072.244	L.5.3	L-261
CTUIR (6-3-96)	0072 (W)	0072.245	L.5.3	L-261
CTUIR (6-3-96)	0072 (W)	0072.246	L.5.3	L-262
CTUIR (6-3-96)	0072 (W)	0072.247	L.5.3	L-262
CTUIR (6-3-96)	0072 (W)	0072.248	L.5.3	L-263
CTUIR (6-3-96)	0072 (W)	0072.249	L.5.3	L-263
CTUIR (6-3-96)	0072 (W)	0072.250	L.5.3	L-264
CTUIR (6-3-96)	0072 (W)	0072.251	L.5.3	L-264
CTUIR (6-3-96)	0072 (W)	0072.252	L.5.6	L-271
CTUIR (6-3-96)	0072 (W)	0072.253	L.5.6	L-274
CTUIR (6-3-96)	0072 (W)	0072.254	L.5.6	L-274
CTUIR (6-3-96)	0072 (W)	0072.255	L.5.6	L-275
CTUIR (6-3-96)	0072 (W)	0072.256	L.5.6	L-275
CTUIR (6-3-96)	0072 (W)	0072.257	L.5.6	L-275
CTUIR (6-3-96)	0072 (W)	0072.258	L.4.2.2	L-211
CTUIR (6-3-96)	0072 (W)	0072.259	L.4.2.2	L-211
CTUIR (6-3-96)	0072 (W)	0072.260	L.4.2.3	L-212
CTUIR (6-3-96)	0072 (W)	0072.261	L.4.2.2	L-212
CTUIR (6-3-96)	0072 (W)	0072.262	L.4.3	L-213
CTUIR (6-3-96)	0072 (W)	0072.263	L.4.4	L-221
CTUIR (6-3-96)	0072 (W)	0072.264	L.4.4	L-221
CTUIR (6-3-96)	0072 (W)	0072.265	L.4.4	L-222
CTUIR (6-3-96)	0072 (W)	0072.266	L.4.4	L-222
CTUIR (6-3-96)	0072 (W)	0072.267	L.4.5	L-226
CTUIR (6-3-96)	0072 (W)	0072.268	L.4.5	L-226
CTUIR (6-3-96)	0072 (W)	0072.269	L.4.5	L-227
CTUIR (6-3-96)	0072 (W)	0072.270	L.4.5	L-227
CTUIR (6-3-96)	0072 (W)	0072.271	L.4.6	L-230
CTUIR (6-3-96)	0072 (W)	0072.272	L.4.6	L-232
CTUIR (6-3-96)	0072 (W)	0072.273	L.4.7	L-233
CTUIR (6-3-96)	0072 (W)	0072.274	L.4.7	L-233
CTUIR (6-3-96)	0072 (W)	0072.275	L.4.7	L-234

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CTUIR (6-3-96)	0072 (W)	0072.276	L.4.7	L-234
CTUIR (6-3-96)	0072 (W)	0072.277	L.4.7	L-235
CTUIR (6-3-96)	0072 (W)	0072.278	L.4.7	L-235
CTUIR (6-3-96)	0072 (W)	0072.279	L.4.7	L-236
CTUIR (6-3-96)	0072 (W)	0072.280	L.4.9	L-237
CTUIR (6-3-96)	0072 (W)	0072.281	L.4.11	L-238
Culbert, Laurette	0090 (W)	Postcard Correspondence	*	
D'Alensio, David	0090 (W)	Postcard Correspondence	*	
Dansereau, Carol	0090 (W)	Postcard Correspondence	*	
Davenport, Leslie C.	0060 (W)	0060.01	L.3.4.1.2	L-75
Davenport, Leslie C.	0060 (W)	0060.02	L.3.4.1.2	L-78
Davenport, Leslie C.	0060 (W)	0060.03	L.3.4.1.2	L-79
Davenport, Leslie C.	0060 (W)	0060.04	L.3.4.1.2	L-79
Davenport, Leslie C.	0060 (W)	0060.05	L.3.5.1.2	L-187
Davis, Mary L.	0090 (W)	Postcard Correspondence	*	
Debb, Bartley	0090 (W)	Postcard Correspondence	*	
Delaney, Susan	0090 (W)	Postcard Correspondence	*	
Devoy, Tiffany	0025 (W)	Survey Respondant	L.3.9	
Devoy, Tiffany	0093 (O)	0093.01	L.9.7	L-361
Devoy, Tiffany	0093 (O)	0093.02	L.3.4.1.2	L-85
DHHS	0028 (W)	0028.01	L.5.11.1	L-282
Di Girolamo, Benedetto	0025 (W)	Survey Respondant	L.3.9	
DiGirolamo, Linda Raye	0025 (W)	Survey Respondant	L.3.9	
DiGirolamo, Linda Raye	0046 (W)	0046.01	L.9.8	L-362
DiGirolamo, Linda Raye	0046 (W)	0046.02	L.5.21	L-320
DiGirolamo, Linda Raye	0046 (W)	0046.03	L.3.9	L-201
DiGirolamo, Linda Raye	0046 (W)	0046.04	L.3.4.1.2	L-77
Doane, Margaret	0090 (W)	Postcard Correspondence	*	
Donovan, Virgil	0063 (O)	0063.01	L.9.3	L-339
Donovan, Virgil	0063 (O)	0063.02	L.9.3	L-339
Dubois, Pauline M.	0090 (W)	Postcard Correspondence	*	
Duncan, Julia K.	0090 (W)	Postcard Correspondence	*	
Durfey, Carla M.	0090 (W)	Postcard Correspondence	*	
Dyson, Jessica	0025 (W)	Survey Respondant	L.3.9	
Dyson, Jessica	0091 (O)	0091.01	L.5.2	L-239
Dyson, Jessica	0091 (O)	0091.02	L.3.4.1.2	L-72
Earle, Judith	0090 (W)	Postcard Correspondence	*	
Egbert, Gordon T.	0090 (W)	Postcard Correspondence	*	
Eid, Elizabeth A.	0090 (W)	Postcard Correspondence	*	
Eister, Warren	0102 (W)	0102.01	L.3.4.6	L-148
Eldredge, Maureen	0037 (O)	0037.01	L.3.4.1.2	L-71
Eldredge, Maureen	0037 (O)	0037.02	L.9.7	L-359

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Eldredge, Maureen	0037 (O)	0037.03	L.3.4.2.1	L-96
Eldredge, Maureen	0037 (O)	0037.04	L.9.7	L-360
Eldredge, Maureen	0037 (O)	0037.05	L.3.4.11	L-177
Engel, Jane	0090 (W)	Postcard Correspondence	*	
Engkjer, Nathan	0025 (W)	Survey Respondant	L.3.9	
EPA (5-10-96)	0007 (W)	0007.01	L.9.9	L-366
EPA (5-28-96)	0042 (W)	0042.01	L.3.4.1.1	L-60
EPA (5-28-96)	0042 (W)	0042.02	L.9.1	L-335
EPA (5-28-96)	0044 (W)	0044.01	L.9.9	L-371
Erickson, Linda V.	0090 (W)	Postcard Correspondence	*	
Erickson, Richard	0090 (W)	Postcard Correspondence	*	
Ersfeld, Al and Mary	0090 (W)	Postcard Correspondence	*	
Evett, Donald E.	0008 (W)	0008.01	L.3.4.2.1	L-90
Evett, Donald E.	0008 (W)	0008.02	L.3.4.2.1	L-91
Evett, Donald E.	0008 (W)	0008.03	L.3.5.1.1	L-185
Evett, Donald E.	0008 (W)	0008.04	L.3.4.2.4	L-125
Evett, Donald E.	0008 (W)	0008.05	L.5.2.1	L-241
Evett, Donald E.	0008 (W)	0008.06	L.3.5.1.1	L-44
Evett, Donald E.	0008 (W)	0008.07	L.10.5	L-379
Farjo, Yousif A.	0090 (W)	Postcard Correspondence	*	
Faste, Andrea	0090 (W)	Postcard Correspondence	*	
Finley, Andre and Scott	0090 (W)	Postcard Correspondence	*	
Finn, Ellen	0090 (W)	Postcard Correspondence	*	
Fisk, Charles P.	0025 (W)	Survey Respondant	L.3.9	
Fisk, Charles P.	0017 (W)	0017.01	L.3.4.1.2	L-74
Fisk, Charles P.	0017 (W)	0017.02	L.3.4.1.2	L-74
Fisk, Charles P.	0017 (W)	0017.03	L.3.4.1.2	L-74
Fisk, Charles P.	0017 (W)	0017.04	L.3.4.1.2	L-75
Forzi, Alicia	0090 (W)	Postcard Correspondence	*	
Fulcher, Neva	0090 (W)	Postcard Correspondence	*	
Fuson, Beth	0025 (W)	Survey Respondant	L.3.9	
Garfield, John	0057 (O)	0057.01	L.10.3	L-377
Garfield, John	0057 (O)	0057.02	L.3.4.11	L-180
Garfield, John	0057 (O)	0057.03	L.3.4.7	L-151
Garfield, John	0057 (O)	0057.04	L.3.4.2.1	L-101
Garfield, John	0057 (O)	0057.05	L.3.4.7	L-151
Garfield, John	0057 (O)	0057.06	L.3.4.2.2	L-108
Garfield, John	0057 (O)	0057.07	L.3.4.8	L-161
Geosafe	0023 (W)	0023.01	L.3.4.6	L-133
Geosafe	0023 (W)	0023.02	L.3.4.6	L-134
Geosafe	0023 (W)	0023.03	L.3.4.6	L-135
Geosafe	0023 (W)	0023.04	L.3.4.6	L-135

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Geosafe	0023 (W)	0023.05	L.3.4.6	L-136
Geosafe	0023 (W)	0023.06	L.3.4.6	L-136
Geosafe	0023 (W)	0023.07	L.3.4.6	L-137
Geosafe	0023 (W)	0023.08	L.3.4.6	L-137
Geosafe	0023 (W)	0023.09	L.3.4.6	L-138
Geosafe	0023 (W)	0023.10	L.3.4.6	L-138
Geosafe	0023 (W)	0023.11	L.3.4.6	L-139
Geosafe	0023 (W)	0023.12	L.3.4.6	L-139
Geosafe	0023 (W)	0023.13	L.3.4.6	L-140
Geosafe	0023 (W)	0023.14	L.3.4.6	L-140
Geosafe	0023 (W)	0023.15	L.3.4.6	L-140
Geosafe	0023 (W)	0023.16	L.3.4.6	L-141
Geosafe	0023 (W)	0023.17	L.3.4.6	L-141
Geosafe	0023 (W)	0023.18	L.3.4.6	L-141
Geosafe	0023 (W)	0023.19	L.3.4.6	L-142
Geosafe	0023 (W)	0023.20	L.3.4.6	L-142
Geosafe	0023 (W)	0023.21	L.3.4.6	L-143
Geosafe	0023 (W)	0023.22	L.3.4.6	L-143
Geosafe	0023 (W)	0023.23	L.3.4.6	L-143
Geosafe	0023 (W)	0023.24	L.3.4.6	L-144
Geosafe	0023 (W)	0023.25	L.3.4.6	L-144
Geosafe	0023 (W)	0023.26	L.3.4.6	L-145
Geosafe	0023 (W)	0023.27	L.3.4.6	L-145
Geosafe	0023 (W)	0023.28	L.3.4.6	L-145
Geosafe	0023 (W)	0023.29	L.3.4.6	L-146
Geosafe	0023 (W)	0023.30	L.3.4.6	L-146
Gerard, Joe	0025 (W)	Survey Respondant	L.3.9	
Gerhardt, Merle	0090 (W)	Postcard Correspondence	*	
Gilligan, Patrick H.	0090 (W)	Postcard Correspondence	*	
Gilsdorf, Paul D.	0011 (W)	0011.01	L.9.7	L-357
Goodwan, Kim	0025 (W)	Survey Respondant	L.3.9	
GRAY*STAR	0010 (W)	0010.01	L.9.3	L-336
Gress, S.	0025 (W)	Survey Respondant	L.3.9	
Griffiths, Eddie	0090 (W)	Postcard Correspondence	*	
Griffiths, Mary	0090 (W)	Postcard Correspondence	*	
Gustafson, Chuck	0090 (W)	Postcard Correspondence	*	
Gutierrez, Christina	0025 (W)	Survey Respondant	L.3.9	
Haas, Deesa M.	0090 (W)	Postcard Correspondence	*	
HAB (Exhibit) (5-6-96)	0039 (W)	0039.01		
Hamblin, Donald E.	0090 (W)	Postcard Correspondence	*	
Hamm, Barb	0090 (W)	Postcard Correspondence	*	
Hanford Communities	0043 (W)	0043.01	L.2.0	L-18

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Hanford Communities	0043 (W)	0043.02	L.3.4.1.1	L-60
Hanford Communities	0043 (W)	0043.03	L.9.6	L-356
Hanford Communities	0043 (W)	0043.04	L.9.7	L-360
Hanford Communities	0043 (W)	0043.05	L.3.5.1.1	L-187
Hanford Watch (Exhibit) (5-9-96)	0080 (W)	No new comments identified.		
Hanson, Mary	0025 (W)	Survey Respondant	L.3.9	
Hanson, Mary	0092 (O)	0092.01	L.3.4.2.2	L-113
Harms, Lucille	0090 (W)	Postcard Correspondence	*	
Hastings, Kathy	0090 (W)	Postcard Correspondence	*	
Haufit, Mary Jane	0090 (W)	Postcard Correspondence	*	
Hauge, Gladys	0090 (W)	Postcard Correspondence	*	
Haven, Sylvia	0090 (W)	Postcard Correspondence	*	
Hawkins, Betty	0090 (W)	Postcard Correspondence	*	
Hawkins, Elizabeth	0090 (W)	Postcard Correspondence	*	
Hawkins, William	0090 (W)	Postcard Correspondence	*	
Heacock, Harold	0032 (O)	0032.01	L.6.2	L-325
Heacock, Harold	0032 (O)	0032.02	L.3.4.1.2	
Heacock, Harold	0032 (O)	0032.03	L.3.4.1.2	L-76
Heacock, Harold	0032 (O)	0032.04	L.3.4.1.1	L-57
Heacock, Harold	0032 (O)	0032.05	L.3.4.11	L-171
Heacock, Harold	0032 (O)	0032.06	L.3.4.11	L-171
Heacock, Harold	0032 (O)	0032.07	L.3.5.1.1	L-186
Heacock, Harold (5-2-96)	0048 (O)	0048.01		
HEAL (Exhibit) (5-7-96)	0036 (W)	0036		
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.01	L.3.4.2.1	L-95
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.02	L.3.4.2.1	L-96
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.03	L.3.4.11	L-173
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.04	L.3.4.11	L-174
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.05	L.3.4.11	L-174
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.06	L.3.4.11	L-175
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.07	L.9.9	L-369
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.08	L.9.9	L-370
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.09	L.3.4.1.2	L-77
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.10	L.3.4.1.1	L-58
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.11	L.3.4.11	L-175
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.12	L.5.11.2	L-289
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.13	L.3.4.9	L-164
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.14	L.5.2.1	L-246
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.15	L.3.4.11	L-176
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.16	L.3.4.7	L-150
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.17	L.6.4	L-332
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.18	L.5.7	L-275

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
HEAL (Exhibit) (5-4-96)	0036 (W)	0036.19	L.5.11.2	L-289
HEAL (Exhibit) (5-2-96)	0056 (W)	0056.01		
HEAL (Exhibit) (5-15-96)	0071 (W)	No new comments identified.		
Heath, P. and Jensen D.	0090 (W)	Postcard Correspondence	*	
Hendrix, Richard M.	0090 (W)	Postcard Correspondence	*	
Herbst, Rodger	0090 (W)	Postcard Correspondence	*	
Hicks, David	0025 (W)	Survey Respondant	L.3.9	
Hill, Patricia	0090 (W)	Postcard Correspondence	*	
HOA (Exhibit) (5-15-96)	0070 (W)	No new comments identified.		
Holman, Peggy	0090 (W)	Postcard Correspondence	*	
Holmes, John A.	0090 (W)	Postcard Correspondence	*	
Hood, Bill and Ruth	0090 (W)	Postcard Correspondence	*	
Ingram, Michael C.	0090 (W)	Postcard Correspondence	*	
J.L. Shepherd and Assoc.	0016 (W)	0016.01	L.9.7	L-357
J.L. Shepherd and Assoc.	0016 (W)	0016.02	L.9.7	L-358
Jacobsen, Virginnia	0090 (W)	Postcard Correspondence	*	
James Jordan Assoc. (6-5-96)	0059 (W)	0059.01	L.3.4.1.2	L-77
James Jordan Assoc. (6-5-96)	0059 (W)	0059.02	L.3.9	L-202
Jamieson, S. and S.	0090 (W)	Postcard Correspondence	*	
Jimenez, Vanessa	0025 (W)	Survey Respondant	L.3.9	
Johnson, Neil	0090 (W)	Postcard Correspondence	*	
Johnson, P. Anna	0090 (W)	Postcard Correspondence	*	
Jordan, James (5-28-96)	0024 (W)	0024.01	L.9.9	
Journee, Lillian	0090 (W)	Postcard Correspondence	*	
Justen, Camerson	0090 (W)	Postcard Correspondence	*	
Kaald, Patricia T.	0090 (W)	Postcard Correspondence	*	
Kaeser, Norma	0090 (W)	Postcard Correspondence	*	
Kaiser, Carl	0090 (W)	Postcard Correspondence	*	
Kaplan, Alex	0090 (W)	Postcard Correspondence	*	
Kaplan, David M.	0090 (W)	Postcard Correspondence	*	
Katz, Mildred	0090 (W)	Postcard Correspondence	*	
Kearney, Tim	0090 (W)	Postcard Correspondence	*	
Keehn, Dell E.	0090 (W)	Postcard Correspondence	*	
Kelley, Dorothy M.	0090 (W)	Postcard Correspondence	*	
Kenyon, Sharon and Jeff	0090 (W)	Postcard Correspondence	*	
Kettrick, Catherine	0090 (W)	Postcard Correspondence	*	
Kimball, Janet	0090 (W)	Postcard Correspondence	*	
Kiriluk, Lawrence B.	0090 (W)	Postcard Correspondence	*	
Klein, Lyn	0090 (W)	Postcard Correspondence	*	
Klein, Robin	0085 (O)	0085.01	L.3.4.1.2	L-84
Klein, Robin	0085 (O)	0085.02	L.3.4.1.1	L-48
Klein, Robin	0085 (O)	0085.03	L.3.9	L-205

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Klein, Robin	0085 (O)	0085.04	L.5.11	L-281
Klein, Robin	0085 (O)	0085.05	L.5.11	L-282
Klein, Robin	0085 (O)	0085.06	L.9.10	L-375
Klein, Robin (Exhibit) (5-9-96)	0086 (W)	No new comments identified.		
Kloter, Elise	0090 (W)	Postcard Correspondence	*	
Knight, Paige	0079 (O)	0079.01	L.3.4.1.2	L-82
Knight, Paige	0079 (O)	0079.02	L.3.4.1.1	L-63
Knight, Paige	0079 (O)	0079.03	L.3.4.1.2	L-83
Knight, Paige	0079 (O)	0079.04	L.3.4.1.2	L-83
Knight, Paige	0079 (O)	0079.05	L.3.4.2.1	L-103
Knight, Paige	0079 (O)	0079.06	L.9.3	L-344
Kost, D'Vorah	0090 (W)	Postcard Correspondence	*	
Kramer, Ed	0090 (W)	Postcard Correspondence	*	
Krieg, Ronald K.	0030 (W)	0030.01	L.3.9	L-198
Krieg, Ronald K.	0030 (W)	0030.02	L.5.2.1	L-244
Krieg, Ronald K.	0030 (W)	0030.03	L.5.2.1	L-245
Krieg, Ronald K.	0030 (W)	0030.04	L.3.9	L-198
Krieg, Ronald K.	0030 (W)	0030.05	L.3.9	L-199
Kurfirst, Jill	0090 (W)	Postcard Correspondence	*	
Langren, Mary L.	0090 (W)	Postcard Correspondence	*	
Lantz, Ruth	0090 (W)	Postcard Correspondence	*	
Larsen, Jo Anne	0090 (W)	Postcard Correspondence	*	
LaValley, Rene	0025 (W)	Survey Respondant	L.3.9	
Leaman, Michael	0090 (W)	Postcard Correspondence	*	
LeBlanc, Judy	0090 (W)	Postcard Correspondence	*	
Leenstra, Carol	0090 (W)	Postcard Correspondence	*	
Leffew, Janice E.	0090 (W)	Postcard Correspondence	*	
Legaz, James and Mary Ann	0090 (W)	Postcard Correspondence	*	
Lercher-Chi, Heidi	0090 (W)	Postcard Correspondence	*	
Levri, Helen	0090 (W)	Postcard Correspondence	*	
Liebert, Paul	0090 (W)	Postcard Correspondence	*	
Liffew, Milford R.	0025 (W)	Survey Respondant	L.3.9	
Lipson, Joanne	0090 (W)	Postcard Correspondence	*	
Logan, Diane H.	0090 (W)	Postcard Correspondence	*	
Logan, Don	0090 (W)	Postcard Correspondence	*	
Longmeyer, Richard	0062 (O)	0062.01	L.6.2	L-326
Longmeyer, Richard	0062 (O)	0062.02	L.3.9	L-202
Longmeyer, Richard	0062 (O)	0062.03	L.3.4.2.3	L-120
Longmeyer, Richard	0062 (O)	0062.04	L.1.2.2	L-14
Longmeyer, Richard	0062 (O)	0062.05	L.3.4.2.1	L-102
Longmeyer, Richard	0062 (O)	0062.06	L.9.8	L-362
Lorella, Kathy	0090 (W)	Postcard Correspondence	*	

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Lucas, Betty	0090 (W)	Postcard Correspondence	*	
Luthy, L. and L.	0090 (W)	Postcard Correspondence	*	
Lynch, Brian	0025 (W)	Survey Respondant	L.3.9	
MacKenzie, Dornie	0090 (W)	Postcard Correspondence	*	
Mackey, Melvin E.	0090 (W)	Postcard Correspondence	*	
Mage, Carroll M.	0090 (W)	Postcard Correspondence	*	
Magee, Joan	0090 (W)	Postcard Correspondence	*	
Mannion, Don	0018 (W)	0018.01	L.9.9	
Manusos, P. and P.	0090 (W)	Postcard Correspondence	*	
Marioni, Paul	0090 (W)	Postcard Correspondence	*	
Markman, Sheila	0090 (W)	Postcard Correspondence	*	
Marquiss, Sherrill	0090 (W)	Postcard Correspondence	*	
Martin, Todd (5-7-96)	0035 (O)	0035.01	L.9.5	L-351
Martin, Todd (5-7-96)	0035 (O)	0035.02	L.3.4.1.2	L-76
Martin, Todd (5-7-96)	0035 (O)	0035.03	L.9.6	L-355
Martin, Todd (5-7-96)	0035 (O)	0035.04	L.3.4.2.1	L-93
Martin, Todd (5-7-96)	0035 (O)	0035.05	L.3.4.2.1	L-94
Martin, Todd (5-7-96)	0035 (O)	0035.06	L.3.4.11	L-171
Martin, Todd (5-7-96)	0035 (O)	0035.07	L.3.4.11	L-172
Martin, Todd (5-7-96)	0035 (O)	0035.08	L.3.4.1.1	L-58
Martin, Todd (5-7-96)	0035 (O)	0035.09	L.3.4.13	L-184
Martin, Todd (5-2-96)	0055 (O)	0055.01	L.9.9	L-371
Martin, Todd (5-2-96)	0055 (O)	0055.02	L.9.4	L-347
Martin, Todd (5-2-96)	0055 (O)	0055.03	L.9.3	L-338
Martin, Todd (5-2-96)	0055 (O)	0055.04	L.3.4.2.1	L-100
Martin, Todd (5-2-96)	0055 (O)	0055.05	L.3.4.2.1	L-100
Martin, Todd (5-2-96)	0055 (O)	0055.06	L.3.4.2.2	L-107
Martin, Todd (5-2-96)	0055 (O)	0055.07	L.5.11.2	L-292
Martin, Todd (5-2-96)	0055 (O)	0055.08	L.3.4.11	L-179
Martin, Todd (5-2-96)	0055 (O)	0055.09	L.3.4.9	L-165
Martin, Todd (5-15-96)	0068 (O)	0068.01	L.6.2	L-326
Martin, Todd (5-15-96)	0068 (O)	0068.02	L.3.4.11	L-180
Martin, Todd (5-15-96)	0068 (O)	0068.03	L.3.4.2.4	L-126
Martynouych, Marty	0090 (W)	Postcard Correspondence	*	
Matera, Susan	0090 (W)	Postcard Correspondence	*	
Mathes, Patricia K.	0090 (W)	Postcard Correspondence	*	
Mayhew, Isabel	0090 (W)	Postcard Correspondence	*	
McCourt, David	0090 (W)	Postcard Correspondence	*	
McKay, Martha	0090 (W)	Postcard Correspondence	*	
McNamara, Thomas W.	0090 (W)	Postcard Correspondence	*	
Melton, Don	0090 (W)	Postcard Correspondence	*	
Memmer, R. J.	0090 (W)	Postcard Correspondence	*	

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Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Miller, Winifred E.	0090 (W)	Postcard Correspondence	*	
Mink, Arthur R.	0090 (W)	Postcard Correspondence	*	
Mohunden, Anne	0090 (W)	Postcard Correspondence	*	
Moore, Jennifer	0094 (O)	0094.01	L.3.3.1	L-41
Moore, Jennifer	0094 (O)	0094.02	L.6.2	L-328
Moore, T. and M.	0090 (W)	Postcard Correspondence	*	
Moores, Alan	0090 (W)	Postcard Correspondence	*	
Morgan	0090 (W)	Postcard Correspondence	*	
Morrison, Ken and Marion	0090 (W)	Postcard Correspondence	*	
Mueller, Elizabeth J.	0090 (W)	Postcard Correspondence	*	
Murph, Kenneth	0090 (W)	Postcard Correspondence	*	
Murphy, Kenneth	0025 (W)	Survey Respondant	L.3.9	
Nafziger, Charles	0090 (W)	Postcard Correspondence	*	
Nash, Jr., Clyde	0025 (W)	Survey Respondant	L.3.9	
Nelson, Shirley Taylor	0090 (W)	Postcard Correspondence	*	
Neubert, Mary E.	0090 (W)	Postcard Correspondence	*	
Nez Perce Tribe ERWM	0089 (W)	0089.01	L.3.4.1.2	L-85
Nez Perce Tribe ERWM	0089 (W)	0089.02	L.3.5.1.2	L-188
Nez Perce Tribe ERWM	0089 (W)	0089.03	L.3.4.2.3	L-124
Nez Perce Tribe ERWM	0089 (W)	0089.04	L.3.4.2.2	L-112
Nez Perce Tribe ERWM	0089 (W)	0089.05	L.3.4.2.4	L-128
Nez Perce Tribe ERWM	0089 (W)	0089.06	L.5.2.1	L-252
Nez Perce Tribe ERWM	0089 (W)	0089.07	L.3.3.1	L-41
Nez Perce Tribe ERWM	0089 (W)	0089.08	L.5.2.1	L-253
Nez Perce Tribe ERWM	0089 (W)	0089.09	L.3.4.7	L-161
Nez Perce Tribe ERWM	0089 (W)	0089.10	L.3.2.1	L-31
Nez Perce Tribe ERWM	0089 (W)	0089.11	L.3.4.2.4	L-128
Nez Perce Tribe ERWM	0089 (W)	0089.12	L.5.11.2	L-301
Nez Perce Tribe ERWM	0089 (W)	0089.13	L.5.2.1	L-254
Nez Perce Tribe ERWM	0089 (W)	0089.14	L.5.2.1	L-254
Nez Perce Tribe ERWM	0089 (W)	0089.15	L.5.2.1	L-255
Nez Perce Tribe ERWM	0089 (W)	0089.16	L.5.5	L-268
Nez Perce Tribe ERWM	0089 (W)	0089.17	L.4.5	L-228
Nez Perce Tribe ERWM	0089 (W)	0089.18	L.3.4.2.1	L-104
Nez Perce Tribe ERWM	0089 (W)	0089.19	L.5.12.2	L-311
Nez Perce Tribe ERWM	0089 (W)	0089.20	L.4.1	L-207
Nez Perce Tribe ERWM	0089 (W)	0089.21	L.4.5	L-228
Nez Perce Tribe ERWM	0089 (W)	0089.22	L.4.5	L-228
Nez Perce Tribe ERWM	0089 (W)	0089.23	L.5.2	L-239
Nolan, Catherine	0090 (W)	Postcard Correspondence	*	
NRC	0015 (W)	0015.01	L.10.5	L-379
Number not used	0084			

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
O'Brien-Ochs, Rose	0090 (W)	Postcard Correspondence	*	
O'Donnell, Mariette	0090 (W)	Postcard Correspondence	*	
O'Farrell, Mary	0090 (W)	Postcard Correspondence	*	
O'Keefe, Raymond J.	0090 (W)	Postcard Correspondence	*	
ODOE (5-24-96)	0012 (W)	0012.01	L.3.4.1.1	L-55
ODOE (5-24-96)	0012 (W)	0012.02	L.3.4.1.2	L-69
ODOE (5-24-96)	0012 (W)	0012.03	L.3.4.1.1	L-56
ODOE (5-24-96)	0012 (W)	0012.04	L.3.4.1.2	L-70
ODOE (5-24-96)	0012 (W)	0012.05	L.3.4.1.2	L-70
ODOE (5-24-96)	0012 (W)	0012.06	L.3.4.2.1	L-91
ODOE (5-24-96)	0012 (W)	0012.07	L.3.4.1.1	L-56
ODOE (5-24-96)	0012 (W)	0012.08	L.3.4.12	L-183
ODOE (5-24-96)	0012 (W)	0012.09	L.3.4.1.1	L-56
ODOE (5-24-96)	0012 (W)	0012.10	L.9.6	L-355
ODOE (5-24-96)	0012 (W)	0012.11	L.9.3	L-337
ODOE (5-24-96)	0012 (W)	0012.12	L.9.2	L-336
ODOE (5-24-96)	0012 (W)	0012.13	L.3.5.1.2	L-187
ODOE (5-24-96)	0012 (W)	0012.14	L.3.2.1	L-20
ODOE (5-24-96)	0012 (W)	0012.15	L.5.2.1	L-241
ODOE (5-24-96)	0012 (W)	0012.16	L.5.2.1	L-243
ODOE (5-24-96)	0012 (W)	0012.17	L.5.11.2	L-288
ODOE (5-24-96)	0012 (W)	0012.18	L.4.4	L-214
ODOE (5-24-96)	0012 (W)	0012.19	L.7.0	L-332
ODOE (5-24-96)	0012 (W)	0012.20	L.3.4.2.3	L-116
ODOE (5-24-96)	0012 (W)	0012.21	L.5.12	L-302
ODOE (Exhibit) (5-9-96)	0077 (W)	0077.01	L.3.2.1	L-30
ODOE (Exhibit) (5-9-96)	0077 (W)	0077.02	L.3.4.1.2	L-81
ODOE (Exhibit) (5-9-96)	0077 (W)	0077.03	L.3.4.1.1	L-61
ODOE (Exhibit) (5-9-96)	0077 (W)	0077.04	L.3.4.2.2	L-110
ODOE (Exhibit) (5-9-96)	0077 (W)	0077.05	L.3.4.2.1	L-102
ODOE (Exhibit) (5-9-96)	0078 (W)	0078.01	L.9.3	L-343
ODOE (Exhibit) (5-9-96)	0078 (W)	0078.02	L.3.4.1.2	L-81
ODOE (Exhibit) (5-9-96)	0078 (W)	0078.03	L.3.4.1.2	L-82
ODOE (Exhibit) (5-9-96)	0078 (W)	0078.04	L.1.2.2	L-15
ODOE (Exhibit) (5-9-96)	0078 (W)	0078.05	L.9.3	L-343
ODOE (Exhibit) (5-9-96)	0078 (W)	0078.06	L.9.3	L-344
ODOE (Exhibit) (5-9-96)	0078 (W)	0078.07	L.3.4.1.2	L-75
Oliverson, Lenora M.	0025 (W)	Survey Respondant	L.3.9	
Palmer, M. T.	0090 (W)	Postcard Correspondence	*	
Patrick, Josephine	0090 (W)	Postcard Correspondence	*	
Pendergrass, May	0090 (W)	Postcard Correspondence	*	
Perry, Henry	0097 (O)	0097.01	L.3.3.1	L-41

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Perry, Henry E.	0090 (W)	Postcard Correspondence	*	
Phipps, Thomas	0065 (O)	0065.01	L.9.4	L-348
Plaag, Robert E.	0090 (W)	Postcard Correspondence	*	
Pollet, Gerald (5-2-96)	0052 (O)	0052.01	L.3.4.2.3	L-119
Pollet, Gerald (5-2-96)	0052 (O)	0052.02	L.3.4.2.1	L-99
Pollet, Gerald (5-2-96)	0052 (O)	0052.03	L.3.4.2.2	L-106
Pollet, Gerald (5-2-96)	0052 (O)	0052.04	L.3.4.2.2	L-106
Pollet, Gerald (5-2-96)	0052 (O)	0052.05	L.3.4.2.1	L-99
Pollet, Gerald (5-15-96)	0069 (O)	0069.01	L.5.2.1	L-248
Pollet, Gerald (5-15-96)	0069 (O)	0069.02	L.5.2.1	L-248
Pollet, Gerald (5-15-96)	0069 (O)	0069.03	L.5.11.2	L-292
Pollet, Gerald (5-15-96)	0069 (O)	0069.04	L.3.4.2.2	L-108
Pollet, Gerald (5-15-96)	0069 (O)	0069.05	L.6.3	L-329
Pollet, Gerald (5-15-96)	0069 (O)	0069.06	L.5.11.2	L-293
Pollet, Gerald (5-15-96)	0069 (O)	0069.07	L.5.11.2	L-293
Pollet, Gerald (5-15-96)	0069 (O)	0069.08	L.5.11.1	L-111
Pollet, Gerald (5-15-96)	0069 (O)	0069.09	L.5.11.1	L-248
Pollet, Gerald (5-15-96)	0069 (O)	0069.10	L.5.12.2	L-309
Pollet, Gerald (5-15-96)	0069 (O)	0069.11	L.5.12.2	L-309
Pollet, Gerald (5-15-96)	0069 (O)	0069.12	L.5.12.2	L-310
Pollet, Gerald (5-15-96)	0069 (O)	0069.13	L.5.12.2	L-311
Pollet, Gerald (5-15-96)	0069 (O)	0069.14	L.6.2	L-327
Pollet, Gerald (5-9-96)	0081 (O)	0081.01	L.3.4.2.2	L-111
Pollet, Gerald (5-9-96)	0081 (O)	0081.02	L.1.1.6	L-11
Pollet, Gerald (5-9-96)	0081 (O)	0081.03	L.3.4.2.2	L-111
Pollet, Gerald (5-9-96)	0081 (O)	0081.04	L.3.4.2.3	L-124
Pollet, Gerald (5-9-96)	0081 (O)	0081.05	L.3.4.2.1	L-103
Pollet, Gerald (5-9-96)	0081 (O)	0081.06	L.5.2.1	L-251
Pollet, Gerald (5-9-96)	0081 (O)	0081.07	L.5.12.1	L-308
Pollet, Gerald (5-9-96)	0081 (O)	0081.08	L.9.5	L-353
Pollet, Gerald (5-9-96)	0081 (O)	0081.09	L.5.11.2	L-301
Pollet, Gerald (5-9-96)	0081 (O)	0081.10	L.9.10	L-375
Pollet, Gerald (Exhibit) (5-9-96)	0082 (W)	No new comments identified.		
Pollet, Gerald (Exhibit) (5-9-96)	0083 (W)	0083.01	L.3.9	L-204
Pollet, Gerald (Exhibit) (5-9-96)	0083 (W)	0083.02	L.5.2.1	L-252
Pollet, Gerald (5-22-96)	0098 (O)	0098.01	L.3.4.2.2	L-114
Pollet, Gerald (5-22-96)	0098 (O)	0098.02	L.3.3.1	L-42
Pollet, Gerald (5-22-96)	0098 (O)	0098.03	L.3.4.2	L-86
Pollet, Gerald (5-22-96)	0098 (O)	0098.04	L.5.21	L-321
Pollet, Gerald (5-22-96)	0098 (O)	0098.05	L.5.12.2	L-312
Pollet, Gerald (5-22-96)	0098 (O)	0098.06	L.1.1.5	L-9
Pollet, Gerald (5-22-96)	0098 (O)	0098.07	L.9.10	L-376

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Pollet, Gerald (Exhibit) (5-22-96)	0099 (W)	No new comments identified.		
Poor, Penelope M.	0090 (W)	Postcard Correspondence	*	
Porter, Lynn	0088 (O)	0088.01	L.3.4.1.2	L-84
Porter, Lynn	0088 (O)	0088.02	L.9.8	L-364
Porter, Lynn	0088 (O)	0088.03	L.3.4.1.1	L-49
Porter, Lynn	0088 (O)	0088.04	L.9.3	L-345
Porter, Lynn	0088 (O)	0088.05	L.3.4.11	L-182
Postcard	0090 (W)	0090.01	L.3.4.2.2	L-113
Postcard Correspondence	0090 (W)	0090.02	L.5.2.1	L-255
Postcard Correspondence	0090 (W)	0090.03	L.5.12.2	L-311
Postcard Correspondence	0090 (W)	0090.04	L.3.4.1.2	L-72
Postcard Correspondence	0090 (W)	0090.05	L.5.11.1	L-287
Price, Patricia R.	0090 (W)	Postcard Correspondence	*	
Rabinowitz, Alan	0090 (W)	Postcard Correspondence	*	
Rainbow, Dee Dee	0090 (W)	Postcard Correspondence	*	
Ramey, Gerry	0025 (W)	Survey Respondant	L.3.9	
Raskin, Stephen	0090 (W)	Postcard Correspondence	*	
Read, David H.	0090 (W)	Postcard Correspondence	*	
Rediske, Mark	0090 (W)	Postcard Correspondence	*	
Reeves, Merilyn	0038 (O)	0038.01	L.3.4.4	L-130
Reeves, Merilyn	0038 (O)	0038.02	L.9.5	L-351
Reeves, Merilyn	0038 (O)	0038.03	L.3.4.1.1	L-59
Reeves, Merilyn	0038 (O)	0038.04	L.5.11.2	L-290
Reeves, Merilyn	0038 (O)	0038.05	L.3.4.1.1	L-59
Reeves, Merilyn	0038 (O)	0038.06	L.3.4.11	L-177
Reeves, Merilyn	0038 (O)	0038.07	L.3.4.11	L-178
Reeves, Merilyn	0038 (O)	0038.08	L.3.4.11	L-178
Reeves, Merilyn	0038 (O)	0038.09	L.3.4.11	L-178
Reeves, Merilyn	0038 (O)	0038.10	L.3.4.2.1	L-97
Reeves, Merilyn	0038 (O)	0038.11	L.3.4.11	L-178
Reeves, Merilyn	0038 (O)	0038.12	L.9.5	L-352
Reich, Jeff	0090 (W)	Postcard Correspondence	*	
Reichert, Eileen	0090 (W)	Postcard Correspondence	*	
Richards, Michael	0090 (W)	Postcard Correspondence	*	
Rieck, Marjorie L.	0090 (W)	Postcard Correspondence	*	
Rivard, Mary A.	0090 (W)	Postcard Correspondence	*	
Robinson, Bob	0090 (W)	Postcard Correspondence	*	
Robnett, Aussey H.	0025 (W)	Survey Respondant	L.3.9	
Roecker, John H. (4-22-96)	0002 (W)	0002.01	L.9.9	L-365
Roecker, John H. (5-27-96)	0027 (W)	0027.01	L.9.10	L-372
Roecker, John H. (5-27-96)	0027 (W)	0027.02	L.3.4.2.1	L-92
Roecker, John H. (5-27-96)	0027 (W)	0027.03	L.3.9	L-195

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Roecker, John H. (5-27-96)	0027 (W)	0027.04	L.3.9	L-196
Roecker, John H. (5-27-96)	0027 (W)	0027.05	L.3.4.2.1	L-93
Roecker, John H. (5-27-96)	0027 (W)	0027.06	L.3.9	L-196
Roecker, John H. (5-27-96)	0027 (W)	0027.07	L.3.4.2.1	L-93
Roecker, John H. (5-27-96)	0027 (W)	0027.08	L.3.9	L-197
Roecker, John H. (5-27-96)	0027 (W)	0027.09	L.3.9	L-197
Roecker, John H. (5-27-96)	0027 (W)	0027.10	L.3.4.7	L-150
Roecker, John H. (5-27-96)	0027 (W)	0027.11	L.3.4.2.3	L-118
Roecker, John H. (5-15-96)	0064 (O)	0064.01	L.3.4.2.3	L-120
Roecker, John H. (5-15-96)	0064 (O)	0064.02	L.9.4	L-348
Rogers, Gordon J.	0040 (W)	0040.01	L.3.4.1.1	L-47
Rogers, Gordon J.	0040 (W)	0040.02	L.3.4.2.3	L-119
Rogers, Gordon J.	0040 (W)	0040.03	L.5.11.2	L-290
Rogers, Gordon J.	0040 (W)	0040.04	L.6.4	L-332
Rogers, Gordon J.	0040 (W)	0040.05	L.3.5.1.1	L-187
Rogers, Gordon J.	0040 (W)	0040.06	L.5.2.1	L-247
Rogers, Gordon J.	0040 (W)	0040.07	L.9.6	L-355
Rolfe, Arthur	0090 (W)	Postcard Correspondence	*	
Rosenthal, Ann T.	0090 (W)	Postcard Correspondence	*	
Russell, Loretta	0090 (W)	Postcard Correspondence	*	
Saaris, G. and Reid, C.	0090 (W)	Postcard Correspondence	*	
Sand, Barbara	0090 (W)	Postcard Correspondence	*	
Sandiford, Mary E.C.	0090 (W)	Postcard Correspondence	*	
Sauders, Beverly	0090 (W)	Postcard Correspondence	*	
Schilling, Fred E.	0021 (W)	0021.01	L.3.4.1.2	L-65
Schneider-Chen, K. and M.	0090 (W)	Postcard Correspondence	*	
Schroster, Leonard W.	0090 (W)	Postcard Correspondence	*	
Schwarjeuboek, Marian	0090 (W)	Postcard Correspondence	*	
Schwarz, T. and M.	0090 (W)	Postcard Correspondence	*	
Scott, Carolyn	0090 (W)	Postcard Correspondence	*	
Shandera, Stephanie	0090 (W)	Postcard Correspondence	*	
Shaternick, Juanita	0090 (W)	Postcard Correspondence	*	
Shourd, Lonita	0090 (W)	Postcard Correspondence	*	
Silberstein, Bess Ruth	0090 (W)	Postcard Correspondence	*	
Silverman, Larry	0090 (W)	Postcard Correspondence	*	
Simmons-O'Neill, Elizabeth	0090 (W)	Postcard Correspondence	*	
Simon, Ilyse	0090 (W)	Postcard Correspondence	*	
Sims, Lynn	0090 (W)	Postcard Correspondence	*	
Sims, Lynn (5-28-96)	0022 (W)	0022.01	L.9.8	L-361
Sims, Lynn (5-28-96)	0022 (W)	0022.02	L.3.3.1	L-33
Sims, Lynn (5-28-96)	0022 (W)	0022.03	L.3.4.1.1	L-57
Sims, Lynn (5-28-96)	0022 (W)	0022.04	L.3.9	L-192

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Sims, Lynn (5-28-96)	0022 (W)	0022.05	L.9.8	L-362
Sims, Lynn (5-9-96)	0074 (O)	0074.01	L.3.4.1.2	L-69
Sims, Lynn (5-9-96)	0074 (O)	0074.02	L.9.3	L-342
Sitley, Paul W.	0090 (W)	Postcard Correspondence	*	
Sjoblom, H.R.	0090 (W)	Postcard Correspondence	*	
Skaug, Ed	0025 (W)	Survey Respondant	L.3.9	L-193
Sladen, Chris	0090 (W)	Postcard Correspondence	*	
Smith, J. and Daubert K.	0090 (W)	Postcard Correspondence	*	
Smith, Travis and Edith	0090 (W)	Postcard Correspondence	*	
Springle, Suzann L.	0090 (W)	Postcard Correspondence	*	
St. John, Jeralyn	0090 (W)	Postcard Correspondence	*	
Stablu, Ryan	0025 (W)	Survey Respondant	L.3.9	L-193
Stakley, Margaret L.	0090 (W)	Postcard Correspondence	*	
Steele, William K.	0090 (W)	Postcard Correspondence	*	
Steputis, Janet R.	0090 (W)	Postcard Correspondence	*	
Stern, Anna M.	0090 (W)	Postcard Correspondence	*	
Stilger, Bob	0066 (O)	0066.01	L.9.10	L-373
Stock, Sidney	0095 (O)	0095.01	L.10.3	L-378
Strauss	0090 (W)	Postcard Correspondence	*	
Stripes, Julie	0090 (W)	Postcard Correspondence	*	
Surla, Johanna	0090 (W)	Postcard Correspondence	*	
Survey (HOA)	0025 (W)	0025.01	L.3.9	L-193
Sutherland, Marquerite	0090 (W)	Postcard Correspondence	*	
Sutton, Shelley	0090 (W)	Postcard Correspondence	*	
Swanson, John L. (5-11-96)	0005 (W)	0005.01	L.9.9	L-365
Swanson, John L. (5-11-96)	0005 (W)	0005.02	L.9.5	L-349
Swanson, John L. (5-11-96)	0005 (W)	0005.03	L.9.10	L-372
Swanson, John L. (5-11-96)	0005 (W)	0005.04	L.9.5	L-350
Swanson, John L. (5-11-96)	0005 (W)	0005.05	L.3.4.12	L-182
Swanson, John L. (5-11-96)	0005 (W)	0005.06	L.9.5	L-350
Swanson, John L. (5-11-96)	0005 (W)	0005.07	L.9.4	L-345
Swanson, John L. (5-11-96)	0005 (W)	0005.08	L.6.4	L-330
Swanson, John L. (5-11-96)	0005 (W)	0005.09	L.3.4.10	L-168
Swanson, John L. (5-11-96)	0005 (W)	0005.10	L.3.2.1	L-19
Swanson, John L. (5-11-96)	0005 (W)	0005.11	L.3.4.13	L-184
Swanson, John L. (5-11-96)	0005 (W)	0005.12	L.3.4.2.2	L-104
Swanson, John L. (5-11-96)	0005 (W)	0005.13	L.3.4.2.2	L-105
Swanson, John L. (5-11-96)	0005 (W)	0005.14	L.3.4.2.2	L-105
Swanson, John L. (5-11-96)	0005 (W)	0005.15	L.3.7	L-191
Swanson, John L. (5-11-96)	0005 (W)	0005.16	L.5.11	L-298
Swanson, John L. (5-11-96)	0005 (W)	0005.17	L.3.3.1	L-31
Swanson, John L. (5-11-96)	0005 (W)	0005.18	L.3.3.1	L-32

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Swanson, John L. (5-11-96)	0005 (W)	0005.19	L.5.2.1	L-240
Swanson, John L. (5-11-96)	0005 (W)	0005.20	L.1.2.1	L-12
Swanson, John L. (5-11-96)	0005 (W)	0005.21	L.1.1.2	L-3
Swanson, John L. (5-11-96)	0005 (W)	0005.22	L.3.2.1	L-19
Swanson, John L. (5-11-96)	0005 (W)	0005.23	L.1.1.4	L-7
Swanson, John L. (5-11-96)	0005 (W)	0005.24	L.1.1.1	L-1
Swanson, John L. (5-11-96)	0005 (W)	0005.25	L.1.1.1	L-1
Swanson, John L. (5-11-96)	0005 (W)	0005.26	L.3.3.1	L-33
Swanson, John L. (5-11-96)	0005 (W)	0005.27	L.1.1.3	L-6
Swanson, John L. (5-11-96)	0005 (W)	0005.28	L.1.1.1	L-1
Swanson, John L. (5-11-96)	0005 (W)	0005.29	L.1.1.1	L-1
Swanson, John L. (5-11-96)	0005 (W)	0005.30	L.1.1.4	L-7
Swanson, John L. (5-11-96)	0005 (W)	0005.31	L.1.2.1	L-13
Swanson, John L. (5-11-96)	0005 (W)	0005.32	L.1.1.6	L-10
Swanson, John L. (5-11-96)	0005 (W)	0005.33	L.1.2.1	L-13
Swanson, John L. (5-11-96)	0005 (W)	0005.34	L.1.2.1	L-13
Swanson, John L. (5-11-96)	0005 (W)	0005.35	L.1.2.1	L-14
Swanson, John L. (5-11-96)	0005 (W)	0005.36	L.2.0	L-17
Swanson, John L. (5-11-96)	0005 (W)	0005.37	L.3.2.1	L-19
Swanson, John L. (5-11-96)	0005 (W)	0005.38	L.3.3.1	L-33
Swanson, John L. (5-11-96)	0005 (W)	0005.39	L.3.4.2.3	L-114
Swanson, John L. (5-11-96)	0005 (W)	0005.40	L.3.4.2.3	L-115
Swanson, John L. (5-11-96)	0005 (W)	0005.41	L.3.4.2.4	L-125
Swanson, John L. (5-11-96)	0005 (W)	0005.42	L.3.4.2.3	L-115
Swanson, John L. (5-11-96)	0005 (W)	0005.43	L.3.4.2.4	L-125
Swanson, John L. (5-11-96)	0005 (W)	0005.44	L.3.4.2.1	L-90
Swanson, John L. (5-11-96)	0005 (W)	0005.45	L.3.4.7	L-149
Swanson, John L. (5-11-96)	0005 (W)	0005.46	L.3.4.7	L-149
Swanson, John L. (5-11-96)	0005 (W)	0005.47	L.3.4.7	L-150
Swanson, John L. (5-11-96)	0005 (W)	0005.48	L.3.4.8	L-161
Swanson, John L. (5-11-96)	0005 (W)	0005.49	L.3.4.9	L-163
Swanson, John L. (5-11-96)	0005 (W)	0005.50	L.3.4.9	L-164
Swanson, John L. (5-11-96)	0005 (W)	0005.51	L.3.4.11	L-170
Swanson, John L. (5-11-96)	0005 (W)	0005.52	L.3.4.11	L-170
Swanson, John L. (5-11-96)	0005 (W)	0005.53	L.3.4.11	L-170
Swanson, John L. (5-11-96)	0005 (W)	0005.54	L.3.4.11	L-170
Swanson, John L. (5-11-96)	0005 (W)	0005.55	L.3.7	L-191
Swanson, John L. (5-11-96)	0005 (W)	0005.56	L.5.11.1	L-282
Swanson, John L. (5-11-96)	0005 (W)	0005.57	L.6.3	L-328
Swanson, John L. (5-11-96)	0005 (W)	0005.58	L.6.4	L-331
Swanson, John L. (5-11-96)	0005 (W)	0005.59	L.3.9	L-192
Swanson, John L. (5-11-96)	0005 (W)	0005.60	L.3.9	L-192

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Swanson, John L. (5-2-96)	0058 (O)	0058.01	L.3.9	L-202
Swegel, Grace I.	0090 (W)	Postcard Correspondence	*	
Sykes, Megan	0006 (W)	0006.01	L.3.5.1.1	L-185
Taylor, Jeanie	0090 (W)	Postcard Correspondence	*	
Taylor, Mason D.	0090 (W)	Postcard Correspondence	*	
Tewksbury, Ross	0087 (O)	0087.01	L.9.8	L-363
Tewksbury, Ross	0087 (O)	0087.02	L.9.3	L-344
Tewksbury, Ross	0087 (O)	0087.03	L.9.5	L-354
Tewksbury, Ross	0087 (O)	0087.04	L.3.4.1.2	L-84
Thode, Kay	0090 (W)	Postcard Correspondence	*	
Thomas, G. and Carreri, D.	0090 (W)	Postcard Correspondence	*	
Thompson, Jason	0090 (W)	Postcard Correspondence	*	
Thompson, Marilyn	0090 (W)	Postcard Correspondence	*	
Thornbrugh, David	0090 (W)	Postcard Correspondence	*	
Tieksaudom, Nancy	0090 (W)	Postcard Correspondence	*	
Tomlinson, Barbara	0090 (W)	Postcard Correspondence	*	
TRIDEC (Exhibit) (5-2-96)	0033 (W)	0033.01		
TRIDEC (Exhibit) (5-2-96)	0049 (W)	0049.01		
Trimble-Beetz, Victoria	0090 (W)	Postcard Correspondence	*	
Trumbauers, M. and K.	0090 (W)	Postcard Correspondence	*	
Tweedy, Glenda	0090 (W)	Postcard Correspondence	*	
USDOC	0061 (W)	0061.01	L.4.12	L-239
USDOC	0061 (W)	0061.02	L.5.21	L-320
USDOI	0045 (W)	0045.01	L.4.2.2	L-210
USDOI	0045 (W)	0045.02	L.5.2.1	L-247
USDOI	0045 (W)	0045.03	L.5.2.1	L-248
USDOI	0045 (W)	0045.04	L.4.2.2	L-210
Van Fleet, Janet	0090 (W)	Postcard Correspondence	*	
Vanderwall, Bruce	0090 (W)	Postcard Correspondence	*	
Vayda, Genevieve	0090 (W)	Postcard Correspondence	*	
Verbois, Margaret	0090 (W)	Postcard Correspondence	*	
Wagner, Elizabeth	0090 (W)	Postcard Correspondence	*	
Waite, Corey N.	0020 (W)	0020.01	L.9.9	L-367
Walters, Bennie	0025 (W)	Survey Respondant	L.3.9	L-193
Watts, Dave and Carol	0090 (W)	Postcard Correspondence	*	
WDFW	0019 (W)	0019.01	L.6.1	L-323
WDFW	0019 (W)	0019.02	L.2.0	L-323
WDFW	0019 (W)	0019.03	L.3.6	L-188
WDFW	0019 (W)	0019.04	L.3.4.2.3	L-118
WDFW	0019 (W)	0019.05	L.4.4	L-214
WDFW	0019 (W)	0019.06	L.5.20	L-317
WDFW	0019 (W)	0019.07	L.3.6	L-190

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
WDFW	0019 (W)	0019.08	L.4.4	L-215
WDFW	0019 (W)	0019.09	L.4.4	L-215
WDFW	0019 (W)	0019.10	L.4.4	L-215
WDFW	0019 (W)	0019.11	L.4.4	L-216
WDFW	0019 (W)	0019.12	L.4.4	L-266
WDFW	0019 (W)	0019.13	L.5.4	L-267
WDFW	0019 (W)	0019.14	L.5.4	L-267
WDFW	0019 (W)	0019.15	L.5.4	L-267
WDFW	0019 (W)	0019.16	L.5.4	L-268
WDFW	0019 (W)	0019.17	L.5.13	L-312
WDFW	0019 (W)	0019.18	L.5.14	L-314
WDFW	0019 (W)	0019.19	L.5.20	L-318
WDFW	0019 (W)	0019.20	L.5.20	L-319
WDFW	0019 (W)	0019.21	L.4.4	L-216
WDFW	0019 (W)	0019.22	L.4.4	L-216
WDFW	0019 (W)	0019.23	L.4.4	L-216
WDOH	0100 (W)	0100.01	L.5.3	L-266
WDOH	0100 (W)	0100.02	L.5.3	L-266
Weinrod, David	0090 (W)	Postcard Correspondence	*	
Welch, C. and A.	0090 (W)	Postcard Correspondence	*	
Wharton, Joe	0090 (W)	Postcard Correspondence	*	
White, Barbara S.	0090 (W)	Postcard Correspondence	*	
Wickett, Kathleen	0090 (W)	Postcard Correspondence	*	
Willett, Betty	0090 (W)	Postcard Correspondence	*	
Williams, Steve	0090 (W)	Postcard Correspondence	*	
Wilson, Marie L.	0090 (W)	Postcard Correspondence	*	
Wiren, Harold and Alice	0090 (W)	Postcard Correspondence	*	
Woliner, Michael	0090 (W)	Postcard Correspondence	*	
Wright, Gary E.	0090 (W)	Postcard Correspondence	*	
Wright, Peter (5-9-96)	0075 (O)	0075.01	L.9.8	L-363
Wright, Peter (5-9-96)	0075 (O)	0075.02	L.9.3	L-342
Wynstra, Susan	0090 (W)	Postcard Correspondence	*	
Yakama Indian Nation	0101 (W)	0101.01	L.3.4.2	L-86
Yakama Indian Nation	0101 (W)	0101.02	L.5.11.2	L-301
Yakama Indian Nation	0101 (W)	0101.03	L.5.5	L-268
Yakama Indian Nation	0101 (W)	0101.04	L.3.4.2	L-87
Yakama Indian Nation	0101 (W)	0101.05	L.5.13	L-313
Yakama Indian Nation	0101 (W)	0101.06	L.3.3.1	L-43
Yakama Indian Nation	0101 (W)	0101.07	L.3.4.2	L-88
Yakama Indian Nation	0101 (W)	0101.08	L.5.19	L-316
Yakama Indian Nation	0101 (W)	0101.09	L.6.2	L-328
Yakama Indian Nation	0101 (W)	0101.10	L.7.0	L-334

Table L.1 Appendix L Individual/Organization Index (cont'd)

Individual/Organization (Date Submitted)	Comment Document (Oral or Written)	Comment Number	Response Section	Page Number
Yarbrougt, Nicola	0090 (W)	Postcard Correspondence	*	
Yazzolino, Brad	0090 (W)	Postcard Correspondence	*	
Yazzolino, Brad (5-9-96)	0073 (O)	0073.01	L.3.4.1.2	L-71
Yazzolino, Brad (5-9-96)	0073 (O)	0073.02	L.5.2.2	L-276
Zepetta, Barbara	0025 (W)	Survey Respondant	L.3.9	L-193
Zepetta, Barbara	0096 (O)	0096.01	L.10.3	L-378

Note:
* Please refer to "Postcard Correspondence" in Column 1.

Table L.2 Appendix L Section/Page Index

Section	Page Numbers	Comment Number
L.1.0 Summary and Introduction	L-1	No comments were received for this section.
L.1.1 Summary	L-1	No comments were received for this section.
L.1.1.1 Definitions	L-1 to L-3	0005.24, 0005.25, 0005.28, 0005.29, 0041.01, 0072.41, 0072.43
L.1.1.2 Regulatory Compliance	L-3 to L-6	0005.21, 0072.42, 0072.45, 0072.59
L.1.1.3 Vitrification	L-6 to L-7	0005.27, 0072.44
L.1.1.4 Transportation	L-7	0005.23, 0005.30
L.1.1.5 Risk	L-7 to L-10	0072.55, 0072.57, 0072.60, 0098.06
L.1.1.6 Other	L-10 to L-12	0005.32, 0072.56, 0072.58, 0081.02
L.1.2 Introduction and Policy Background	L-12	No comments were received for this section.
L.1.2.1 Wording	L-12 to L-14	0005.20, 0005.31, 0005.33, 0005.34, 0005.35
L.1.2.2 Tank Waste Disposal	L-14 to L-15	0062.04, 0072.64, 0078.04
L.1.2.3 Inventory	L-15 to L-17	0072.61, 0072.62, 0072.63
L.1.2.4 Other	L-17	0072.65, 0072.66
L.2.0 Purpose and Need for Action	L-17 to L-19	0005.36, 0019.02, 0043.01
L.3.0 Description and Comparison of Alternatives	L-19	No comments were received for this section.
L.3.1 Introduction	L-19	No comments were received for this section.
L.3.2 Site and Waste Description	L-19	No comments were received for this section.
L.3.2.1 Tank Waste	L-19 to L-31	0005.10, 0005.22, 0005.37, 0012.14, 0072.07, 0072.14, 0072.67, 0072.68, 0072.69, 0072.70, 0072.71, 0072.72, 0072.73, 0072.74, 0072.80, 0072.81, 0072.168, 0072.169, 0072.170, 0072.171, 0072.172, 0072.173, 0072.174, 0072.175, 0072.176, 0077.01, 0089.10
L.3.2.2 Cesium and Strontium Capsules	L-31	No comments were received for this section.
L.3.3 Development of Alternatives	L-31	No comments were received for this section.
L.3.3.1 Tank Waste	L-31 to L-44	0005.17, 0005.18, 0005.26, 0005.38, 0022.02, 0072.05, 0072.08, 0072.50, 0072.51, 0072.75, 0072.76, 0072.77, 0072.78, 0072.79, 0072.177, 0089.07, 0094.01, 0097.01, 0098.02, 0101.06
L.3.3.2 Cesium and Strontium Capsules	L-44	No comments were received for this section.
L.3.4 Tank Waste Alternatives	L-44	No comments were received for this section.
L.3.4.1 Preferences for Tank Waste Alternatives	L-44	No comments were received for this section.
L.3.4.1.1 Specific Preferences	L-44 to L-63	0008.03, 0009.05, 0009.06, 0009.07, 0009.08, 0009.09, 0009.10, 0009.11, 0009.12, 0009.15, 0009.16, 0009.17, 0009.18, 0009.19, 0012.01, 0012.03, 0012.07, 0012.09, 0022.03, 0032.04, 0035.08, 0036.10, 0038.03, 0038.05, 0040.01, 0042.01, 0043.02, 0072.01, 0076.02, 0077.03, 0079.02, 0085.02, 0088.03
L.3.4.1.2 General Preferences	L-63 to L-86	0009.03, 0009.04, 0012.02, 0012.04, 0012.05, 0014.03, 0014.04, 0017.01, 0017.02, 0017.03, 0017.04, 0021.01, 0026.01, 0026.02, 0026.03, 0026.04, 0032.02, 0032.03, 0034.02, 0034.03, 0034.04, 0034.06, 0035.02, 0036.09, 0037.01, 0046.04, 0059.01, 0060.01, 0060.02, 0060.03, 0060.04, 0072.10, 0072.16, 0073.01, 0074.01, 0076.03, 0077.02, 0078.02, 0078.03, 0078.07, 0079.01, 0079.03, 0079.04, 0085.01, 0087.04, 0088.01, 0089.01, 0090.04, 0091.02, 0093.02

Table L.2 Appendix L Section/Page Index (cont'd)

Section	Page Numbers	Comment Number
L.3.4.2 Elements Common to Tank Waste Alternative	L-86 to L-89	0098.03, 0101.01, 0101.04, 0101.07
L.3.4.2.1 Issues Related to Disposal Costs Calculations and Repository	L-89 to L-104	0004.01, 0005.44, 0008.01, 0008.02, 0012.06, 0027.02, 0027.05, 0027.07, 0035.04, 0035.05, 0036.01, 0036.02, 0037.03, 0038.10, 0050.01, 0052.02, 0052.05, 0055.04, 0055.05, 0057.04, 0062.05, 0072.84, 0077.05, 0079.05, 0081.05, 0089.18
L.3.4.2.2 Alternatives Costs	L-104 to L-113	0005.12, 0005.13, 0005.14, 0052.03, 0052.04, 0055.06, 0057.06, 0069.04, 0072.92, 0072.93, 0077.04, 0081.01, 0081.03, 0089.04, 0090.01, 0092.01, 0098.01
L.3.4.2.3 Assumptions	L-113 to L-125	0005.39, 0005.40, 0005.42, 0012.20, 0019.04, 0027.11, 0040.02, 0052.01, 0062.03, 0064.01, 0072.85, 0072.86, 0072.88, 0072.89, 0072.90, 0072.178, 0072.179, 0072.194, 0072.195, 0081.04, 0089.03
L.3.4.2.4 Miscellaneous Issues	L-125 to L-128	0005.41, 0005.43, 0008.04, 0068.03, 0072.82, 0072.83, 0072.87, 0072.91, 0072.180, 0089.05, 0089.11
L.3.4.3 No Action Alternative (Tank Waste)	L-129 to L-130	0072.94, 0072.181, 0072.182
L.3.4.4 Long-Term Management Alternative	L-130 to L-132	0038.01, 0072.183, 0072.95, 0072.96
L.3.4.5 In Situ Fill and Cap Alternative	L-132	0072.184
L.3.4.6 In Situ Vitrification Alternative	L-132 to L-149	0014.01, 0023.01, 0023.02, 0023.03, 0023.04, 0023.05, 0023.06, 0023.07, 0023.08, 0023.09, 0023.10, 0023.11, 0023.12, 0023.13, 0023.14, 0023.15, 0023.16, 0023.17, 0023.18, 0023.19, 0023.20, 0023.21, 0023.22, 0023.23, 0023.24, 0023.25, 0023.26, 0023.27, 0023.28, 0023.29, 0023.30, 0072.97, 0072.98, 0072.99, 0072.185, 0102.01
L.3.4.7 Ex Situ Intermediate Separations Alternative	L-149 to L-161	0005.45, 0005.46, 0005.47, 0027.10, 0036.16, 0057.03, 0057.05, 0072.100, 0072.101, 0072.102, 0072.103, 0072.104, 0072.105, 0072.106, 0072.107, 0072.108, 0072.109, 0072.110, 0072.111, 0072.186, 0072.187, 0072.188, 0072.189, 0089.09
L.3.4.8 Ex Situ No Separations Alternative	L-161 to L-163	0005.48, 0057.07, 0072.112, 0072.113, 0072.114, 0072.115, 0072.116
L.3.4.9 Ex Situ Extensive Separations Alternative	L-163 to L-168	0005.49, 0005.50, 0036.13, 0055.09, 0072.117, 0072.118, 0072.119, 0072.190, 0072.191
L.3.4.10 Ex Situ/In Situ Combination 1 Alternative	L-168 to L-171	0005.09, 0072.120, 0072.121, 0072.192
L.3.4.11 Phased Implementation Alternative	L-170 to L-183	0005.51, 0005.52, 0005.53, 0005.54, 0032.05, 0032.06, 0035.06, 0035.07, 0036.03, 0036.04, 0036.05, 0036.06, 0036.11, 0036.15, 0037.05, 0038.06, 0038.07, 0038.08, 0038.09, 0038.11, 0055.08, 0057.02, 0068.02, 0072.122, 0072.193, 0088.05
L.3.4.12 Ex Situ/In Situ Combination 2 Alternative	L-182 to L-185	0005.05, 0012.08
L.3.4.13 Miscellaneous	L-184	0005.11, 0035.09
L.3.5 Cesium and Strontium Capsule Alternatives	L-185	No comments were received for this section.
L.3.5.1 Preferences for Capsule Alternative	L-185	No comments were received for this section.
L.3.5.1.1 Specific Preferences	L-185 to L-187	0006.01, 0008.06, 0032.07, 0040.05, 0043.05
L.3.5.1.2 General Preferences	L-187 to L-188	0012.13, 0060.05, 0089.02

Table L.2 Appendix L Section/Page Index (cont'd)

Section	Page Numbers	Comment Number
L.3.5.2 No Action Alternative (Capsules)	L-188	No comments were received for this section.
L.3.5.3 Onsite Disposal Alternative	L-188	No comments were received for this section.
L.3.5.4 Overpack and Ship Alternative	L-188	No comments were received for this section.
L.3.5.5 Vitrify with Tank Waste Alternative	L-188	No comments were received for this section.
L.3.6 Borrow Site Summary	L-188 to L-191	0019.03, 0019.07, 0072.123
L.3.7 Comparison of Activities Associated with the Alternatives	L-191	0005.15, 0005.55
L.3.8 Alternatives Considered But Dismissed	L-192	No comments were received for this section.
L.3.9 Miscellaneous	L-192 to L-205	0005.59, 0005.60, 0022.04, 0025.01, 0027.03, 0027.04, 0027.06, 0027.08, 0027.09, 0030.01, 0030.04, 0030.05, 0046.03, 0054.01, 0058.01, 0059.02, 0062.02, 0072.15, 0072.196, 0072.236, 0083.01, 0085.03
L.4.0 Affected Environment	L-205	No comments were received for this section.
L.4.1 Geology	L-205 to L-207	0072.124, 0072.125, 0072.126, 0072.127, 0072.128, 0072.129, 0072.130, 0089.20
L.4.2 Water Resources	L-207 to L-211	0072.131, 0072.132, 0072.133, 0072.134, 0072.135, 0072.136, 0072.137, 0072.138, 0072.139
L.4.2.1 Surface Water	L-210	No comments were received for this section.
L.4.2.2 Groundwater	L-210 to L-212	0045.01, 0045.04, 0053.03, 0072.258, 0072.259, 0072.261
L.4.2.3 Water Quality and Supply	L-212 to L-213	0072.260
L.4.3 Meteorology and Air Quality	L-213 to L-214	0072.140, 0072.262
L.4.4 Biological and Ecological Resources	L-214 to L-222	0012.18, 0019.05, 0019.08, 0019.09, 0019.10, 0019.11, 0019.21, 0019.22, 0019.23, 0072.141, 0072.142, 0072.143, 0072.144, 0072.145, 0072.146, 0072.147, 0072.148, 0072.149, 0072.150, 0072.263, 0072.264, 0072.265, 0072.266
L.4.5 Cultural Resources	L-222 to L-228	0072.37, 0072.38, 0072.39, 0072.40, 0072.151, 0072.152, 0072.153, 0072.154, 0072.267, 0072.268, 0072.269, 0072.270, 0089.17, 0089.21, 0089.22
L.4.6 Socioeconomics	L-228 to L-232	0072.155, 0072.156, 0072.157, 0072.271, 0072.272
L.4.7 Land Use	L-232 to L-236	0072.158, 0072.159, 0072.273, 0072.274, 0072.275, 0072.276, 0072.277, 0072.278, 0072.279
L.4.8 Visual Resources	L-236 to L-237	0072.160
L.4.9 Noise	L-237	0072.161, 0072.280
L.4.10 Transportation	L-237	No comments were received for this section.
L.4.11 Radiological Environment: Overview and Potential Radiation Doses from 1994 Hanford Site Operations	L-238 to L-239	0072.162, 0072.163, 0072.281
L.4.12 Miscellaneous	L-239	0061.01
L.5.0 Environmental Consequences	L-239	No comments were received for this section.
L.5.1 Geology	L-239	No comments were received for this section.
L.5.2 Water Resources	L-239 to L-240	0089.23, 0091.01

Table L.2 Appendix L Section/Page Index (cont'd)

Section	Page Numbers	Comment Number
L.5.2.1 Groundwater	L-240 to L-255	0005.19, 0008.05, 0012.15, 0012.16, 0030.02, 0030.03, 0036.14, 0040.06, 0045.02, 0045.03, 0069.01, 0069.02, 0072.165, 0072.166, 0072.167, 0072.237, 0072.238, 0081.06, 0083.02, 0089.06, 0089.08, 0089.13, 0089.14, 0089.15, 0090.02
L.5.2.2 Surface Water	L-256	0073.02
L.5.3 Air Quality	L-256 to L-266	0072.28, 0072.29, 0072.30, 0072.31, 0072.32, 0072.239, 0072.240, 0072.241, 0072.242, 0072.243, 0072.244, 0072.245, 0072.246, 0072.247, 0072.248, 0072.249, 0072.250, 0072.251, 0100.01, 0100.02
L.5.4 Biological and Ecological Resources	L-266 to L-268	0019.12, 0019.13, 0019.14, 0019.15, 0019.16
L.5.5 Cultural Resources	L-268 to L-269	0089.16, 0101.03
L.5.6 Socioeconomics	L-269 to L-275	0072.33, 0072.34, 0072.35, 0072.36, 0072.252, 0072.253, 0072.254, 0072.255, 0072.256, 0072.257
L.5.7 Land Use	L-275 to L-277	0036.18
L.5.8 Visual Resources	L-277	No comments were received for this section.
L.5.9 Noise	L-277	No comments were received for this section.
L.5.10 Transportation	L-277	No comments were received for this section.
L.5.11 Anticipated Health Effects	L-278 to L-282	0005.16, 0072.197 0072.198, 0072.199, 0072.200, 0072.201, 0072.202, 0072.203, 0072.204, 0072.205, 0072.206, 0085.04, 0085.05
L.5.11.1 Remediation Risk	L-282 to L-287	0005.56, 0028.01, 0069.08, 0069.09, 0072.17, 0072.207, 0072.208, 0072.209, 0072.210, 0072.211, 0072.212, 0072.213, 0072.214, 0090.05
L.5.11.2 Post-Remediation Risk	L-288 to L-302	0009.02, 0012.17, 0036.12, 0036.19, 0038.04, 0040.03, 0041.02, 0041.03, 0055.07, 0069.03, 0069.06, 0069.07, 0072.18, 0072.19, 0072.20, 0072.21, 0072.22, 0072.23, 0072.24, 0072.54, 0072.215, 0072.216, 0072.217, 0072.218, 0072.219, 0072.220, 0072.221, 0072.222, 0072.223, 0072.224, 0081.09, 0089.12, 0101.02
L.5.12 Accidents	L-302 to L-306	0012.21, 0072.225, 0072.226, 0072.227, 0072.228, 0072.229, 0072.230, 0072.231, 0072.232, 0072.233
L.5.12.1 Nonradiological Occupational and Transportation Accidents	L-306 to L-309	0072.25, 0072.26, 0072.234, 0072.235, 0081.07
L.5.12.2 Radiological Accidents	L-309 to L-312	0069.10, 0069.11, 0069.13, 0072.27, 0089.19, 0090.03, 0098.05
L.5.12.3 Potential Toxicological Accidents	L-312	No comments were received for this section.
L.5.13 Cumulative Impacts	L-312 to L-314	0019.17, 0053.02, 0101.05
L.5.14 Unavoidable Adverse Impacts	L-314	0019.18
L.5.15 Relationship Between Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term	L-314	No comments were received for this section.
L.5.16 Irreversible and Irretrievable Commitment of Resources	L-314	No comments were received for this section.
L.5.17 Conflicts Between the Proposed Action and the Objectives of Federal, Regional, and State	L-314	No comments were received for this section.
L.5.18 Pollution Prevention	L-314	No comments were received for this section.
L.5.19 Environmental Justice	L-314 to L-317	0072.53, 0101.08

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L.5.20 Mitigation Measures	L-317 to L-319	0019.06, 0019.19, 0019.20, 0072.06
L.5.21 Miscellaneous	L-319 to L-323	0046.02, 0061.02, 0072.164, 0098.04
L.6.0 Statutory and Regulatory Requirements	L-323	No comments were received for this section.
L.6.1 RCRA/CERCLA	L-323 to L-324	0019.01, 0072.02, 0072.03, 0072.04
L.6.2 Tri-Party Agreement	L-324 to L-328	0032.01, 0062.01, 0068.01, 0069.14, 72.52, 0094.02, 0101.09
L.6.3 Incidental Waste	L-328 to L-330	0005.57, 0069.05
L.6.4 Other	L-330 to L-332	0005.08, 0005.58, 0009.13, 0036.17, 0040.04
L.7.0 Scoping, Public Participation, and Consultations	L-332 to L-335	0012.19, 0101.10
L.8.0 List of Preparers	L-335	No comments were received for this section.
L.9.0 NEPA-Related Comments	L-335	No comments were received for this section.
L.9.1 EIS Presentation and Distribution	L-335 to L-336	0042.02
L.9.2 Closure	L-336	0012.12
L.9.3 Scope	L-336 to L-345	0010.01, 0012.11, 0055.03, 0063.01, 0063.02, 0067.01, 0072.09, 0072.46, 0072.47, 0072.48, 0072.49, 0074.02, 0075.02, 0076.04, 0078.01, 0078.05, 0078.06, 0079.06, 0087.02, 0088.04
L.9.4 Need to Prepare the EIS	L-345 to L-349	0005.07, 0009.01, 0034.05, 0055.02, 0064.02, 0065.01
L.9.5 Adequacy of the Draft EIS	L-349 to L-354	0005.02, 0005.04, 0005.06, 0014.02, 0035.01, 0038.02, 0038.12, 0072.01, 0081.08, 0087.03
L.9.6 Record of Decision	L-354 to L-356	0009.14, 0012.10, 0035.03, 0040.07, 0043.03, 0072.12, 0072.13
L.9.7 Out of Scope Issues (Other Than Closure)	L-357 to L-361	0011.01, 0014.05, 0014.06, 0016.01, 0016:02, 0031.01, 0031.02, 0037.02, 0037.04, 0043.04, 0093.01
L.9.8 Hearings	L-361 to L-364	0022.01, 0022.05, 0046.01, 0062.06, 0075.01, 0087.01, 0088.02
L.9.9 Comment Period	L-365 to L-371	0002.01, 0003.01, 0005.01, 0007.01, 0013.01, 0013.02, 0018.01, 0020.01, 0024.01, 0036.07, 0036.08, 0044.01, 0055.01
L.9.10 Miscellaneous	L-372 to L-376	0005.03, 0027.01, 0066.01, 0081.10, 0085.06, 0098.07
L.10.0 Policy Issues	L-376	No comments were received for this section.
L.10.1 Mission	L-376	No comments were received for this section.
L.10.2 Authority and Responsibility	L-376	No comments were received for this section.
L.10.3 Credibility	L-376 to L-378	0053.01, 0053.04, 0057.01, 0095.01, 0096.01
L.10.4 Government Policy	L-378	No comments were received for this section.
L.10.5 Miscellaneous	L-379	0008.07, 0015.01

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0005.01	L.9.9	L-365
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0023.09	L.3.4.6	L-138
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0027.03	L.3.9	L-195
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0034.03	L.3.5.1.2	L-68
0034.04	L.3.5.1.2	L-68
0034.05	L.9.4	L-346
0034.06	L.3.4.1.2	L-69
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0035.03	L.9.6	L-355
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0035.05	L.3.4.2.1	L-94
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0036.05	L.3.4.11	L-174
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0036.08	L.9.9	L-370
0036.09	L.3.4.1.2	L-77
0036.10	L.3.4.1.1	L-58
0036.11	L.3.4.11	L-175
0036.12	L.5.11.2	L-289
0036.13	L.3.4.9	L-164
0036.14	L.5.2.1	L-246
0036.15	L.3.4.11	L-176
0036.16	L.3.4.7	L-150
0036.17	L.6.4	L-332
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0038.04	L.5.11.2	L-290
0038.05	L.3.4.1.1	L-59
0038.06	L.3.4.11	L-177
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0038.08	L.3.4.11	L-178
0038.09	L.3.4.11	L-178
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0038.11	L.3.4.11	L-178
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0040.02	L.3.4.2.3	L-119
0040.03	L.5.11.2	L-290
0040.04	L.6.4	L-332
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0040.07	L.9.6	L-355
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0043.02	L.3.4.1.1	L-60
0043.03	L.9.6	L-356
0043.04	L.9.7	L-360
0043.05	L.3.5.1.1	L-187
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0045.04	L.4.2.2	L-210
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0052.05	L.3.4.2.1	L-99
0053.01	L.10.3	L-376
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0055.03	L.9.3	L-338
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0055.05	L.3.4.2.1	L-100
0055.06	L.3.4.2.2	L-107
0055.07	L.5.11.2	L-292
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0055.09	L.3.4.9	L-165
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0057.03	L.3.4.7	L-151
0057.04	L.3.4.2.1	L-101
0057.05	L.3.4.7	L-151
0057.06	L.3.4.2.2	L-108
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0059.02	L.3.9	L-202
0060.01	L.3.4.1.2	L-75
0060.02	L.3.4.1.2	L-78
0060.03	L.3.4.1.2	L-79
0060.04	L.3.4.1.2	L-79
0060.05	L.3.5.1.2	L-187
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0063.02	L.9.3	L-339
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0067.01	L.9.3	L-339
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0068.02	L.3.4.11	L-180
0068.03	L.3.4.2.4	L-126
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0069.02	L.5.2.1	L-249
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0069.05	L.6.3	L-329
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L.1.0 SUMMARY AND INTRODUCTION
L.1.1 SUMMARY
L.1.1.1 Definitions

Comment Number 0005.24 *Swanson, John L.*

Comment Page S-3 contains an incorrect definition of transuranic waste (TRU) (it does not specify the concentration of contaminants that divides LLW from TRU waste). A better definition is given on page 1-3.

Response The definition of transuranic in the Summary is expressed with less technical terms than the technically complete definition on page 1-3 in Volume One, Section 1.0 to help the reader understand the different types of waste. By design, the Summary contains the least amount of technical language possible, yet still accurately explains the key aspects of this technically complex project. The main text (Volume One) contains a greater amount of technical information, yet is still understandable by the general public. The appendices contain the greatest amount of technical information and provide more detailed technical information to persons with a higher level of technical interest.

Comment Number 0005.25 *Swanson, John L.*

Comment Also on page S-3; the definition given for "low-level or low-activity waste" is not consistent with usages and definitions elsewhere in this EIS. Page 6-18 contains a good explanation (at least it is understandable to me) of the distinction between LLW and LAW, and page 1-3 contains an understandable definition of LAW.

Response The definitions of low-level waste (LLW) and low-activity waste (LAW), respectively are expressed in the Summary with less technical terms than on page 1-3 (Volume One, Section 1.0) or 6-18 (Volume One, Section 6.0) to help the general public understand the different types of waste. Please refer to the response to Comment number 0005.24. The definitions of LAW and LLW in the Summary have been modified to be consistent with their usage elsewhere in the EIS.

Comment Number 0005.28 *Swanson, John L.*

Comment Page S-15 contains the term "high-activity waste" (instead of "high-level waste").

Response "Activity" has been replaced with "level."

Comment Number 0005.29 *Swanson, John L.*

Comment Page S-21 contains a definition of "carcinogenic" that I believe to be incorrect. (See page 5-151 for one that makes more sense to me).

Response A clearer definition of carcinogenic has been added to Section S.5.2.

Comment Number 0041.01 *Berry, Bill*

Comment The definition of low-level waste in the Summary is misleading. In some cases, low-level waste can contain more activity than either high-level waste or transuranic. Classification of radioactive waste based on the source and definition leads to a situation that is confusing to many. Nevertheless, some low-level waste (remote handled, greater than class C, etc.) in fact may be more dangerous than high-level waste or transuranic.

Response The referenced text is not intended to be a definition of LLW but rather presents the general relative characteristics of the waste with respect to classification requirements. It is true that the designation of low-level does not mean the waste is without potentially significant hazard. It is also true that concentrated high-level waste (HLW) and spent nuclear fuel generally are more hazardous than LLW. The Environmental Impact Statement (EIS) presents the hazards associated with remediating both the LAW and the HLW. The EIS does not infer that there are no hazards associated with the LAW. The definition of LLW in the Summary has been modified to be consistent with usage of the term elsewhere in the EIS. The information requested in the comment includes a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.41 *CTUIR*

Comment Why are there multiple terms, such as low-level and low-activity: are these in fact identical? If they are, use only one of the terms. Same for hazardous/dangerous. The LAW-LLW discrepancy in particular raises red flags about exact waste specifications and disposal requirements.

Response Multiple terms such as low-level, low-activity, and hazardous/dangerous are used to denote and preserve a regulatory distinction or convention related to the waste disposal. As noted in Volume One, Section 6.2.1, DOE uses the term LAW to preserve the distinction that the LAW is the residual that remains after concentration and separation of the majority (by activity) of the HLW components from waste originally designated as HLW, compared to the Nuclear Regulatory Commission definition of LLW. To some extent, waste specifications and disposal requirements (i.e., low-activity) are subject to regulatory interpretation and negotiation as discussed in Volume One, Section 6.0. Please refer to the response to Comment number 0005.25.

Comment Number 0072.43 *CTUIR*

Comment Describe how residual HLW (the heel) will be reclassified as LLW in order to remain in situ. The statement is made that HLW that is not readily retrievable will be evaluated for in-place stabilization or disposal in a geologic repository. Describe the regulatory steps that must occur for HLW to be left in situ.

Response Disposal of the tank residual waste is a closure issue that is not within the scope of the Tank Waste Remediation System (TWRS) EIS. Please refer to the response to Comment number 0072.08 and Volume One, Section 3.3, for more information on closure. If, after appropriate environmental impact analysis for closure is conducted, a decision is made to close the tanks with the residual waste in place, two major regulatory actions are required. Nuclear Regulatory Commission (NRC) determination on whether the residual waste meets the criteria for disposal as incidental waste would be required. The residual waste would not be reclassified as LLW, but as incidental waste. The incidental waste might be within the concentration limits for Class A, B, or C LLW, as defined in 10 Code of Federal Regulations (CFR) 61. Onsite disposal of this incidental waste would not be subject to NRC licensing. A discussion of this issue is provided in Volume One, Section 6.2 of the EIS. Closure of tanks that contain any residual waste is subject to the TRI-Party Agreement (Part Two and Section 6.3). In-place disposal of the hazardous components of the residual waste would require approval by Ecology, including closure as a land disposal unit; a post closure permit would also be required.

The statement that "HLW that is not readily retrievable will be evaluated for in-place stabilization or disposal in a geologic repository" was in the context of HLW disposal in DOE Order 5820.2A. A discussion of this DOE Order is provided in Volume One, Section 6.1. Onsite disposal of HLW would include review and consultation by the NRC. The NRC previously has held that the tanks have not been authorized for use for long-term storage or disposal and are, therefore, not subject to NRC licensing (58 FR 12346). Disposal of the hazardous components of the HLW would be subject to approval and permitting by Ecology according to existing or negotiated requirements of the Tri-Party Agreement. Also, U.S. Environmental Protection Agency (EPA) review for compliance with the requirements of 40 CFR 191 may be necessary. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

L.1.1.2 Regulatory Compliance

Comment Number 0005.21 *Swanson, John L.*

Comment More wording problems.
a) On page S-44 are the words "--separations necessary for the LAW to meet drinking water standards." and on page S-45 are the words "--to reduce releases to the groundwater from the low-activity waste vaults and ensure that drinking water standards would be met." These two phrases are intended to mean the same thing (I believe), but they most certainly do not.
b) In the same location on page S-44, it says that enhanced sludge washing and cesium ion exchange processes would be required to have the waste meet drinking water standards. Enhanced sludge washing has no bearing on this.
c) In the same locations on page S-45, it says that additional separations would be performed to reduce releases so that drinking water standards would be met. How can only cesium removal suffice on page S-44 if additional separations are required on page S-45?

Response The referenced sentences have been clarified. References to the drinking water standard on pages S-44 and S-45 of the Draft EIS were deleted and replaced with "criteria for onsite disposal" and "groundwater protection standards" respectively in the Final EIS. As a precursor to cesium ion exchange, enhanced sludge washing does have an impact on acceptance criteria for onsite disposal. The wording "ensure that" was changed to "enhance" to convey the intent to provide additional groundwater protection beyond that achieved by the intermediate separations alternative.

Comment Number 0072.42 *CTUIR*

Comment Under potential contracts: The permit that covers in-ground disposal of vitrified LLW is not listed.

Response No permit is required for DOE to dispose of LLW. Disposal of the hazardous waste component of mixed waste would require amendment to the Hanford Site Dangerous Waste Permit and may require amendment of the Washington Administrative Code (WAC).

Comment Number 0072.45 *CTUIR*

Comment Since two vitrification plants are anticipated, and presumably will operate simultaneously, describe the Air Quality Permit for the entire Hanford site that will include simultaneous maximum rated emissions.

Will construction of the vitrification plants require another EIS, or is this EIS intended to cover privatized activities as well as the DOE portion of retrieval? Will construction of the LAW vaults require another EIS or is it intended to be covered by this EIS? Is this EIS intended to include the impacts of mining the barrier material? It should not, because this is not a closure EIS.

Response As stated in Volume One, Section 6.2, DOE applied for a Sitewide Air Operating Permit under the Washington State Air Operating Permit Regulation. Once DOE has determined the TWRS alternative to be implemented, the activities will be examined for new source review applicability, and Notices of Construction will be prepared as needed. Specific requirements of the Notice of Construction may require permit modification. Section 6.2 also identifies the air emission regulations and potential permits that would require review before implementation of any alternative.

The TWRS EIS includes the impacts of the vitrification plants that are part of the alternatives included in the EIS including air quality impacts in Volume One, Section 5.3 and Volume Five, Appendix G; therefore, DOE expects that no additional NEPA analysis will be required if the decision to construct the plants is made by DOE. Privatized activities are not specifically called out in the EIS because privatization is merely a different method of procurement, not a separate alternative. See Volume One, Section 3.3 for a discussion of this issue. The EIS includes the environmental impacts of Phased Implementation, which is the preferred alternative; however, it does not make reference to the

contracting strategy regarding how Phased Implementation will be carried out. This alternative will be expected to have the same impacts without regard to the method of procurement.

This EIS covers the construction of the LAW vaults because they are part of the ex situ and ex situ/in situ combination alternatives as presented in Volume One, Section 3.4 and Volume Two, Appendix B. While this EIS describes the impacts to typical borrow sites, as explained in Volume One, Section 3.6, the final selection of borrow sites has not been made. Future borrow site decisions will be addressed in future Hanford Site decision making. The TWRS EIS is not a closure EIS, and as explained in the Summary, Section S.5 and Volume One, Section 3.7, the EIS includes a representative closure scenario (closure as a landfill) to provide a meaningful comparison of alternatives (please refer to the response to Comment number 0072.08).

Comment Number 0072.59 *CTUIR*

Comment Even the extensive retrieval alternatives would "show exceedances of the water quality protection requirements for the tank residuals" (p. S-43). This is an oddly worded sentence that raises significant questions about Hanford's Groundwater Quality Protection Management Plan, Washington Water Quality Standards, the Dangerous Waste/RCRA requirements (and the MTCAR requirements), and whether DOE really intends to comply with them. On page S-46, the statement is made that "releases of contaminants to the groundwater... would be reduced to the greatest extent practicable" (emphasis added). This wording should apply only to technology, not to irreversible contamination, because this implies that the intent to comply with regulations, agreements and policies is only as great as is convenient.

What correspondence is there between the offsite dose limit of 100 mrem/year, the projected doses from all TWRS retrieval/processing activities (including privatized activities), and the projected doses from all other planned future Hanford activities?

Response The context of the first referenced statement is in regard to applying an assumed generic closure to all alternatives for purposes of comparison. The underlying conservative bounding assumption is that the ex situ alternatives leave in place the maximum residual waste under the Tri-Party Agreement (see Volume One, Section 3.4). Using that assumption, and relatively conservative assumptions for the eventual transport of that residual through the vadose zone to the groundwater, results in the estimate that groundwater requirements would be exceeded (see Volume One, Section 5.2 and Volume Four, Appendix F). Additional action (e.g., soil and/or groundwater Remediation) may need to be taken in order for closure of the tanks to achieve the required level of protection of the groundwater. Closure of the tanks would be conducted in compliance with the Tri-Party Agreement, as discussed in Section 6.3 of the agreement.

In the context of regulatory compliance, the control of contaminate releases to the greatest extent practicable is fully applicable to irreversible contamination. The cited use of the term in the Draft EIS refers to technology. The condition of practicability is often imbedded in regulations in recognition of

technological limitations to achievement of regulatory standards. The phrase "the greatest extent practicable" is not synonymous with "only as great as is convenient" and is not implied by use of the term. DOE intends to comply with all applicable Federal, State, and local laws and regulations and the requirements of the Tri-Party Agreement and reduce the release of contaminants to the environment to the greatest extent practicable.

The maximally-exposed individual would receive an annual average dose of about 0.7 mrem/yr, less than 1 percent of the 100-mrem/yr offsite dose limit, from all Hanford Site operations during the period of implementation of the TWRS alternative with the highest radiological impact (DOE 1996b). (A discussion of cumulative impacts is provided in the EIS in Volume One, Section 5.13.)

L.1.1.3 Vitrification

Comment Number 0005.27 *Swanson, John L.*

Comment Page S-12 contains a statement that "--a vitrified waste form was adopted as the proposed approach as a result of concerns with the adequacy of disposal of low-activity waste in near-surface vaults." This does not seem to me to be the right "flavor", weren't the concerns the leachability and retrievability of the grout, instead of the use of near-surface vaults?

Response The concerns about the adequacy of disposal of the LAW in the grout vaults were primarily due to concerns that grout would not adequately inhibit leaching of contaminants, and because it may be difficult and hazardous to workers to retrieve the grout should retrieval become necessary in the future. The sentence was revised to reflect the two reasons grout vaults were replaced by glass vaults as the DOE planning basis.

Comment Number 0072.44 *CTUIR*

Comment Page S-44 indicates that a borosilicate glass form is required for the geologic repository, yet a soda-lime glass is assumed in the No Separation alternative. Why didn't the No Separation alternative consider a borosilicate glass as the other separation alternatives do? Will the soda-lime glass meet repository requirements?

Response Because the Ex Situ No Separations alternative treats all of the tank waste without separating the waste into HLW and LAW fractions, all sodium present in the tank waste would be included in the HLW feed stream. The majority of the sodium is sent to the LAW treatment process for the alternatives that include separations. Because of the amount of sodium in the Ex Situ No Separations glass, the glass formulation more closely approximates a soda-lime glass.

Volume One, Sections 3.4 and 6.3 indicate that soda-lime glass would not meet the current repository waste acceptance criteria for HLW. Evaluation of the soda-lime glass would be required to determine its acceptability at the geologic repository.

L.1.1.4 Transportation

Comment Number 0005.23 *Swanson, John L.*

Comment Last paragraph on page 3 refers to "truck transport of tank waste residuals." I thought that the "residuals" were what could not be removed from the tanks; if so, how can they be transported?

Response The referenced language on page 3 of the Summary was included to provide examples of truck transportation that would present radiological and toxicological risks during remediation. See Volume One, Section 5.12 and Volume Four, Appendix E for an analysis of transportation risks. Truck transport is limited to the following activities:

- Delivery of materials to the Site.
- Transportation of earthen borrow material.
- Transportation of small quantities of waste from various locations on the Site that DOE may wish to process.
- Transportation of the small quantities of waste that remain in the miscellaneous underground storage tanks (MUSTs).

To clarify the text, the word "residuals" has been deleted.

Comment Number 0005.30 *Swanson, John L.*

Comment During the May 2 hearing, it became clear to me that you were trying to maintain a distinction between "transportation" and "transportation to a geologic repository." This distinction was not clear to me when I read the draft (see page S-22, for example). Could this distinction be clarified? (Perhaps by using terms like "normal transport" and "HLW transport").

Response The EIS draws a distinction between transportation of non-radioactive materials and supplies and transportation of HLW. This distinction was made in the second paragraph on page S-22. The distinction was made more clear in the Final EIS by placing the impacts of HLW shipments in a separate section.

L.1.1.5 Risk

Comment Number 0072.55 *CTUIR*

Comment The lowest lifetime cancer risk (p. S-29) is 3E-4; this is not "relatively low" - in the general Superfund world this is generally unacceptable. For Native American subsistence exposure scenarios, which are likely to be at least 10 fold higher, this is an unacceptable residual risk burden for a *single generation*, much less multiple generations.

The time frame should likely be extended to 100,000 years for long-lived radionuclides such as Plutonium.

Response The words "relatively low" on page 5-29 refers to how the In Situ Vitrification (ISV) alternative compares to the other alternatives and does not imply judgement regarding the acceptability of the risk. A clarification was added to the Final EIS.

A Native American scenario has been added to the Final EIS in Volume One, Section 5.11 and Volume Three, Appendix D. Please refer to the response to Comment number 0072.198 for a description of the Native American scenario, which includes an evaluation of post-remediation risk to a Native American user of the Hanford Site.

Calculating human health risks 10,000 years into the future includes a high degree of uncertainty due to the inability to estimate socioeconomic, cultural, and climate conditions over that long duration. Extending these calculations to 100,000 years would include such a high degree of uncertainty that the results may be meaningless. As shown on Figures 5.11.1 and 5.11.2, the health risks for all alternatives peak within 6,000 years and are steadily declining by 10,000 years in the future. Please refer to the response to Comment number 0012.17. A discussion of uncertainties has been added to the Final EIS in Volume Five, Appendix K.

The information requested in the comment represents a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.57 *CTUIR*

Comment Table S.7.3 (the column with potential use restrictions) needs some careful consideration - restrictions may be removed if pollution standards are met or risk levels are within "acceptable" ranges, but there are nevertheless high-use groups (Native Americans) who not only have higher exposures, they may also have higher sensitivity. Further, the fact that this occurs in "usual and accustomed" fishing locations clearly results in an unequal exposure and risk burden. The designation of "No Restriction" needs to be clearly defined as non-zero risk.

Response Recognizing possible uncertainty, a footnote has been added to Table S.7.5 to clarify that the term "No Restriction" in the table means that there is no restriction with respect to meeting applicable standards that are based on commonly applied exposure pathways, intakes, and receptor sensitivity. A Native American user scenario has been added to the Final EIS (Volume One, Section 5.11 and Volume Four, Appendix F) and this scenario analyzes impacts to a subsistence lifestyle, including consumption of fish. Please refer to the response to Comment number 0072.60.

Comment Number 0072.60 *CTUIR*

Comment Even though DOE "considered comments from ... Indian Nations," there is an inadequate information base with respect to tribal concerns and interests.

Response As indicated in the Summary and Volume One, Section 1.0 of the EIS, the Tribal Nation scoping comments were one source of information used to define the scope of the EIS. This text was not meant to imply that scoping comments were the only information with respect to Tribal concerns and interests used during the preparation of the EIS. The scoping process and comments submitted on the scope of the EIS are described in the Implementation Plan for the TWRS EIS (DOE/RL-94-88).

During the preparation of the EIS, DOE and Ecology consulted formally and informally with the affected Tribes to clarify areas of potential impacts, to understand Tribal Nation concerns, or to receive information provided by Tribal Nations about the issues addressed in the EIS (Volume One, Section 8.0). The comments on the Draft EIS represent another part of the ongoing consultation with the Tribes. The Final EIS has been modified in response to many of the issues identified by Tribal Nations, including the following topics.

- The analysis of impacts to human health includes a Native American Subsistence Scenario (Volume One, Section 5.11 and Appendix D).
- The description of potential environmental justice impacts has been modified to more fully place in context potential impacts to Tribal culture and lifestyle (Volume One, Section 5.19).
- The description of the affected environment has been modified to present Tribal Nation perspectives on cultural values (Volume One, Section 4.5 and Volume Five, Appendix I).

Please refer to the responses to Comment numbers 0072.57, 0072.198, and 0072.252.

Comment Number 0098.06 *Pollet, Gerald*

Comment Lastly, the fatalities claimed in the summary documents are ridiculous. For instance, 100 years for long-term management, radiation fatality from accidents of one. Well, deep within the EIS and from other Westinghouse documents, you will discover that if there is an event, it is likely that there will be 20 to 40 short-term deaths and latent cancer fatalities. If you have one, you are likely to have 40. Now, you can say, "Well we multiplied by the probability except the probability that the department has used", this ridiculous one in a million probability claim, which fails to consider the reality of worker-initiated events in violation of any administrative controls. It is based in essence on the assumption that the Hanford workforce follows rules. It does not drop rocks down high-level nuclear waste tanks. Is that a one in a million likelihood? Well, it happened in the last couple years. In fact, twice in the last year on tanks that were considered to have a potential to explode for hydrogen, administrative controls were violated. So does that mean we have three one in a million likelihood events? In fact, this EIS does not consider how you might calculate these events and needs to be far, far more conservative about their probability and needs to show that the likely fatalities from long-term management are not one fatality, but folks if we fail to remove waste from the tanks we are in deed, according to this EIS, if you substitute 25 tanks ... 50 tanks for 25 tanks for hydrogen explosion consider how many other errors similar to this. You have a half of 1 percent likelihood of an

explosion. Half of 1 percent. That means two explosions ... one explosion every 200 years. We can not live with that risk.

Response To adequately inform decision makers and the public in making reasonable comparisons among alternatives, the EIS provides information on three measures of accident impact: 1) consequences (i.e., the results of an accident without consideration of the probability of the accident); 2) the probability that an accident would occur and result in consequences; and 3) the product of probability and consequence, which is sometimes referred to as "risk" or "point estimate of risk." For example, Draft EIS Summary Table S.7.1 presents the "risk" (i.e., probability times consequence) of radiation-induced fatalities resulting from operational accidents during 100-years of long-term management. The risk is expressed in units of fatalities, which may be interpreted in a statistical sense as an expectation taking account of a range of foreseeable accidents. This range includes foreseeable accidents that are more likely to occur and some with more severe consequences. The table also contains information about he consequences of the maximum reasonable foreseeable accident (i.e., one that would result in the most severe consequences, or "bounding accident"). In this example, potential fatalities would vary between 2 and 52 (see Note 3 to the Table). Volume One, Section 5.12 and Volume Four, Appendix E contain detailed information on accident consequences, including how many fatalities might result if the accidents identified occurred.

The probability that a Site worker may accidentally or knowingly violate an administrative control is a key factor in determining the probability of an accident occurring and is included in the EIS. The accident analysis was updated in the Final EIS to include recent information concerning certain accident scenarios.

L.1.1.6 Other

Comment Number 0005.32 *Swanson, John L.*

Comment In the last paragraph on page S-44 is the term "extensive separations alternatives." I believe that RETRIEVAL is meant here instead of SEPARATIONS.

Response The text has been revised.

Comment Number 0072.56 *CTUIR*

Comment Table S.7.2 appears to compare acres of shrub steppe habitat disturbed with short-term jobs; this is absolutely inappropriate, and should not be presented in the same table.

Response Table S.7.2 presents two potential short-term environmental impacts for each of the alternatives. No attempt is made to compare shrub-steppe habitat impacts with peak employment. They simply are the two primary short-term environmental impacts and are therefore shown on the same table.

Comment Number 0072.58 *CTUIR*

Comment The extensive retrieval alternatives (p. S-42) indicate that disturbed shrub-steppe would be partially mitigated. Closure should not be covered by the ROD, but the impacts due to retrieval activities should be included, along with demonstration that past mitigation efforts have been successful and completed without interruptions (EMSL site as a case in point where funding was interrupted to the great detriment of the restoration project.).

Response The impacts of retrieval activities are addressed in the EIS. A tank farm closure method will not be addressed in the Record of Decision (ROD). The cost of each alternative includes a contingency based on the level of uncertainty associated with providing cost estimates on the level of design detail provided in the EIS. For a discussion of this, see Volume One, Section 3.4 and Volume Two, Appendix B. A Mitigation Action Plan will be prepared in consultation with the Tribes, Natural Resources agencies, and the Natural Resources Trustee Council to define the mitigation measures that will be included as part of the alternative selected for implementation. Please refer to the responses to Comment numbers 0072.08 and 0019.06.

Comment Number 0081.02 *Pollet, Gerald*

Comment When we look at the order of costs. Excuse me, the cost order, as presented in the EIS of the alternatives, which involve removing the waste from the tanks, the first alternative with lowest cost is the Ex Situ/In Situ Combination with a total cost estimate range of 23 to 28 billion dollars. The second least expensive is extensive separation, with a cost range of 27 to 36 billion dollars. Third is intermediate separation, 30 to 41 billion. Fourth is phased intermediate separation, the preferred alternative, 32 to 42 billion. And then, hold on to your wallets, the no separation alternative is 69 to 252.6 billion dollars. Unfortunately these costs have been totally manipulated by adding in the cost of a hypothetical charge by the Department of Energy to itself, for depositing high-level waste in a hypothetical repository that is a decade behind schedule, and which, the only the thing that is not hypothetical, in which the Department admits will never have sufficient capacity to store this waste.

So why is this presented in the cost estimates, especially in the presentation in terms of high-level summary cost estimates, other than to skew the appearances. If we remove the astonishing 211 billion dollars in hypothetical costs, which the Department of Energy would charge itself for placing hypothetical waste in a hypothetical repository, that will hypothetically be completed a decade or two behind schedule, and which doesn't have capacity to take the waste, even if you were to hypothetically send it. If we remove the 211 billion dollars, and remove all consideration of repository costs from the mix, we get some very interesting policy results. All of a sudden, although the Ex Situ/In Situ Combination, in other words, leave the waste partially behind, is still the cheapest. It is only the cheapest by the barest of margins.

The extensive separation, which Westinghouse and the Department of Energy at Richland have favored repeatedly, despite advice to the contrary, goes from 2nd place to 4th place. In fact, the extensive

separation option goes from what would be 1st in terms of total retrieval options, to number 4th, and goes from having a 5 to 6 billion dollar cost advantage over the Tri-Party Agreement preferred alternative, to having a 5 to 6 billion dollar cost disadvantage over the Tri-Party Agreement. In other words, if I'm a Washington D.C. decision maker, I look at this and say, you mean if we could just do extensive separations, I can save 5 to 6 billion dollars over that ridiculous thing that was forced down my throat by the Department of Ecology for Tank Waste Remediation for the preferred alternative. Well yes, our cost estimates are 5 to 6 billion dollars cheaper if we can just build a hugely expensive extensive separations plant with untried technology. In fact, the decision makers will not know that cost advantage not only evaporates, but turns into a cost disadvantage of 5 to 6 billion dollars if we get rid of the hypothetical repository charge.

In fact the no separation alternative goes from a quarter trillion dollars, 252 billion dollars, down to a price range that is comparable to all the other alternatives.

Response DOE and Ecology have revised the Final EIS, in response to public comment, to present the estimated repository fees, assumptions, and impacts separately. Repository costs are presented in Volume One, Section 3.4 and Appendix B. Where appropriate, impacts associated with repository disposal are addressed separately in the applicable sections of Volume One, Section 5.0. The estimated costs for disposal of the HLW at the potential geologic repository have been included in the Final EIS because there would be real costs associated with packaging, transport, and placement of HLW in a geologic repository. Eliminating the repository fees from the cost estimates presented in the EIS would not provide all of the costs associated with the alternatives and would bias the presentation of the alternatives.

DOE and Ecology acknowledge that the repository fees presented in the Draft EIS for the ex situ alternatives were overly conservative. Since the Draft EIS was published, the DOE Office of Radioactive Waste (DOE-RW) has acknowledged the technical feasibility of a larger canister for HLW and DOE convened an independent technical review to review the waste loading and blending assumptions used in the Draft EIS. The recommendations of the independent technical review team along with the larger HLW canister were incorporated into the ex situ alternatives for the Final EIS. Volume One, Section 3.4 describes the common assumptions and additional detail is provided in Volume Two, Appendix B. Please also refer to the response to Comment number 0004.01 for a discussion of how the repository costs were recalculated for the Final EIS and the response to Comment number 0005.08 for a discussion of revisions to canister assumptions and calculations of repository capacity relative to defense HLW.

L.1.2 INTRODUCTION AND POLICY BACKGROUND

L.1.2.1 Wording

Comment Number 0005.20 *Swanson, John L.*

Comment Another "loose wording" problem exists on page S-4, where it is stated that "--uranium was extracted from the single-shell tanks---" and that "--when single-shell tank waste was recovered---."

These actions involved only SOME OF the single-shell tanks. Why not say that and be accurate, instead of potentially misleading. (The same statement is made on page 1-7 regarding uranium extraction) (Also on page 3-18 regarding the usage of SOME OF the cesium and strontium capsules).

Response The text in the Summary and in Volume One, Section 1.1 has been modified to indicate that uranium extraction involved "some" of the single-shell tanks (SSTs). However, the text in Volume One, Section 3.2 regarding cesium and strontium capsules correctly characterizes the status of the effort to return all capsules to the Hanford Site, and therefore the text has not been modified in the Final EIS.

Comment Number 0005.31 *Swanson, John L.*

Comment The last sentence on page S-23 is confusing in two respects:
a) "Only the extensive retrieval alternatives would potentially involve accidents from the transportation of high-level waste--." How about the partial waste retrieval alternatives? They also involve transportation of HLW.
b) It is unclear to me what the second part of that sentence is referring to. Is it still transportation to a repository (in which case data on page S-22 indicates the statement to be incorrect) or is it something else?

Response The partial retrieval alternatives would involve a low volume of offsite shipments of HLW. The language was revised as follows. "The extensive retrieval alternative and partial retrieval alternatives would ...."

The second part of the sentence refers to the transportation of HLW to the repository and is consistent with page S-22 and all data in the TWRS EIS. Please also refer to the response to Comment number 0005.30.

Comment Number 0005.33 *Swanson, John L.*

Comment On page 1-6, it is stated "For many years, the waste---was managed in a manner that complied with standards at that time." This implies that there were years when it was not managed in that manner. Is that the intent?

Response The referenced language points out that the regulations concerning management of the waste have changed and become more stringent over time.

Comment Number 0005.34 *Swanson, John L.*

Comment On page 1-7 it is said "--chemicals were added to the tanks in the 1960's to separate cesium and strontium from the waste." This is not a correct statement; some of the wastes were removed from the tanks and treated in B Plant to achieve these separations.

Response The text has been modified in Volume One, Section 1.1 to state that the waste was recovered from the tanks and that separation of the cesium and strontium from the waste occurred in B Plant.

Comment Number 0005.35 *Swanson, John L.*

Comment The description of "Chemical Elements" on page 1-18 is incorrect. For example, cesium-137 is NOT a chemical element; it is an ISOTOPE of the ELEMENT cesium.

Response The text has been revised to reflect that the discussion involves both chemical elements and radioactive isotopes. The heading for the referenced text now reads "Chemical Elements and Radioactive Isotopes" and corresponding changes have been made to the text following the heading in Volume One, Section 1.5.

L.1.2.2 Tank Waste Disposal

Comment Number 0062.04 *Longmeyer, Richard*

Comment The original Tri-Party Agreement had in it plans to build a vitrification plant. Those plans were scrapped. It was re-looked at. It was decided that's still the current methodology, and technology that's needed. And so we go again back to where we were five years ago, with still no vitrification plant.

Response As indicated in Volume One, Section 1.1, substantial changes have occurred since the decision to vitrify the double-shell tank (DSTs) waste was reached in 1989. These changes resulted in the 1994 revisions to the Tri-Party Agreement approach to tank waste management and disposal, and is the subject of the proposed action addressed in this EIS. The vitrification facilities addressed in the Tri-Party Agreement and this EIS are substantially different from the plant that was considered five years ago.

Comment Number 0072.64 *CTUIR*

Comment P 1-9: PP1: S 6: The CTUIR agrees with the national consensus to isolate the HLW permanently from the human and natural environment with minimal reliance on institutional controls.

Response DOE and Ecology acknowledge the CTUIR preference for the permanent isolation of HLW with minimal reliance on institutional controls. HLW disposal, as presented in the description of the alternatives, is assumed to be in a geologic repository for all HLW retrieved from the tanks (see Volume One, Section 3.4 for a discussion of this assumption). Where HLW is not retrieved, and would potentially be disposed of in place, the discussion of regulatory compliance in the Draft EIS identified the lack of compliance with national policy (see Volume One, Section 6.2). The Summary Section S.7 describes the current regulatory compliance status for each alternative included in the TWRS EIS.

Comment Number 0078.04 *CTUIR*

Comment The public has spoken at length on what to do with the tank wastes. The public overwhelmingly supported removing all the tank waste technology allows, and putting it into the most stable and durable waste form possible.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The retrieval approach is the existing planning basis for the TWRS program, as mandated by the Tri-Party Agreement (please refer to the response to Comment number 0062.04). Tank waste retrieval is also the approach evaluated in this EIS through the Ex Situ Intermediate Separations and Phased Implementation alternative (see Volume One, Section 3.4 and Volume Two, Appendix B).

L.1.2.3 Inventory

Comment Number 0072.61 *CTUIR*

Comment P 1-4: PP 4: S 3: There is no Information here, to indicate that much of the liquid, (a subjective term) has not leaked.

Response Volume One, Section 1.0 is an introduction to the EIS and does not contain the level of detail presented elsewhere in the EIS. The intent of this section is to provide a general background of the issues addressed in the EIS, the NEPA process, and the structure of information presented in the EIS. Volume One, Section 3.2 and Volume Two, Appendix B present detailed information regarding the volume of liquid waste disposed of in the tanks, as well as the volume of liquid waste removed from the tanks through evaporation, concentration, decanting and leaks. Based on the best available data at the time of publication of the Draft EIS, approximately 300 million gallons of waste were sent to SSTs and double-shell tanks (DSTs) throughout the production period. Volume reduction practices including decanting and evaporation reduced the waste volume to approximately 56 million gallons in 1995. An estimated 1 million gallons have leaked from the tanks over the years. Thus, the vast majority of the waste disposed of in the tanks (i.e., over 240 million gallons) was evaporated, concentrated, or decanted from the tanks. A smaller amount of the waste remains in the tanks and a much smaller volume of waste leaked from the tanks to the surrounding environment.

Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.62 *CTUIR*

Comment P 1-7: PP 2: S 1: How much Uranium was extracted, how much was processed, how much new chemicals were added, which chemicals added to the tanks caused the radionuclides to settle, and

would the concentration of these radionuclides cause structural stress to the tank shells, was the process done in separate batches? Where is the reference?

Response From 1952 to 1958, uranium was retrieved from the SSTs and sent to U Plant where it was dissolved in nitric acid and recovered by a solvent extraction process. The retrieval method consisted of sluicing or adding pressurized water to the tank contents to stir it up and allow pumping. The acidic waste from solvent extraction was neutralized with sodium hydroxide and returned to the SSTs. The exact quantity of uranium extracted is not contained in the publicly available literature because the information was classified, but it is estimated that over 5,000 tons of tank waste were returned for reprocessing (Agnew 1994). Cesium-137 was precipitated from the U Plant wastes by the addition of sodium ferrocyanide and nickel sulfate. These two chemicals plus the sodium hydroxide concentrated the cesium-137 in the precipitate, which settled to the tank bottom. The ferrocyanide addition took place at U Plant and directly at the tanks via the pipe openings or risers. The chemical additions to the tank risers were made in separate batches, and the chemical additions at U Plant probably were made in batches, with each batch being continuously pumped to the tanks. It is estimated that approximately 350 tons of ferrocyanide were added to the SSTs (Gephart-Lundgren 1995) (this reference will be added to the EIS). Because the cesium-137 precipitate was one component of a widely variable precipitate in the tanks, there would be no way to determine if its concentration caused structural stress to the tank shells; however, this cannot be ruled out. The heat from the radioactive decay of the cesium-137 (plus that from other radionuclides) has caused the contents of some SSTs to boil, which would structurally stress the tanks involved.

Comment Number 0072.63 *CTUIR*

Comment P 1-7: PP3: S 2: What part of this estimated 1 million gallons were added for cooling purposes? Due to the lack of tank leak information the estimate of gallons may be orders of magnitude low.

Response Based on available data, no accurate estimate can be provided of the portion of the 1 million gallons of water that were added for cooling purposes versus liquid waste disposed of in the tanks. This uncertainty regarding the nature and extent of waste that has leaked from the tanks, as well the extent of migration of the waste through the vadose zone and into the groundwater beneath the tanks, is one reason the TWRS EIS does not provide support for closure decisions. DOE initiated a vadose zone characterization program in 1994 to address some of the data uncertainty related to past tank leaks. Preliminary data from this program, based on a limited number of samples beneath one tank farm, became available as the Draft EIS was being prepared for publication. These data have been incorporated into the Final EIS in Volume One, Sections 4.2 and 5.2, Volume Four, Appendix F, and Volume Five, Appendix I. As additional data become available from the tank waste characterization program and vadose zone and groundwater monitoring, estimates of the volume and characteristics of past waste leaks from the tanks will be possible. This data also would be used to support DOE and Ecology decision making regarding closure of the tank farms. Please refer to the responses to Comment numbers 0072.08 and 0012.15.

L.1.2.4 Other

Comment Number 0072.65 *CTUIR*

Comment P 1-15: Sect. Areas of environmental analysis: Why doesn't this TWRS-EIS include assessing intact ecologies?

Response The EIS analyzes the potential impacts of the TWRS alternatives on all aspects of the natural and human environment. This includes ecosystems that are both undisturbed and thus may be considered to be intact, as well as ecosystems that have been disturbed by past events and in this sense may not be intact. The description of the affected environment presented in Volume One, Section 4.4 and Volume Five, Appendix I addresses both disturbed and undisturbed ecologies. Volume One, Section 5.4 describes the potential environmental impacts to the undisturbed ecologies. This analysis addresses how activities under each of the alternatives would impact ecological and biological resources, including impacts to biodiversity, wildlife, vegetation, and critical habitats.

Comment Number 0072.66 *CTUIR*

Comment P 1-16: Sect. 5.0: Environmental Consequences: Is environmental productivity measured by environmental diversity or by impact to environmental diversity?

Response Environmental diversity is one indicator of environmental productivity. Thus, impacts to environmental diversity were considered to represent an impact to environmental productivity. The EIS describes the environmental diversity of the Hanford Site in Volume One, Section 4.4 and Volume Five, Appendix K and analyzes the potential impacts to biodiversity associated with each of the alternatives in Volume One, Section 5.4.

L.2.0 PURPOSE AND NEED FOR ACTION

Comment Number 0005.36 *Swanson, John L.*

Comment The term "low-activity waste" is used incorrectly on page 2-1: at least the usage there does not agree with the distinction drawn on pages 1-3 and 6-18 that LAW is tank waste remaining after the removal of the practicable amount of HLW. By this distinction, how can there be any LAW in the tanks now? As I understand it, all of the tank wastes except for the NCRW and PFP tanks are HLW by definition; they will be pretreated to divide them into HLW and LAW fractions, but LAW does not exist until after pretreatment has happened. If this understanding is not correct, you had better revise your definition of LAW so that it is consistent with whatever it is that you mean. (I would be happy to try to assist in such a revision if it were explained to me what is really meant).

Response The use of the term LAW on page 2-1 is consistent with the definition of LAW provided in Volume One, Section 1.0. LAW is the waste remaining after the removal of as much of the radioactivity as is practicable from HLW. As indicated in Volume One, Section 1.1, during the 1950's and 1960's uranium, cesium, and strontium were separated from the waste in some of the SSTs.

Based on this earlier waste separations, some of the SSTs may be able to be classified as containing LAW. However, due to incomplete tank-by-tank waste characterization, it is not possible at this time to conclude how many or which tanks could potentially be considered for classification as LAW tanks.

As discussed in Volume One, Section 6.2, the correct classification of the waste from each tank will be required to determine which regulations are applicable to the disposition of the waste in each tank. Thus, it is possible that when tank waste characterization is complete, some of the tanks may be classified as LAW tanks. The waste from these tanks then could be processed accordingly. For example, under the preferred alternative, Phased Implementation, the waste from tanks determined to contain only LAW could be directly treated at the low-activity vitrification facility without requiring pretreatment. Please refer to the responses to Comment numbers 0005.25, 0041.01, and 0072.41.

Comment Number 0019.02 *WDFW*

Comment WDFW has reviewed, the purpose and need for action, and requests additional language be incorporated for clarification. Specifically, the need for action should state 67 SSTs are known or are assumed to have leaked 2.3 million to 3.4 million liters of hazardous waste to the groundwater, thus the need to remediate the source (tank waste) to prevent further contamination of groundwater. As long as an uncontained liquid waste source exists, it will continue to contribute to groundwater contamination and ultimately end up in the Columbia River.

Response The transfer of the liquid waste from the SSTs, many of which have leaked or could leak in the future, into the DSTs greatly reduces the potential for additional leaks into the soil column. A separate NEPA analysis was performed for this action, referred to as saltwell pumping. The purpose and need does identify the need to manage and dispose of tank waste to "reduce existing and potential future risks to the public, Site workers, and environment." The analyses provided in the EIS include a No Action alternative and the impacts analyzed for the alternative include potential future migration of waste to groundwater. Because DOE and Ecology believe the purpose and need for action is accurately presented in the Draft EIS, no modification to the document is warranted.

Comment Number 0043.01 *Hanford Communities*

Comment Radioactive tank waste is one of the most serious environmental risks on the Hanford site. The tanks continue to pose imminent safety risks to workers and the environment. These risks include the potential for catastrophic release through hydrogen gas flammability and groundwater contamination from leaking tanks. Our communities are frustrated with the lack of progress in getting the wastes out of the tanks and safely stored.

Response DOE and Ecology share the desire to move forward with remediation of the tanks at the earliest possible date and are implementing plans to accelerate remediation. In the mean time, DOE is performing numerous activities to place the tank farms in a controlled and stable condition and upgrade

the regulatory compliance status of the tank farm system. (See Volume One, Section 3.4 and Appendix B for discussions of current and planned programs to manage the tank waste.)

L.3.0 DESCRIPTION AND COMPARISON OF ALTERNATIVES
L.3.1 INTRODUCTION
L.3.2 SITE AND WASTE DESCRIPTION
L.3.2.1 Tank Waste

Comment Number 0005.10 *Swanson, John L.*

Comment On another matter related to tank-by-tank inventory, on page A-2 it is said that "...tank farms were grouped together based on tank contents (inventory)..." Again, what data were used to perform such groupings? The inventory data presented in the EIS, and represented to be used therein, do not allow such groupings to be made. We thus have no way of knowing (or estimating) how valid these groupings are. I detect no special bias here, as I do in the consideration of the combined ex situ/in situ alternatives cases, but the story presented in the EIS should be complete and consistent.

Response DOE and Ecology acknowledge the concern expressed in the comment. The text has been modified to show that the tanks were grouped according to configuration, not according to content. This text modification appears in Volume Two, Appendix A, Section A.2.1.1.

Comment Number 0005.22 *Swanson, John L.*

Comment On page A-3, it appears to be stated as a fact that the K Basins sludges will be added to the tanks. This is news to me, and I do not believe that it is reflected in other portions of the EIS.

Response One proposed option for disposition of K Basin sludge identified by the 1996 K Basins EIS ROD is to remove and transfer the sludge to the DSTs. If implemented, the final disposition of this waste would be in accordance with the alternative implemented for tank waste management and disposal under the TWRS EIS. The Draft EIS included, in Appendix A, the K Basin sludge inventory as a potential source of new waste to be added to DSTs. K Basin sludges are discussed in Volume One, Section 3.4.1 and Volume Two, Appendix A, Section A.2.4.

Comment Number 0005.37 *Swanson, John L.*

Comment On page 3-11 it is said that "--new leaks are developing in these tanks at a rate of more than one a year." Are data available to support this statement, or is it an assumption that is stated as fact?

Response At the time the Safe Interim Storage (SIS) EIS was published, 67 SSTs were assumed to have leaked over the past 50 years. This number was used to support the statement that leaks would develop at a rate of more than one a year in the future. The saltwell pumping program, which involves removing liquids from the tanks, is expected to slow the rate of corrosion and substantially reduce future leaks (see Volume One, Section 3.4). Data are not available to accurately predict the number of

new leaking tanks that will develop. The data identified above provide the best estimate available at the current time. Based on the saltwell pumping program to stabilize the SSTs and for the purposes of analysis in the TWRS EIS, no new leaks are assumed to occur during the 100-year administrative control period. The text of the EIS in Volume One, Section 3.2 has been modified to state that, "... new leaks are developing at a rate of one new tank known or assumed to have leaked per year."

Please refer to the response to Comment numbers 0072.70 (leak detection methods), and 0072.85 (predicted and anticipated future leaks).

Comment Number 0012.14 *ODOE*

Comment Tank Waste Characterization
The tank wastes are complex and poorly understood. The complex operating history of Hanford tanks has created a situation where the contents and character of the waste in every tank varies significantly from every other tank.

USDOE is working to characterize tank wastes. This should allow USDOE to narrow the uncertainties and mitigate severe hazards such as flammable gas generation. But, the data will not be detailed or accurate enough to ensure the risk assessments can accurately predict the fate of these wastes if they are left in the tanks.

Response The tank wastes are not well characterized on an individual tank basis, but an estimate of overall tank contents can be made. As noted in the EIS in Volume One, Section 3.2 and Volume Two, Appendix A, DOE has implemented a program to characterize tank waste on a tank-by-tank basis, which will be instrumental for resolving tank safety issues and final design activities for waste treatment. This program will aid in narrowing uncertainties regarding the waste in the tanks. However, DOE and Ecology believe that the existing historical data, laboratory data, and characterization reports provide an approximate estimate of tank contents from which the analysis of the tanks alternative can be completed to support the analysis and comparison of potential environmental and human health impact under National Environmental Protection Act (NEPA). The EIS acknowledges the uncertainties involved with the level of knowledge of the tank waste inventory and uses a conservative approach to assessing impacts based on the available data. This approach, known as bounding, provides an inventory of tank wastes that supports a risk assessment that DOE and Ecology believe fairly and objectively informs the decision makers and the public of the potential impacts associated with each alternative and support a comparative analysis of the alternatives. Tank-by-tank characterization will be needed to implement detailed design and operation of the TWRS action. If characterization data become available that are not bounded by the EIS analysis, DOE would complete an appropriate NEPA analysis to support analysis of environmental impacts and, if appropriate, alternatives that address the new data. See Volume Two, Appendix A for a discussion of tank inventory and Volume Five, Appendix K for a discussion of uncertainties.

Comment Number 0072.07 *CTUIR*

Comment In particular, two aspects are deficient within the TWRS-EIS. First, thorough characterization of the nature and composition of Hanford's chemically and physically complex tank wastes is in its infancy. It is clear that not enough information exists about these wastes within this EIS to adequately support retrieval and treatment needs, let alone facility design(s). If overall planning goals are not well understood in advance, the CTUIR SSRP asks, how will it be possible to design retrieval, treatment, and disposition systems that will meet protective waste management endstate and Tri-Party Agreement goals? This EIS should fit hand in hand with the Hanford site's overall guiding, framework document.

Response Though the characterization program for the tank waste is not complete, the EIS functions primarily as an environmental planning document, not as an engineering design document, and as such, will not include the complete details of programs like tank inventory and characterization or retrieval. As required by the Tri-Party Agreement, the tank waste characterization program will be completed September 1999. Assuming the tank waste characterization sample collection, analysis, and data interpretation must be finalized well in advance of the program, in addition to the reservoir of existing information, sufficient data would be available to support the detailed design of the transfer and retrieval systems, as well as of the treatment facilities. Where appropriate, the EIS incorporates such information by referencing the publicly available information on relevant topics. The locations of DOE Reading Rooms and information repositories containing publicly available information are given in the Summary, Section S.8. For example, the EIS contains references WHC 1995b, WHC 1995o, WHC 1994f, and WHC 1994g pertaining to tank contents and WHC 1994h pertaining to the characterization program. Tank retrieval and blending strategy is the subject of reference WHC 1995p. DOE and Ecology agree that it is necessary to ensure that tank waste remediation decisions are based on this EIS and are consistent with overall goals or designed endstates for the Hanford Site. To this end, the EIS describes the relationships among the alternatives and broader goals and policies, both nationwide and for the Hanford Site. For example, the relationship between the alternatives and tank closure is discussed in Volume One, Sections 3.3, 5.1-5.10, and 6.0. Further, Volume One, Section 6.0 describes the policy and regulatory background, including the Tri-Party Agreement, in relationship to the proposed action. Please refer to the response to Comment number 0012.14.

Comment Number 0072.14 *CTUIR*

Comment Considering the controversy surrounding the characterization of tank waste, the documentation of the contents of individual tanks and development of the "supertank" inventory should be better.

The entire tank waste characterization strategy needs to be examined and improved.

Response More complete knowledge of the tank contents would be preferable. At present, there is a program of tank characterization which, when completed, will provide information on the contents of

each tank. Because that program of characterization is not completed, estimates of tank components were used in the EIS. The documentation of the inventory estimates that were used in the EIS is discussed in Volume Two, Section A.3.0 and in Volume Four, Appendix E (Section E.1.1.3.1). The use of the super tank inventory is specifically discussed in Appendix A (Section A.3.3). The super tank inventory is intended to present the most conservative impacts from an accident so that the effects of accidents will not be underestimated. The super tank concentration of a chemical or radionuclide is the highest reported value that has been measured or calculated for that substance. This means that for assessing the impacts of an accident, a uniform inventory will be used for every accident scenario. For assessment of impacts, the use of this inventory data provides an equitable comparison of impacts. For the Final EIS, Appendix K (Volume Five) has been added to provide expanded information regarding uncertainties including inventory and accident. Please refer to the response to Comment numbers 0012.14 and 0072.07.

Comment Number 0072.67 *CTUIR*

Comment P 3-2: Sect. 3.2.1.2: Tank farm description: It is indicated here that 67 SSTs have leaked 2.3 million -3.4 million liters of liquids, it would be useful if there were a description on how this was calculated.

Response The estimate for the volume of waste that has leaked from the 67 known or assumed leaking SSTs was taken from the cited reference (Hanlon 1995). The referenced document, titled Tank Farm Surveillance and Waste Status Summary Report is one of a series of periodic reports that contains tank volume data as well as estimates and data for leak volumes from each of the known or assumed leaking SSTs. The methods used to estimate the volume of waste to have leaked varied by tank. The estimating method and the other parameters that impacted the assessment are contained in the footnotes to Table H-1 in the Waste Tank Summary Report for the month ending February 29, 1996 (Hanlon 1996).

Comment Number 0072.68 *CTUIR*

Comment P 3-4: PP 1: A vadose zone baseline characterization program could not possibly have determined the structure of the region underneath the tank farms given the amount of liquids presumed to have leaked and the large number of unknowns associated with the vadose zone points to an enormous amount of error in the ground water assumptions changing the future predictions on the rate of contaminate transport through the vadose zone will necessarily change the risk.

Response There are uncertainties and unknowns associated with the vadose zone modeling of rate and transport of contaminants from the tanks. Many of the uncertainties were addressed in Volume Four, Sections F.4.3.5 and F.3.4. The impact assessment modeling in Appendix F only addresses impacts from releases associated with TWRS remediation, not past leaks. Additional modeling was performed with evaluations provided in Volume Five, Appendix K that address potential transport mechanisms that may have been active during past leaks. Together, these evaluations and assessments provide the

basis for developing appropriate mitigating measures. The response to Comment number 0012.15 contains an extensive discussion of vadose zone contamination issues, particularly uncertainty and subsurface geology.

Comment Number 0072.69 *CTUIR*

Comment P 3-7: PP 3: S 5: what is the precipitation process for the metal-salt compounds indicated here.

Response The sentence cited in the comment refers to the sludges in the tanks. Sludge is contained in a layer of water-insoluble chemicals that precipitated and settled to the bottom of the tank when the waste liquid from the processing plants was made basic by the addition of sodium hydroxide. Because of their reaction with sodium hydroxide, the sludge compounds are composed of primarily of metal hydroxides. Because the sludge composition may vary and other compounds may precipitate, the precipitate also is termed hydrous metal oxides.

Comment Number 0072.70 *CTUIR*

Comment P 3-11: PP 3: Bullet 1: How was the rate of leakage determined? Please explain how the control wells or the leak sensors are strategically placed.

Response The statement cited in this comment, taken from the SIS EIS, is as follows: "Removing saltwell liquid from older SSTs to reduce the likelihood of liquid waste escaping from corroded tanks into the environment. Many of these tanks have leaked, and new leaks are developing in these tanks at a rate of more than one per year" (DOE 1995i). This statement was intended to reflect the age, condition, and historical perspective of the SSTs. This statement also reflected the thinking at the time that since 67 SSTs were assumed or confirmed to leak, the leakage rate would continue at more than one per year in the future.

Several methods are used to find leaks. Starting in the early 1960's, vertical monitoring wells, called drywells, were drilled around the SSTs. These wells are called drywells because they do not reach the water table. Approximately 760 drywells, located around the SSTs, are used to measure increases in radiation in the ground caused by tank leakage. Multiple drywells are located around the perimeter of the tanks in order to monitor around the tanks. A second way to detect leaks is to use a lateral drywell. This is a drywell drilled horizontally underneath a tank where the radiation in the soil can be measured by a detection probe. A third way to detect leaks is to lower radiation probes into liquid observation wells inside the tank and measure the radiation as a way to identify the level of liquid. By comparing the current liquid level with the last recorded level, a large leak can be detected. Detecting leaks in SSTs is an imprecise activity. As all tanks continue to age, the number of leaking tanks will likely increase. Please refer to the response to Comment number 0005.37.

Comment Number 0072.71 *CTUIR*

Comment P 3-11: PP 5: Bullet 3: In the event of loss of institutional control, and the loss of the mixer pump in 101-SY, could the microcrystalline mat reform much stronger and thicker, resulting in greater entrapment of hydrogen and other flammable gases?

Response The loss of institutional control, as an assumed event, would result in the termination of continuing operations at the tank farms. The loss of institutional control would mean that the day-to-day activities concerned with management of the tank wastes would no longer continue. This would mean that the mitigative measures currently being applied to the tank wastes would no longer be performed including the use of the mixer pump in tank 101-SY. The tank would revert to its condition before the mixer pump was installed. Whether the sludge layer would reform much stronger and thicker is unknown; however, this possibility cannot be ruled out. A discussion of potential remediation and post-remediation accidents is contained in Volume One, Section 5.12 and Volume Three, Appendix E. Please also refer to the response to Comment numbers 0040.02 and 0040.03 for more information related to administrative controls and the response to Comment number 0072.80 for discussions of the reason and basis for assuming a 100-year administrative control period.

Hydrogen and other flammable gas deflagration accidents were analyzed in the EIS. For post-remediation accidents, an analysis of the flammable gas deflagration accident, among others, determined that a seismic event would result in bounding case accident conditions and therefore the post-remediation accident presented in Volume One, Section 5.12 is the seismic event.

Comment Number 0072.72 *CTUIR*

Comment P 3-13: PP 1: This is the first notation on complexing of tank waste, please include a discussion on exactly what is meant by complexing waste.

Response The subject discussion regarding the SIS EIS ROD is provided in the EIS to inform the reader of planned activities to address urgent safety or regulatory compliance issues. The discussion of complexed and noncomplexed waste with respect to tank 102-SY was presented in the SIS EIS (DOE 1995i). A definition of complexed and noncomplexed waste is also provided in the glossary of the TWRS EIS. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted. Please also see the response to Comment number 0072.170 for more information about complexed waste.

Comment Number 0072.73 *CTUIR*

Comment P 3-13: PP 2: S 3: What part if any has the DOE done to insure that the affected tribes are involved and kept up to date with the transfer of responsibility, accountability, and liability?

Response The phased approach to implementation of the alternatives is discussed in Volume One, Section 3.3. Contracting strategy is not an issue addressed in the EIS. However, DOE recognizes the importance of maintaining an interactive relationship with the affected Tribes. Informal discussions as well as meaningful consultation and cooperation result in better understanding of important cleanup issues.

In the developing months of the privatization effort (Spring/Summer 1995), invitations were issued to the affected Tribes to present the initially envisioned concept. Letters and follow-up communiqués were issued to J.R. Wilkinson, Hanford Program, Confederated Tribes of the Umatilla Indian Reservation (CTUIR); Donna Powaukee, Environmental Restoration and Waste Management (ERWM) Manager, Nez Perce Tribe; and Russell Jim, Confederated Tribes and Bands of the Yakima Indian Nation. Of the invitations, only the Nez Perce requested and participated in a discussion of the project with a DOE representative and staff. Follow up correspondence addressing questions and concerns was issued August 1995.

Following issuance of the TWRS Request for Proposals (RFP) (February 1996), a request was made for a copy by Joseph H. Richards, Environmental Compliance Auditor, CTUIR on February 23. The following day, the document was forwarded to him.

Progress reports and status updates are routinely provided to the Hanford Advisory Board, which has Tribal representation. This is not to suggest that interactions with the Board substitutes, or may be conducted in lieu of, both formal and informal interactions with the Tribes. DOE encourages such interactions and welcomes opportunities to discuss important cleanup activities with the Tribes. An in-depth discussion of the Tribal consultation process for the TWRS EIS is presented in the response to Comment number 0072.252.

Comment Number 0072.74 *CTUIR*

Comment P 3-13: PP 2: S 7: The CTUIR agrees that the plan for privatization is subject to the final record of decision of the TWRS EIS.

Response The TWRS EIS ROD will document the decision for how to remediate the tank waste. DOE intent in preparing the schedules for the TWRS EIS and the award of Phase 1a contracts was to have the EIS ROD completed prior to the contract award. To ensure that the award of contract could proceed in the event of a schedule disruption to the EIS ROD, DOE clarified in the final RFP that action under the contract would be contingent on the outcome of the TWRS EIS ROD, a decision which would be considering other alternatives and, if chosen, might necessitate renegotiating or voiding the contract award.

DOE NEPA Implementing Procedures (10 CFR 1021) require DOE to "complete its NEPA review for each DOE proposal before making a decision on the proposal (e.g., normally in advance of, and for use in reaching, a decision to proceed with detailed design)" (10 CFR 1021.210 [b]). The November

1995 draft RFP indicates that Phase 1a is intended as a "development period to establish the technical, operations, regulatory, and financial elements required in privatized facilities." It is only in Phase 1b that the selected contractors will provide detailed, complete design, and be authorized to proceed with construction and operations. These circumstances and requirements comply with NEPA procedures that provide for submittal of environmental data and analysis by offerors and incorporation of an environmental synopsis of that data and analysis in any NEPA document prepared (10 CFR 1021.216 [h]), as long as the actions taken prior to beginning detailed design do not "have an adverse environmental impact" or "limit the choice of reasonable alternatives." Based on the planned Phase 1 approach of splitting the action into two subphases, DOE would be able to proceed with Phase 1a (conceptual design) prior to completion of the TWRS EIS ROD and be within the intent of NEPA. However, the TWRS EIS ROD would be required prior to the anticipated April 1998 award of Phase 1b contracts.

Comment Number 0072.80 *CTUIR*

Comment P 3-21/22: while it is acknowledged that NEPA requires that an EIS includes a no-action alternative, it should also be acknowledged that leaving leaking tanks violates several laws, regulations, and statutes. Also, no-action would not necessarily be a "continue the current waste 'management' program." It would more likely be a walk-away situation where institutional controls fail.

Response The No Action alternative would result in failure to comply with Federal and State laws and regulations. This information is presented in Volume One, Section 6.2 and in the Summary, Section S.7. EIS Sections S.7, 3.4, and 6.2 describe the Federal and State compliance issues applicable to the No Action alternative. DOE guidance on NEPA requires that EIS alternatives be addressed regardless of "conflict with lawfully established requirements" (DOE 1993d). DOE is required to identify the laws and regulations that apply to each alternative and indicate whether the alternative, if selected, would comply with applicable laws and regulations (40 CFR 1502.2d). Please refer to the response to Comment numbers 0093.02 and 0072.52.

Guidance on the implementation of NEPA Council on Environmental Quality (CEQ) Memorandum to Agencies: Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations states the following.

> Section 1502.14(d) requires the alternatives analysis in the EIS to "include the alternative of no action." There are two distinct interpretations of "no action" that must be considered, depending on the nature of the proposal being evaluated. The first situation might involve an action such as updating a land management plan where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases "no action" is "no change" from current management direction or level of management intensity. To construct an alternative that is based on no management at all would be useless academic exercise.

> Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed.

In the case of the TWRS program, there is an ongoing program to safely manage the tank waste that would continue under any reasonable scenario for the 100-year administrative control period. For this EIS, no action is assumed to be no effort other than the safe management practices currently conducted. The "walk-away" alternative was not evaluated, because it would present an imminent danger to human health and the environment and would be a useless academic exercise.

Comment Number 0072.81 *CTUIR*

Comment P 3-24: last paragraph: exactly what does "enough waste would be remediated"? Does this mean that the characterization of the tanks, tank farms, intra-tank, tank mixtures, solubility mixtures would be done on a pilot scale in ten years on an order of magnitude to justify 1.6 billion dollars of set-aside moneys. Is this amount of money justified in terms of removal of tank waste, lowering of risk, characterization, and achieving Tri-Party Agreement milestones.

Response The referenced language means that a sufficient quantity of waste would be remediated during Phase 1 to prove that remediation would be effective for the entire remediation program. The sentence was modified in Volume One, Section 3.3 as follows for clarification. "A sufficient quantity of a variety of tank waste types would be processed to demonstrate the effectiveness of the process and to provide the necessary data to design a full-scale facility." Please refer to the response to Comment number 0005.38.

Comment Number 0072.168 *CTUIR*

Comment P A-1: Sect. A.2.1: It is appropriate to list the estimated radionuclide and non-radionuclide inventory for each tank or tank farm for comparison.

Response Please refer to the response to Comment numbers 0012.14 and 0072.07. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.169 *CTUIR*

Comment P B-8: What is actually in the miscellaneous underground storage tanks?
The characteristics of an expected waste indicates a need for a comprehensive characterization, even if the total combined inventory of MUSTs volumes is less than one half of one percent of the total tank inventory.

Response Please refer to the response to Comment numbers 0012.14 and 0072.07 for issues related to tank waste characterization. Please also refer to Comment number 0072.99 for MUST content

information. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.170 *CTUIR*

Comment P B-10: What are the characteristics of concentrated complexant waste?

Response Concentrated complexant waste is the concentrated aqueous raffinate from strontium-90 liquid-liquid extraction operations performed in the 1960's and 1970's. This waste is a component of the wastes in the AN and SY tank farms, although some is in the DSTs because of saltwell pumping. It is characterized by a high organic content including the complexants ethylenediaminetetraacetic acid (EDTA), citric acid, and hydroxyethylenediaminetriacetic acid (HEDTA).

Comment Number 0072.171 *CTUIR*

Comment P B-12: PP3: Please explain what is meant by 'have or may have' greater than 50,000 gal of drainable liquid.

Response The section describes the installation of liquid observation wells in the tanks. The criteria for installation is the presence, or suggested presence, of at least 50,000 gallons of drainable liquid. The criteria retains the provisional phrase 'have or may have' because the exact quantity of liquid remaining in the saltcake will not be known until the liquid has been removed and its volume is measured.

Comment Number 0072.172 *CTUIR*

Comment P B-12: PP4: How many and how often are radiation measurements taken in the drywells?

Response Radiation measurements taken in the drywells are included in the discussion of ongoing tank monitoring and maintenance activities and are one of the methods used to monitor for tank leaks in Volume One, Section 3.2 and Volume Two, Appendix B. Two drywells at two SSTs (tanks 241-C-105 and 241-C-106) are currently monitored monthly by gamma radiation sensors. The remaining tanks are monitored by the TWRS program periodically based on the need to detect potential new leaks and/or to document the extent and nature of past leaks.

Comment Number 0072.173 *CTUIR*

Comment P B-16: PP5: Please re-do this paragraph. It is confusing and could be better written. For example, the description of the majority of radioactive elements in the sludge's needs to be expanded and an indication needs to be made whether the sludge's are at the bottom of the tanks or elsewhere.

Response The referenced paragraph provides a generic description or overview of the waste in numerous tanks rather than in individual tanks. The three types of waste (i.e., liquid, sludges, and saltcake) are present in the individual tanks in varying combinations and proportions. For example, sludges may be located at the bottom of the tank, caked along the side of the tank, or both. Although there is a considerable amount of tank waste inventory available from process records and past sampling activities, this information is not considered adequate to characterize the waste in individual tanks. However, DOE is actively involved in an ongoing waste characterization program that is using waste sampling and analysis, in situ measurements, monitoring, surveillance, and waste behavior modeling to provide more detailed and accurate characterization data for the content of individual tanks. Current agreements among DOE, Ecology, and EPA require that all characterization reports be issued by September 1999. Volume Two, Sections A.2 and A.3 present additional information on the tank inventory data including the estimated radionuclide inventory for SSTs and DSTs, ongoing tank characterization programs, and tank inventory data accuracy and its effect on the EIS. Please refer to the response to Comment numbers 0012.14 and 0072.07. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.174 *CTUIR*

Comment P B-18: PP3: The statement, "upgrade the regulatory compliance status" implies that the DOE may not be in compliance even after they complete the SIS EIS activities.

Response In the context of the TWRS EIS alternatives, the referenced statement regarding the SIS EIS refers only to the compliance status of the cross-site transfer portion of TWRS. Installing the cross-site transfer pipeline would comply with applicable regulations whereas the existing cross-site transfer pipeline does not. It is DOE policy to conduct its operations in an environmentally safe and sound manner in compliance with applicable environmental statutes, regulations, standards, and the Tri-Party Agreement. Routine operations at the tank farms include monitoring and maintaining the regulatory status, and operations and maintenance of facilities and equipment. However, upgrading the regulatory compliance status as part of the process of placing the tank farms in a controlled, stable condition involves multiple and continuing activities, particularly as facilities age. The EIS addresses upgrades specific to the waste transfer system (Volume Two, Section B.3). The cross-site transfer system and upgrades under the TWRS EIS are actions identified in the Tri-Party Agreement Resource Conservation and Recovery Act (RCRA) compliance provisions. Volume One, Sections 1.1 and 3.2 provide additional information regarding how the SIS EIS and TWRS are interrelated. Volume One, Section 6.0 describes the statutory and regulatory requirements potentially applicable to TWRS.

Comment Number 0072.175 *CTUIR*

Comment P B-20: PP1: If the goal of privatization has a component that transfers a share of accountability and liability to industry, have the affected Tribes been properly notified and consulted regarding this? If so, when and with whom were the notifications and consultations addressed to?

Response Please refer to the response to Comment number 0072.73.

Comment Number 0072.176 *CTUIR*

Comment P B-20: PP2: Once again the statement "upgrade the regulatory compliance status" indicates that even after the current planned upgrades the tank farms may not be in compliance. The planned upgrades listed including instrumentation, ventilation, and electricity is supposed to place the tank farms in a controlled stable condition. Please bring forth a discussion on how these three upgrades will accomplish this.

Response DOE and Ecology acknowledge that even after the current planned upgrades, the tank farms may not be in full compliance. However the upgrades are required by the Tri-Party Agreement which is the RCRA enforcement agreement among DOE, Ecology, and EPA. The upgrades when completed along with other projects such as the saltwell pumping program will result in the attainment of controlled onsite conditions for the SSTs. Upgrades to the instrumentation, ventilation, and electrical systems are not included in the scope of this EIS; however, these activities are the subject of other NEPA documents. Please refer to the response to Comment number 0072.174. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0077.01 *ODOE*

Comment More than a million gallons of high-level wastes have already leaked from these tanks, threatening the aquifer and the groundwater. Plutonium and americium from one tank leak at Hanford have migrated over 100 feet through the soil and may have reached the groundwater. A third of the tanks have been placed on a "watch" list because of the danger of explosions.

Response DOE and Ecology concur the magnitude and complexity of the tank waste issues that constitute the purposes and need for the TWRS action. DOE must implement decisions to manage and dispose of tank waste to reduce existing and potential future risk to the public, Site workers, and the environment. The EIS includes an analysis of alternatives to manage and dispose of tank waste. The analysis of impacts includes potential impacts to groundwater in Volume One, Section 5.2 and Volume Four, Appendix F; remediation and post remediation health impacts in Volume One, Section 5.11 and Volume Three, Appendix D; and remediation and post-remediation accidents, including the risk of explosions, in Volume One, Section 5.11 and Volume Four, Appendix E. The cumulative impacts of past leaks and TWRS actions are presented in Volume One, Section 5.13. Please refer to the response to Comment numbers 0072.61 (estimates of tank volume thought not to have leaked), 0072.63 (leak volume thought to be cooling water) and 0072.67 (leak volume estimating methods) for more information about tank leaks. Current methods used to detect leaks are discussed in the response to Comment number 0072.70.

Comment Number 0089.10 *Nez Perce Tribe ERWM*

Comment Page A-13, Table A.2.1.2
The Table delineates the soluble and insoluble portions of chemical species. This information is useful. but it would be helpful to see a listing of the chemical compounds rather than just anions and cations listed separately. A better understanding of tank chemical processes is possible with a listing of chemical compounds.

Response DOE and Ecology concur that more complete knowledge of the tank contents, including the exact nature of the chemical compounds would be advantageous. At present, there is a program of tank characterization which, when completed, will provide greater depth of knowledge as to the contents of each tank. Because that program of characterization is not yet completed, estimates of tank components were used in the EIS. Information on the chemical compounds within the tanks is limited. The inventory estimate provided for use in the EIS (WHC 1995d) gives the chemical species in their ionic form. For purposes of assessing impacts from the release of the tank contents, the use of the ionic forms was sufficient. Please refer to the response to Comment numbers 0012.14 and 0072.07. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

L.3.2.2 Cesium and Strontium Capsules

No comments were submitted for this topic.

L.3.3 DEVELOPMENT OF ALTERNATIVES

L.3.3.1 Tank Waste

Comment Number 0005.17 *Swanson, John L.*

Comment The fact that tank closure is not included in the analysis seems to me to be a serious deficiency. The statement on S-15 that "Closure is not within the scope of this EIS because there is insufficient information available concerning the amount of contamination to be remediated." seems to me to be a cop-out. You go on to base the analysis that you do on an assumed 1 percent left in the tanks; data given on page S-7 indicate that ~0.5 percent of the waste activity has been released or leaked to the ground. Isn't an estimate of ~1.5 percent of the contamination to be remediated during closure sufficient information on which to base an analysis? (It is certainly as close an estimate as many of those used in the analyses that were done in this draft).

Response Closure is not within the scope of this EIS because information, such as the nature and extent of vadose zone and groundwater contamination to identify and analyze reasonable closure alternatives is insufficient to support an evaluation of closure alternatives. The Notice of Intent to prepare the TWRS EIS stated, "The impacts of closure cannot be meaningfully evaluated at this time. DOE will conduct an appropriate NEPA review, such as an EIS, to support tank closure in the future" (59 FR 4052). However, some of the decisions to be made concerning how to dispose of tank waste may impact future decisions on closure, so the EIS provides information on how tank waste

remediation and closure are interrelated. A single and consistent method of closure was assumed for all alternatives to allow for a meaningful comparison of the alternatives. The closure method used for purposes of analysis was closure as a landfill, which includes filling the tanks and placing an earthen surface barrier over the tanks after remediation is complete. For a discussion of how closure was addressed within the EIS, see Volume One, Section 3.3.

Specific and detailed information on the distribution of contaminants from tank leaks and past practice activities is not available in sufficient detail to provide a meaningful comparison of impacts. When sufficient information is available to evaluate the closure options, DOE will submit a final closure plan to Ecology for review and approval, and an appropriate NEPA analysis will be completed. An extensive discussion of closure and issues related to closure is presented in Comment number 0072.08.

Because the analysis requested in the comment is not within the scope of the EIS, no modification to the document is warranted.

Comment Number 0005.18 *Swanson, John L.*

Comment The assumptions of a) 1 percent of the contaminants (including the water soluble ones) left in the tanks and b) no attempt to immobilize this residual, lead to a lack of discrimination risk is dominated (by a factor of ~100) by the risk of the non-immobilized 1 percent assumed to be left in the tanks. This is a classic case of "assumption driving the conclusion." For the purposes of this EIS, wouldn't it be better to assume a closure approach that would allow differences in the considered alternatives to apparent? It would be strange to me if the same "public" that drove out grout as a LLW form because of perceived contaminant release problems would be willing to accept a situation where the overall release is 100 times greater than that from their preferred waste form because something was not done to immobilize the waste left in the tanks (or to rinse out more than 99 percent of the water-soluble contaminants).

Response As stated in Volume One, Section 3.4, the calculations in the EIS are based on the assumption that the waste residual would be composed of the average tank contents, which is a very conservative assumption because the liquids used to retrieve the waste would remove a high percentage of water-soluble contaminants. The water-soluble contaminants are those that contribute to long-term risks because they can be transported over the long term into the groundwater. In response to the issue raised in this comment and others, calculations have been performed and presented in the Final EIS based on a less conservative content of the residuals where most of the water-soluble contaminants are removed. This provides both a bounding and nominal calculation of risks and provides the public and decision makers with greater information concerning long-term risks. This new information is contained in Section 3.4, 5.2 and Appendix F of the Final EIS. For more information regarding closure assumptions and how closure was addressed in the EIS, please refer to the response to Comment numbers 0005.17 and 0072.08 and Volume One, Section 3.3.

Comment Number 0005.26 *Swanson, John L.*

Comment Page A-7 contains a statement that conservative values of distribution coefficients"--would ensure that travel times of contaminants were at the upper bound--." Shouldn't that be LOWER bound?

Response The distribution coefficient is defined in such a manner that the constituents with the lowest distribution coefficients are those that travel with a greater velocity. The higher the distribution coefficient, the greater the resistance to movement. Therefore, the text is correct as written.

Comment Number 0005.38 *Swanson, John L.*

Comment At the bottom of page 3-24 and top of page 3-25, it is said that the Phased Implementation approach Phase 1 would remediate enough waste to prove that the many waste types in the tanks could be remediated effectively. This sounds good, but for it to be true you must have a different Phase 1 in mind that the Privatization Phase 1, which will prove essentially nothing about the pretreatment of SST sludges. (On page 3-92 I find "The waste processed during Phase 1 COULD (emphasis added) also include selected SST waste." This is a much different slant than the statement on page 3-24,-25).

Response The referenced text in Volume One, Section 3.3 has been revised to be less encompassing. It is DOE's intent to process enough different feedstocks (e.g., waste types and compositions) during Phase 1 to demonstrate the treatment processes before implementing Phase 2. Different feedstocks processed during Phase 1 would be expected to demonstrate maximum facility thruput, treatment of high cesium level waste, and treatment of organically complexed TRU and Strontium-90 waste. It is believed that by treating the different waste feedstocks identified during Phase 1, the majority of the waste types present in the tanks, including the SST sludges, would be adequately demonstrated to proceed with Phase 2. As explained in Volume One, Section 3.3, the contracting strategy known as privatization is not within the scope of the EIS. Please refer to the response to Comment number 0072.81.

Comment Number 0022.02 *Simis, Lynn*

Comment In terms of all human history we are treading on unchartered ground. Here we are confronted with a terrible cold war legacy which threatens our lives and environment. We are engaged in a monumentally serious and expensive undertaking which projects itself far into the future. Our current technology is not totally adequate, but we are morally obligated to do the very best we can NOW and not pass this dilemma to future generations.

We do know we are in this situation because of poor management and inadequate long-term planning during the production years. We do not wish to repeat these mistakes and impose disastrous results upon future generations by shortcomings in clean up decision making now.

Response The magnitude and potential impact of the tank waste are among the most extensive of the Cold War legacies. Moreover, the type and volume of waste and the scale of the technologies required for retrieval, treatment, and disposal are unprecedented. The waste poses substantial potential risks to human health and the environment. The costs for implementing any of the alternatives are substantial, and all alternatives would involve tasks that would continue for many years into the future.

It is for these reasons, among others, the Federal agencies are required to complete an EIS before decisions are made and before actions are taken. This allows decision makers and the public to be aware of the potential environmental consequences of the proposed action and ways to mitigate those impacts and for the public to be involved in decisions that affect the quality of the human environment.

Comment Number 0072.05 *CTUIR*

Comment The idea of NEPA is to identify and assess the full range of available options and technologies to address an issue -- in this case, the safe, effective, and protective treatment and disposition of dangerous Hanford high-level radioactive and hazardous mixed tank wastes. The current TWRS-EIS focuses only on retrieval of wastes and the explicit thermal treatment option of vitrification. Moreover, although 'closure' is not within the scope of the TWRS-EIS, a number of identified alternatives and considerable discussion throughout the EIS either pre-determine or limit ultimate closure options. The CTUIR SSRP, as a result of their interactions with other federal agencies, have noted that other potentially applicable technologies for tank waste treatment exist. A more broad range of applicable and feasible alternative treatment/disposal technologies needs to be systematically assessed with our consultation.

Additionally, NEPA requires a thorough scoping and assessment of key issues, a systematic set of screening or decision criteria, and a comprehensive consideration of a range of technological (or other) approaches to reach the desired endstate. The current TWRS-EIS examines only a limited set of treatment/disposal options and therefore cannot possibly compare the full spectrum of risks, costs, and benefits of alternative treatment/disposal options.

The Tank Waste Task Force (TWTF) identified that a "portfolio" of options for tank waste treatment and disposition should actively be explored, analyzed, and maintained for contingency planning purposes. The sheer complexity, diversity, and volume of Hanford tank wastes should intuitively mandate such an option-as-necessary-and-available approach.

Response A wide range of potentially applicable technologies exists for treating tank waste. One challenge was to eliminate from consideration technologies that were not viable and develop a range of reasonable alternatives for detailed analysis and presentation in the TWRS EIS. This discussion describes how the alternatives were developed.

There is a distinction between technologies and alternatives. Technologies are specific processes (e.g., cesium ion exchange) that relate to a component (e.g., retrieval or treatment) of an alternative.

Alternatives include a set of technologies, or building blocks, that have been engineered to work together, forming complete systems for accomplishing the purpose and need for action. Alternatives are made up of a number of technologies linked together.

The evaluation of potential technologies for inclusion in the TWRS EIS began with a review of available technologies from a variety of sources including the Tank Waste Technical Options Report (Boomer et al. 1993), the Tri-Party Agreement (Ecology et al. 1994), Hanford Defense Waste EIS (DOE 1987), and the engineering data packages prepared by the Site Management and Operations contractor (WHC 1995a, c, e, f, g, h, i, j, and h).

The first step in developing alternatives was to screen out technologies that were not viable. The full range of available technologies for each component of the proposed action was evaluated, and technologies that were not viable were eliminated from further consideration. The technologies eliminated by this screening process are described in Volume One, Section 3.8 and Volume Two, Appendix C.

After rejecting technologies that were not viable, a large number of potential technologies remained for inclusion in the EIS. It would not be practicable to develop alternatives that include all of the potential combinations of technologies. In accordance with NEPA, representative alternatives were developed for detailed analysis to bound the full range of reasonable alternatives (DOE 1993d). Upper, lower, and intermediate bounding alternatives were developed in terms of cost, risk, and technologies for the two primary decisions that affect environmental impacts: the amount of waste to be retrieved from the tanks and the degree of separations of retrieved waste into HLW and LAW. The full range of applicable technologies and alternatives therefore is included in the EIS.

Similar to the approach used by the Tank Waste Task Force, representative alternatives were developed for detailed analysis in the EIS. There are many other viable technologies for individual components of the alternatives that could not be included. These technologies are included in Volume Two, Appendix B and constitute the "portfolio" of options that could be substituted for one of the technologies that is included in an alternative without a substantial change in the impacts of that alternative. An evaluation was performed for each of the technologies identified in Appendix B. Where there would be changes in impacts, the changes are discussed in Appendix B. The level of analysis was dependent on the magnitude of the change on impacts.

The alternatives developed for presentation in the EIS were chosen to be representative of many of the possible variations of the alternative. The design information for all alternatives is at an early planning stage, and the details of the alternative that ultimately is selected and implemented may change as the design process matures. Therefore, the alternatives are intended to represent an overall plan for remediation at a level of detail sufficient for impact analysis and alternative comparisons.

DOE and Ecology are not aware of any other viable technology EIS for tank waste treatment. Please refer to the response to Comment numbers 0005.17 and 0072.08 for a discussion of the reasons closure was not addressed in the EIS.

Comment Number 0072.08 *CTUIR*

Comment The second major deficient factor is closure, both of waste treatment/disposal facilities and the tank farms themselves. The resolution of the tank waste issues are complex, time-transgressive, and fundamentally impact life-cycle costs. Closure issues, while not within the scope of this EIS, are essential to comprehensive planning for both waste retrieval and treatment from the tank farms. Additionally, closure will significantly impact long-term waste management and land consumption requirements on Hanford's Central Plateau -- a directly connected action which must be specifically assessed and coordinated with the CTUIR SSRP. A specific and incremental plan must be developed to accomplish safe and effective long-term waste management, and this necessarily requires a known endstate goal.

Response The final disposition of the tanks and associated equipment and the remediation of contaminated soil and groundwater associated with leaks from the tanks is a process called closure. Closure is not within the scope of this EIS because there is insufficient information concerning the amount of contamination to be remediated. The amount and type of waste that ultimately remains in the tanks after remediation may also affect closure decisions. The Notice of Intent to prepare the TWRS EIS stated that: "The impacts of closure cannot be meaningfully evaluated at this time. DOE will conduct an appropriate NEPA review, such as an EIS to support tank closure, in the future (59 FR 4052)." However, some of the decisions made concerning how to treat and dispose of tank waste may impact future decisions on closure, so the tank waste alternatives provide information on how tank waste remediation and closure are interrelated. Closure options and assumptions are discussed in Volume One, Section 3.3.1 of the EIS.

Under the Tri-Party Agreement, the tanks are classified as hazardous waste management units that eventually would be closed under the State Dangerous Waste Regulations (WAC 173-303) and the requirements of the Tri-Party Agreement. Three options exist for closure of the tanks. The first option is clean closure, which would involve the removal of all contaminants from the tanks and associated equipment, soil, and groundwater until natural background levels or health-based standards are achieved. The second option is modified closure, which would involve a variety of closure methods and would require periodic (at least once after 5 years) assessments to determine if the modified closure requirements were met. If modified closure requirements were not being met, additional remediation would be performed. Modified closure is a method specific to the Hanford Site Permit under the State Dangerous Waste Regulations (WAC 173-303). The third option is closure as a landfill, which would involve leaving some waste in place with corrective action taken for contaminated soil and groundwater performed under postclosure requirements. This type of closure usually involves the construction of a low permeability cover over the contaminated media to reduce water infiltration and prevent inadvertent human intrusion. When sufficient information is available to evaluate the closure options,

DOE will submit a final closure plan to Ecology for review and approval and an appropriate NEPA analysis will be completed.

Although sufficient information is not available to make final decisions on closure, some of the alternatives affect future closure decisions, so information is provided to allow the public and decision makers to understand how the alternatives would be interrelated with future closure of the tank farm system. For example, some of the alternatives addressed in the EIS involve removing most of the waste from the tanks (the ex situ alternatives) and would not substantially affect options for future closure decisions. Conversely, some of the alternatives do not involve removing the waste from the tanks (the in situ alternatives) but rather, would treat and dispose of the waste in the tanks. These alternatives include placing a low permeability cover over the tank farms to reduce water infiltration and prevent inadvertent human intrusion (e.g., Hanford Barrier). This would be considered closure as a landfill. Clean closure would be precluded by implementing one of the in situ alternatives. However, this would not address remediation of the soil and groundwater previously contaminated, so it would not represent complete closure of the tank farms. Therefore, the in situ alternatives would preclude clean closure of the tanks. The ex situ alternatives would not preclude any closure alternative. The decisions on closure will be made in the future when sufficient information is available.

For purposes of comparing the alternatives, a single and consistent method of closure was assumed for all of the alternatives. Closure as a landfill was chosen as the representative closure method for purposes of analysis and is included in all of the alternatives (except the No Action and Long-Term Management alternatives). This does not mean that closure as a landfill is proposed or necessarily would be selected in the future. It is included to allow a meaningful comparison of the in situ and ex situ alternatives and to provide information to the public and the decision makers of the total cost and impacts of final restoration of the Site.

Because decisions on closure cannot be made at this time but are interrelated with decisions to be made on remediation of the tank waste, the EIS presents an analysis of impacts with and without closure in Section 5.0. In each applicable subsection of Section 5.0, the impacts of the activities associated with remediating the waste are presented first. This is followed by the presentation of the combined impacts of remediating the tank waste and closing the tank farms by closure as a landfill. This provides the public and the decision makers with information on the impacts of the issues that are ripe for decision making (remediation of the tank waste) and information on the total project impacts (remediation and closure) as well as how they may be interrelated with the decisions on remediation of the tank waste.

A comprehensive land-use plan (CLUP) is being developed for the Hanford Site, and another NEPA analysis will be prepared on the tank farm closure. The CTUIR will be consulted during the preparation of both documents.

Comment Number 0072.50 *CTUIR*

Comment It is not clear whether any of the alternatives will allow clean closure, and none of the alternatives include removal of tanks (or support structures).

Response Please refer to Comment number 0072.08 for a discussion of the relationship between the TWRS EIS and future closure decisions. Selection of the No Action, Long-Term Management, In Situ Fill and Cap, In Situ Vitrification (ISV), or Ex Situ/In Situ Combination alternatives would preclude clean closure. The extensive retrieval alternatives would not preclude any closure option.
The discussion of closure in Volume One, Section 3.3 was modified to identify which alternatives would preclude clean closure.

Comment Number 0072.51 *CTUIR*

Comment There is an ongoing problem with failure to define retrieval and closure goals before retrieval is begun. At present, the action plan is to attempt retrieval, and then determine how well we did and therefore whether the tank farms will be closed as a landfill or clean closed.

Response DOE has plans to perform retrieval tests. The project is called The Hanford Tank Initiative and is discussed in Volume One, Section 3.2 of the Final EIS. The information gained from this program will provide data on the effectiveness of a variety of retrieval techniques. The waste retrieval goal is discussed in Volume One, Section 3.4 of the EIS. Please refer to the response to Comment number 0072.08 for a discussion of the relationship between NEPA requirements, the TWRS EIS alternatives, and closure. If an ex situ alternative is selected, the success of retrieval would be a factor in determining the type of closure performed.

Comment Number 0072.75 *CTUIR*

Comment P 3-18: PP 6: Because closure is not in the scope of this EIS, the CTUIR feels that this EIS is incomplete and actions to correct this should be taken, for example, by designing how a closure plan should be incorporated into this EIS.

Response Please refer to the response Comment number 0005.18 for a discussion of the reasons why tank farm closure alternatives cannot be analyzed at this time. The response to Comment number 0072.08 discusses the relationship between this EIS and future closure options. This response contains a discussion of the relationship between NEPA requirements, the tank waste remedial alternatives evaluated, and related closure issues. DOE, in the Notice of Intent to propose this TWRS EIS, has committed to complete the appropriate NEPA analysis when data become available to support the analysis. The Tri-Party Agreement contains milestones relative to the preparation and approval of a closure plan for the SSTs.

Comment Number 0072.76 *CTUIR*

Comment P 3-20: PP 1: The CTUIR SSRP technical staff states that anything less than clean closure would result in excess risk to tribal members.

Response DOE and Ecology acknowledge the preference expressed in the comment and will consider this and other concerns when selecting the final action for TWRS waste. Closure will be addressed in a future NEPA analysis when sufficient data are available to provide a meaningful comparison of closure alternatives. Please refer to the response to Comment numbers 0072.08 and 0072.50.

Comment Number 0072.77 *CTUIR*

Comment P 3-20: PP 2: For the purposes of comparing the alternatives and as not to preclude ruling out any closure alternatives, the clean closure is, should, and will be replaced in all the following alternatives sections. Additionally it is impossible to do a meaningful comparison between in situ and ex situ alternatives.

Response Tank farm closure was presented in the EIS as a hypothetical closure scenario to demonstrate the relationship between remediation and closure to the public and the decision makers and so in situ and ex situ alternatives could be equitably compared. Using closure as a landfill as the hypothetical closure scenario does not mean that it has been or will be selected for implementation. Tank farm closure will be addressed in a future NEPA analysis when sufficient data are available to provide a meaningful comparison of closure alternatives. Please refer to the response to Comment number 0072.08 for a discussion of the reasons closure alternatives are not appropriate for inclusion in the EIS.

Comment Number 0072.78 *CTUIR*

Comment P 3-20: PP 3: S 4 : Environmental restoration, waste management, and remediation together which define clean-up have been and are ripe for tank farm decision making. You can not separate a removal process from a closure process and plan for privatization without truly considering the future. This process has to be fair, open, meaningful and involve the complete integration of the affected tribes in order to insure true tank farm closure.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0072.08 for a discussion of the reasons closure alternatives are not appropriate for inclusion in the EIS. Volume One, Section 5.13 of the EIS presents an analysis of the cumulative effects of tank farm remediation and other projects at the Hanford Site. Section 5.13 has been updated to include emerging information concerning the environmental remediation program.

Comment Number 0072.79 *CTUIR*

Comment P 3-21: PP 4: S 2: Why is it not practical to compare the potential acceptable technologies with the alternatives considering the time and effort used to produce this document? It would seem at the very least to be a reasonable thing to do. If you could not include all of the potential combinations of technologies, how can a reader be sure you have included a full range of applicable technologies?

Response In accordance with the regulations (40 CFR 1500 to 1508) that implement NEPA, the full range of reasonable alternatives were developed and analyzed in the EIS. All other viable technologies and their impacts were also addressed in Volume Two, Appendix B. The purpose of the TWRS EIS was to evaluate reasonable methods or processes (i.e., alternatives) of removing, treating, and disposing of tank waste at the Hanford Site. Including all of the potential combinations of technologies in full alternatives would result in dozens of alternatives to be addressed in the EIS. This would be unmanageable and confusing to the public and the decision makers. Specific removal, treatment, and disposal technologies will be evaluated during the detailed design phase following approval of the Final EIS. Selected technologies will be tested against specific effectiveness and efficiency criteria during the Phase I demonstration (preferred alternative). Please also refer to the response to Comment number 0072.05 and Volume One, Section 3.3 for a detailed explanation of the process used to determine the range of technologies to include in the evaluation.

The Draft EIS addressed the full range of reasonable alternatives. The alternative identified in the comment (i.e., evaluate all potential technologies) is bounded by the alternatives addressed in the Draft EIS, and therefore, DOE and Ecology believe that including the analysis of all the potential combinations of technologies would not provide valuable additional information to the public or decision makers.

Comment Number 0072.177 *CTUIR*

Comment P B-29: PP2: The in situ alternative may be required by NEPA, but it violates the Tri-Party Agreement. Please insert language regarding this with all in situ alternatives for clarification purposes.

Response The in situ alternatives would not meet the requirements of the Tri-Party Agreement. The Summary, Section S.7 and Volume One, Section 6.2 discuss whether the alternatives meet all applicable laws, regulations, and agreements (including the Tri-Party Agreement). As required by CEQ, the TWRS Draft EIS identifies and analyzes the range of reasonable alternatives for the proposed action. Potential violation of existing laws, regulations, or agreements (any of which may be revised) is not considered basis for eliminating an otherwise reasonable alternative from consideration. Please refer to the response to Comment numbers 0072.80 and 0072.52.

Comment Number 0089.07 *Nez Perce Tribe ERWM*

Comment Page 3-32, Paragraph 1
The EIS assumed that 99 percent recovery of the tank wastes would be achieved. The remaining 1 percent of tank waste volume left in the tanks will leave a sizable volume of contamination in the tanks to continue to contaminate the vadose zone and groundwater. Future tank closure and soil remediation will not be possible without removal of all tank wastes.

Response The residual waste would likely contain a very low concentration of soluble contaminants because the large volume of liquids used to retrieve the waste would leach the soluble contaminants from the residual waste. The Final EIS presents human health risks based on two scenarios: 1) that the residual waste would contain the average tank contents; and 2) that the residual waste would have been leached to reduce the concentration of soluble contaminants that could be leached into the groundwater. Closure of the tank farms is not within the scope of the EIS. Please refer to the response to Comment number 0072.08 for a discussion of the reasons why closure of the tank farms will be addressed in a future NEPA analysis and 0005.18 for a discussion of the waste retrieval assumption.

Comment Number 0094.01 *Moore, Jennifer*

Comment I just want to say the thing I find the most disturbing about this EIS, well one of the things I find the most disturbing about this EIS, is the fact that they list not one, not two, but quite a few alternatives which violate the Tri-Party Agreement and other laws and standards. We are dealing with a ... laws which were put so that the public would be protected and that this clean up would keep going at a standard that eventually can ensure that people can live around this area and use the drinking water and basically not live in fear of dying of fatal cancer from being exposed to nuclear waste. The fact the Department of Energy is listing these as viable alternatives, viable options indicates that they do not seem to take the public safety into account very much and somewhat see themselves as above the law which they themselves entered into.

Response The NEPA regulations (40 CFR Parts 1500 to 1508 and 10 CFR 1021) require DOE to evaluate reasonable alternatives even if they do not comply with laws and regulations, so it was necessary to include such alternatives in the EIS. The response to Comment number 0072.80 contains an extensive explanation of NEPA requirements and the criteria used in this EIS to analyze the tank waste alternatives. Please refer to the response to Comment number 0072.05 and Volume One, Section 3.3 for a discussion of how DOE and Ecology identified the alternatives to be analyzed in the EIS. DOE and Ecology's preferred alternative would meet all applicable laws and regulations. Please also refer to the response to Comment numbers 0072.52 and 0072.177.

Comment Number 0097.01 *Perry, Henry*

Comment Considering that the DOE is representing us, the public, and is playing with more than fire in this situation with the possibility of placing the environment of the entire Pacific Northwest at risk,

can there be any question that the EIS, that it prepares, should be prepared on the basis of the worst-case scenario and certainly in accordance with the Tri-Party Agreement previously agreed to.

Response The EIS presents a bounding analysis of the reasonable alternatives. Conservative assumptions and calculation methods are used to provide the public and decision makers with an assessment of the reasonable upper limit of the potential impacts of each alternative if implemented. These assumptions and calculation methods are fully presented in the appendices. The preferred alternative is in full accordance with the Tri-Party Agreement, and in the EIS, the Summary and Volume One, Section 6.2 identify regulatory compliance issues for each alternative. The regulations (40 CFR 1500 to 1508) which implement NEPA and other NEPA implementation guidance discourage the use of "worst case" analyses because these scenarios become unrealistic and blur the differences in impacts between alternatives. The EIS was modified to include an expanded consideration of uncertainties associated with the assumptions and analysis of environmental and human health impacts. The information is presented in Volume Five, Appendix K.

Comment Number 0098.02 *Pollet, Gerald*

Comment Secondly, in regards to the cost issues, the EIS should clearly compare the cost of the Phased Implementation Tri-Party Agreement path against the risks and costs of the prior Tri-Party Agreement path that were in place for a short period of time before 1994. Under the prior Tri-Party Agreement path, we would retrieve and process approximately twice as much waste by the year 2010 as we will under so-called Phased Implementation. As part of that clear analysis and depiction, the State and the U.S. Department of Energy owe the public and decision makers a clear presentation of the risk each year from delay. In other words, every year you leave more waste in a tank, you have a set of risks. That is why we are hear tonight. You can not deny it. That is ... we all agree that is why we are here. So the question is, does the public deserve to see what is the risk every year from delay. What is the risk from going forward with a path that the General Accounting Office has said may fail. That the State has said is likely to fail. Because of the Department of Energy's contracting decisions which are outside scope of this EIS, but the risks of failure are in the scope of this EIS and need to be disclosed because decision makers for the next decade sitting 3,000 miles away or in the State capital are going to look at this EIS and say, Ah, the risk of another change in the Tri-Party Agreement and another delay in vitrification of 2, 3, 4, 5, 10 years is not so great and we can not let them say that the risks are not so great.

Response The costs of the prior Tri-Party Agreement path are shown in the EIS as the Ex Situ Intermediate Separations alternative costs and the costs of the revised Tri-Party Agreement path are shown as the Phased Implementation alternative costs (without any adjustments for privatization). This information is presented in Volume One, Section 3.4 and Volume Two, Appendix B.

The Phased Implementation alternative would result in less waste being treated during the first 10 years of the project but also would result in all of the waste being treated 4 years earlier than previously required. These two factors would offset each other in terms of releases to the vadose zone before

treatment. In any case, the leaks prior to completion are expected to be greatly reduced by the salt-well pumping program, which is currently underway. The Phased Implementation alternative also would decrease the potential for construction of a facility that does not function effectively and thereby reduce the potential for long program delays.

Comment Number 0101.06 *Yakama Indian Nation*

Comment Invalid Constraints on Scope of EIS Reflecting Lack of Systems Engineering Integration -- The lack of consideration of the impacts associated with the closure of the tank farms following removal of the bulk of the wastes and remediation of the hazardous vadose zone around the tanks is unreasonable, since an integrated systems approach to develop low impact alternatives for tank waste retrieval and tank farm decontamination and decommissioning is warranted to save financial resources and reduce worker exposure. For example, actions required to remediate vadose zones at the tank farms as part of the closure actions may greatly simplify tank waste retrieval actions, reducing costs and expediting retrieval. Cumulative impacts can only be attained when related/integrated actions are evaluated.

Response DOE and Ecology believe that there is sufficient information available to analyze alternatives for remediation of the tank waste even though a number of uncertainties exist for various aspects of the action. These uncertainties are identified in the EIS. DOE is implementing a systems engineering approach to remediation of the tank waste. The integration of tank waste remediation with tank farm closure has been difficult because there is insufficient information available on contamination in the vadose zone and past practice releases. The Notice of Intent to prepare this EIS stated that, "The impacts of closure cannot be meaningfully evaluated at this time. DOE will conduct an appropriate NEPA review, such as an EIS to support closure, in the future" (59 FR 4052).

There is a relationship between closure and tank waste remediation because certain alternatives for tank waste remediation would preclude clean closure of the tank farms. This relationship was discussed in the Draft EIS in Volume One, Section 3.3 on pages 3-18 to 3-20. In addition, a representative closure option, closure as a landfill, was included in all of the remediation alternatives to demonstrate the relationship of closure to remediation and to allow an equitable comparison of the alternatives. This does not mean that closure as a landfill will be selected as the closure alternative, but it provides an assessment of the total potential impacts for the environment. Consistent with NEPA regulations (40 CFR 1500 to 1508), the EIS has been prepared with the most current available information.

The emerging information concerning contamination in the vadose zone was mentioned in the Draft EIS in Volume One, Section 3.4, and the Final EIS has been modified to address the data, as appropriate, in Volume One, Section 4.2 and Volume Five, Appendix K. A systems engineering approach also will be taken to the development of data and engineering when DOE performs a NEPA analysis for closure.

L.3.3.2 Cesium and Strontium Capsules

No comments were submitted for this topic.

L.3.4 TANK WASTE ALTERNATIVES

L.3.4.1 Preferences for Tank Waste Alternatives

L.3.4.1.1 Specific Preferences

Comment Number 0008.06 *Evett, Donald E.*

Comment I consider the No Action and Long-Term Management alternatives to be unsuitable for consideration. I believe the impact study reveals significant rationale making this alternative too high of a risk, especially for many years into the future.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please also refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives, and the response to Comment number 0072.80 for issues related to the CEQ, NEPA and the 100-year administrative control period.

Comment Number 0009.07 *Broderick, John J.*

Comment This alternative (Ex Situ/In Situ Combination) has acceptable risks to workers and offsite public. The other alternatives do not have a significant reduction in fatalities. (About 75 in 10,000 years.) It should be kept in mind that even though statistics indicate a certain level of health effects will be experienced, Hanford will continue to reduce them. The current safety record of Hanford is much better than the national average. We must assume that the good record will continue, and in fact, we must ensure it.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. As noted, the Hanford Site does have a safety record that exceeds the national average, and DOE is committed to continuing improvement of its safety performances. Please refer to Volume One, Section 5.12 and Volume Four, Appendix E, which discuss accident risk during and after remediation. Please also refer to the response to Comment number 0009.06.

Comment Number 0009.08 *Broderick, John J.*

Comment This alternative (Ex Situ/In Situ Combination) is one of the lowest cost to perform. In addition, it minimizes repository costs. We do not know what the repository costs will be, but it is unlikely that they will be lower than the current estimates.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating

the TWRS waste. A discussion of factors influencing the evaluation of alternatives is provided in the Summary (Section S.6), a comparison among the alternatives is provided in the Summary (Section S.7), and a summary of the environmental impacts is presented in Volume One, Section 5.14.

A reevaluation of repository costs, which accounted for the use of larger canisters in the geologic repository, led to a reduction in repository costs for some alternatives. These revised costs have been presented in the Final EIS in Volume One, Section 3.4 and Volume Two, Appendix B. The response to Comment numbers 0081.02, 0004.01, and 0008.01 extensively discuss the issues related to repository costs.

Comment Number 0009.09 *Broderick, John J.*

Comment This alternative (Ex Situ/In Situ Combination) will have the facilities constructed by 2007. This is faster than most of the alternatives. Speed is very important because it seems that Hanford, as time goes on loses its concentration and wants to do something else. The number of canceled projects is very large, and very expensive.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste.

DOE and Ecology acknowledge the risks associated with projects that take a long time to complete. However, speed of project completion is but one of many factors that influence the evaluation of alternatives. Other factors analyzed include short- and long-term risk to human health and the environment, technical uncertainty, cost, and regulatory compliance. Please refer to the response to Comment numbers 0009.08 and 0009.10.

Comment Number 0009.11 *Broderick, John J.*

Comment This alternative (Ex Situ/In Situ Combination) does not meet all of the regulations; however, they can be negotiated to be modified to assure that the public is adequately protected. The Tri-Party Agreement is a good place to document the negotiations.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The ability of the alternatives analyzed in the EIS to comply with Federal and State regulations is presented in the Summary (Section S.7) and discussed in detail in Volume One, Section 5.7.

Comment Number 0009.16 *Broderick, John J.*

Comment The Preferred Alternative is not acceptable because the cost (for the Preferred Alternative) is not the lowest that provides adequate protection of the public.

Response DOE and Ecology acknowledge the objection to selection of the Phased Implementation alternative as the preferred alternative, and this comment and other public comments will be taken into consideration when making a final decision on remediating TWRS waste. Please refer to the response to Comment number 0009.15. As discussed in the Summary (Section S.6), there are a number of factors that influence the evaluation of the alternatives. Cost was one factor analyzed for each alternative. The results of the impacts analysis are presented in the EIS in an objective, nonvalue-laden (e.g., less or more cost is preferable) manner for careful consideration by the public and decision makers. Cost comparison of the alternatives was never conducted in the absence of all other factors, which included risk to human health and the environment, long-term land use restrictions, and regulatory compliance. Furthermore, for the final EIS cost impacts associated with HLW storage at the proposed geologic repository have been presented separate from costs associated with the waste management, retrieval, treatment, and disposal or disposal onsite. For example in comparing the Ex Situ/In Situ Combination 1 alternative to the Phased Implementation alternative, the cost of long-term land use restrictions and risk to human health and the environment, as well as cost, monetary or other, of not complying with current regulatory requirements were analyzed equally. Please refer to the response to Comment number 0081.02 for discussions of cost issues related to the alternatives.

Miscellaneous Preferences

Comment Number 0001.01 *Bell, Robert C.*

Comment There currently exists containment technology that could completely seal off the leaking nuclear contaminants from migrating through the earth and contaminating the groundwater. However, it appears that no monies have been budgeted for the containment of the leaking nuclear waste. By containing the leaking storage tanks the public along with all life would be protected from the most toxic and deadly nuclear waste. I urge you to actively support the request to the United States Congress for funds to pay for the containment of the leaking tanks at Hanford.

Response Subsurface barriers are addressed in the EIS as a containment technology that could be applied to control tank leakage. The function of the subsurface barriers would be to prevent leakage of tank waste from migrating beyond the barrier into the vadose zone, which would help minimize the volume of contaminated soil. The possible use of subsurface barriers was derived from concerns about using hydraulic sluicing for retrieval, and because some of the SSTs either are confirmed or assumed leakers. Also, a study titled Feasibility Study of Tank Leakage Mitigation Using Subsurface Barrier (Treat et al. 1995) was completed in support of a Tri-Party Agreement milestone and was one of the references used during preparation of this EIS. The feasibility study assessed the application of existing

subsurface barrier technologies and the potential of existing technologies to meet functional requirements for SST waste storage and retrieval activities. Information on subsurface barriers is included in Volume Two, Section B.9.

In addition, the current TWRS program involves a wide variety of ongoing activities that include monitoring the integrity of tanks and characterizing the vadose zone around the tank farms to detect leaks. DOE also conducts numerous activities to provide continued safe storage of the tank waste, such as the saltwell pumping program, which involves removing retrievable liquids from SSTs to minimize potential future leaks. These ongoing programs are described in Volume One, Section 3.2.

This EIS addresses the full range of reasonable alternatives. This includes 10 tank waste alternatives ranging from no action to extensive retrieval. Risk to human health and the environment was among the factors considered by DOE and Ecology in identifying the preferred alternative, Phased Implementation (a discussion of factors that influence the evaluation of alternatives is presented in the Summary, Section S.6). Volume One, Section 5.13 (Cumulative Impacts) addresses actions at other DOE sites, programmatic actions, and actions at the Hanford Site that could impact the TWRS actions, including the Hanford Remedial Action Program. The proposed TWRS activities would be carried out against the baseline of overall Hanford Site operations. Volume One, Section 5.11 and Volume Three, Appendix D detail the anticipated risk for each alternative.

DOE and Ecology acknowledge the recommendation expressed in the comment regarding funding. However, Congressional funding issues are not included in the scope of this EIS.

Comment Number 0040.01 *Rogers, Gordon J.*

Comment The In Situ Fill and Cap alternative is clearly the best choice. The cost is low enough to have some real chance of being funded by Congress. It reaches a reasonable stage of completion in the shortest time. The short-term impacts are trivial. The long-term impacts appear likely to be small and acceptable providing that onsite use of groundwater is prohibited; and further than onsite farming and irrigation is prohibited.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Short- and long-term environmental impacts, uncertainties, and regulatory compliance are among the factors influencing the evaluation of alternatives. A discussion of these and other factors influencing the evaluation of alternatives is provided in the Summary, Section S.6, a comparison among the alternatives is presented in the Summary, Section S.7, and a summary of environmental impacts is provided in Volume One, Section 5.14.

NEPA requires that all reasonable alternatives be evaluated, regardless of cost, although Congressional funding issues associated with implementation of the alternatives were not included in the scope of the

EIS. Please refer to the discussion contained in the response to cost concerns related to a comparison of the alternatives contained in Comment number 0081.02.

Comment Number 0072.11 *CTUIR*

Comment Of the alternatives presented, the CTUIR SSRP technical staff prefers Ex Situ with Extensive Separations because the cost is comparable, the volume of waste is comparable, the technical uncertainty is no higher than the other ex situ alternatives, and the activity of the LAW would be substantially lower than with less extensive separations. The phased approach will not be practical since substantially more land is required for two sets of vitrification facilities rather than the one set required for the non-phased options.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Multiple factors, including land-use commitments, influence the evaluation of alternatives. Among the factors are short- and long-term environmental impacts, regulatory compliance and uncertainties. These factors are addressed in the EIS in the Summary, Section S.6. In the Summary, Section S.7 contains a comparison of the alternatives based on various evaluation factors and Volume One, Section 5.14 provides a summary comparison of all of the environmental impacts addressed in the various sections of Volume One, Section 5.0 and the supporting appendices. The response to Comment number 0081.02 contains a discussion of the comparison impact of separating repository costs from retrieval and treatment costs of the ex situ alternatives.

Land use commitment impacts were analyzed in detail in Volume One, Section 5.7. Based on that analysis, Volume One, Section 5.19 identifies potential land use restrictions as a potential environmental justice concern for affected Tribal Nations. Volume One, Section 5.20 identifies potential mitigation measures that could be implemented to address the land use impacts identified in Section 5.19. For the Final EIS, these sections of the Draft EIS were revised to reflect technical information unavailable at the time the Draft EIS was published.

Comment Number 0085.02 *Klein, Robin*

Comment While it is true that a clearly proven, good solution does not exist, it is also true that the liquid wastes must not remain in these tanks. The leaking tanks are the greatest source of waste contaminations to the soils. Contaminated waste originating from the tanks are moving toward groundwater. Groundwater contaminated with Hanford pollutants already in the soils is now in communication with the Columbia River. Cleaning up waste once in the soils will take heroic efforts. Once they get into the river, the long lived contaminants are practically irretrievable. The single most affective measure we can take to protect the river in the long run is to stop the driving force that enables rapid migration of the wastes offsite, get the waste out of the leaking tanks soon. So it is important to have an aggressive plan in place.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. DOE and Ecology are committed to protecting the Columbia River. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

Comment Number 0088.03 *Porter, Lynn*

Comment There's an article in the Oregonian Sunday March 17th, that raised a whole lot of questions. This was a large article beginning on the front page quoting a panel of scientists from the National Research Council, whoever that is, I probably should know, but I don't. And they're saying just leave the stuff in the tanks. They quote some DOE engineers saying yes we can do it. And one of the points that puzzled me was they're saying in this article, the National Research Council says that before you can sluice out these tanks you have to seal the ground underneath them. I didn't find anything about that in the summary of the Draft EIS, except for the ISV option. So I don't know where this comes from, but their point seems to be that if you're going to have to seal the ground anyway, you might as well leave the stuff in the tanks. That's something I would have like to of heard discussed.

I think the problem is that this kind of thing keeps coming up. And so of course we wonder where's it coming from. There seems to be a lot of energy behind this idea we'll just leave the stuff in the tanks and put it cap on it and walk away. I'm glad to hear that isn't the feeling at the top. But since it keeps coming up in such volume, we wonder what's going on, like is this a trial balloon. If it is, I'd like to shoot it down. I just think leaving the stuff in the tanks is a completely unacceptable alternative. And I wish someone would take this idea out and bury it and drive a stake through it's heart.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The National Research Council, in the cited article, advocated an alternative that evaluated the impact of not removing waste from selected tanks. This alternative, which corresponds to the Ex Situ/In Situ Combination 1 and Ex Situ/In Situ Combination 2 alternatives evaluated in the EIS, is not the preferred approach endorsed by DOE and Ecology. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives and Comment number 0001.01, which discusses subsurface barriers as this issue relates to leak containment.

Specific Preference for Ex Situ/In Situ Combination Alternative
Comment Number 0009.05 *Broderick, John J.*

Comment The above reasoning has lead me to recommend you select the following remediation alternative: Ex Situ/In Situ Combination. I believe the Preferred Alternative is doomed to be not completed because it is trying to avoid leaving waste in place, will take too long to construct, and will

cost too much. In addition, there is a possibility that the whole issue will again be revisited at the beginning of the second phase. This will be another opportunity to change the remediation approach.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0009.06 for a description of revisions to the alternatives in the Final EIS, 0009.08 for a description of the factors considered when evaluating alternatives, and 0009.09 for a description of the time required to implement alternatives.

Comment Number 0009.06 *Broderick, John J.*

Comment This alternative (Ex Situ/In Situ Combination) selects the actions based on long term health effects, rather than a "one size fits all" approach.

Response The ex situ/in situ combination alternatives are based on reduction of human health risk and different tanks having much different contents, therefore representing differing potential long-term impacts to human health. For the Final EIS, two ex situ/in situ combination alternatives are analyzed in detail. Volume One, Section 3.4 and Volume Two, Appendix B provide a description of the two alternatives and the potential impacts associated with each alternative are analyzed in Volume One, Section 5.0 and associated appendices.

Comment Number 0009.10 *Broderick, John J.*

Comment This alternative (Ex Situ/In Situ Combination) will deal with more waste faster than other, more extensive alternatives. Thus there will be less effort expended in just managing the waste.

Response DOE and Ecology acknowledge the risks associated with projects that take a long time to complete. However, speed of completion of the project was one of many factors that influence the evaluation of alternatives (please refer to the response to Comment number 0009.08). Duration of construction and remediation is directly proportional to the nature and volume of tank waste, as well as the complexity of the tank farms as a whole (i.e., vadose zone contamination, groundwater migration, and closure). The preferred alternative, using a phased approach, would allow evaluation and optimization of the technologies used to treat the waste form and nature to be retrieved, which would enable the Agencies to apply "best fit" for the waste type. A summary of the environmental impacts of all alternatives analyzed in the EIS is presented in Volume One, Section 5.14 and a comparison of the alternatives is presented in the Summary (Section S.7).

Comment Number 0009.12 *Broderick, John J.*

Comment This alternative (Ex Situ/In Situ Combination) will provide means so the waste will not migrate from its disposal location. Still, there will be waste present, so there must be a continuing

program to restrict farming, groundwater use, and intrusion. This program will be much less expensive and less complicated than removing all waste from Hanford.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. For purposes of analysis in the EIS, institutional controls for this and other alternatives would end 100 years following the end of remediation. Thus, the long-term impacts assume unrestricted use of the Site for farming and potential use of groundwater as well as intrusion into the waste disposal onsite. Therefore, while the cost, technical complexity, and short-term impacts of the combination alternatives are less than that of the ex situ alternative; long-term impacts tend to be higher. For a comparison of the alternatives, please refer to the Summary, Section in 5.7.

Comment Number 0009.15 *Broderick, John J.*

Comment The Preferred Alternative is not acceptable because the extra effort (for the Preferred Alternative) does not significantly reduce the fatalities expected, even though all the waste is removed.

Response DOE and Ecology acknowledge the preference expressed in the comment, but have identified the Phased Implementation alternative as the preferred alternative for the reasons described in the Summary (Section S.7). As discussed in Section S.6, there are a number of factors that influence the evaluation of the alternatives including short-term and long-term impacts, uncertainties, and compliance with laws and regulations. Please also refer to the response to Comment number 0098.06 for more information about risk calculation. Reduction in fatalities is one method of comparing alternatives; however, other issues such as regulatory compliance, long-term reduction in potential risks to human health and the environment, and implementability in light of technical uncertainty must also be considered.

Comment Number 0009.17 *Broderick, John J.*

Comment The Preferred Alternative is not acceptable because there will be significant repository costs (for the Preferred Alternative). The costs are uncertain now because we do not have a repository.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The repository cost for each alternative was calculated to provide the public and decision makers with information associated with the total potential costs of the various alternatives. Based on new information made available since the publication of the Draft EIS, repository costs have been substantially revised for the Final EIS (Volume One, Section 3.4 and Volume Two, Appendix B). A discussion of the methodology used to calculate repository costs, the cost associated with each alternative, cost formulas, and canister size issues, is contained in the response to Comment numbers 0081.02, 0004.01, and 0008.01.

Comment Number 0009.18 *Broderick, John J.*

Comment The preferred alternative is not acceptable because the construction of facilities will not be completed until 2012 (for the preferred alternative). This is way too long, our experience is that long duration projects often do not reach the operational phase.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Phase 1 of this alternative (construction and operations) would be completed in 2007. Phase 2 construction would be completed in approximately 2011. DOE and Ecology acknowledge the risks associated with projects that take a long time to complete. However, speed of completion of the project is but one of many factors that influence the evaluation of alternatives. Please refer to response to Comment numbers 0009.09, 0009.10, and 0098.02, which discusses issues related to construction starts and duration and the impact of the phased approach on the volume of waste treated.

Comment Number 0009.19 *Broderick, John J.*

Comment The Preferred Alternative is not acceptable because the phased approach is not needed. We can build the facilities with existing technology. As our knowledge and experience increase over the next 45 years, we can modify the facilities. We will need to do that anyway to keep up with technology and safety requirements.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The preferred alternative, Phased Implementation, represents near-term use of currently available technologies to the extent possible. Phase 1, also known as the demonstration period, will assess the capability and effectiveness of existing technologies to retrieve and treat the waste and provide DOE with information on retrieval efficiencies, blending practices, separation efficiencies, vitrification techniques, and costs prior to constructing and operating full-scale facilities. This will result in more efficiently designed and operated facilities for Phase 2. The implementation schedule for the preferred alternative is consistent with Tri-Party Agreement milestones, as well as concurrent with other programmatic and systems activities currently conducted at the Site. Because the phased approach is designed to implement "learn as you go" improvements, system optimization and cost savings are expected. This approach and resulting benefits may be less likely with a fixed, less flexible technology or implementation of full-scale facilities without a demonstration phase. For a discussion of the phased approach to alternative implementation, see Volume One, Section 3.4 and Volume Two, Appendix B. Please refer to the response to Comment number 0098.02 for a discussion of schedule and treatment volume estimates associated with the preferred alternative.

Comment Number 0029.01 *Bartholomew, Dale C.*

Comment I believe that the Ex Situ/In Situ Combination alternative offers the best balance between risk and benefit of the proposed alternatives and should be selected as the preferred alternative for the following reasons:

- It offers the highest real value. It provides a level of safety to the public commensurate with other sub-surface contamination immediately adjacent to some of the tanks, adjacent to the 242-S evaporator, and sites such as cribs throughout the 200 Areas as well as other contaminated areas adjacent to the 200 Areas such as BC Crib. If my understanding is correct, no further action is planned on these other sites. Therefore, totally uncontrolled access by the public would be unacceptable, and I recommend that a waiver be obtained for relief for tank wastes from the regulations. This may be politically incorrect, but makes the most sense in the context of a balanced total system.
- Retrieval of wastes from all SSTs, DSTs, and MUSTs is a huge waste of money if the soil contamination sites outside the tanks are not also ameliorated.
- I also believe retrieval of wastes from all tanks creates a higher-than-projected exposure of working personnel to both occupational and radiological accidents and injuries. I have no data to support this. However, my experience suggests that the input data for the calculations may not be realistic.
- The Summary Table indicates that the Ex Situ/In Situ Combination alternative and the preferred alternative are both rated "moderate" with respect to Technical Uncertainty. I believe the degree of technical uncertainty associated with the Ex Situ/In Situ Combination is less than the preferred alternative because only one-half of the waste volumes would be vitrified and sent to the repository with the Ex Situ/In Situ Combination alternative, (50 percent of the tanks would be filled and capped). It should have received a lower Technical Uncertainty rating because of scaled-down throughput requirements.
- I suspect when wastes from all of the tanks are retrieved, there will be several SSTs thought to be non-leakers that will be found to be leakers. That will only add to existing soil contamination during sluicing.
- I noticed where the U-238, Tc-99, C-14, and I-129 isotopes were to be retrieved. I fully support this action. I may have read the document too quickly, but I did not notice any reference to TRU wastes. Obviously, these must also be removed and vitrified.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste.

The following responses are in the same order as the comments.

- Short-term and long-term impacts to human health and the environment, managing the uncertainties associated with the waste characteristics and treatment technologies, cost,

and compliance with laws, regulations, and policies are among the factors considered when evaluating the alternatives (please refer to the response to Comment number 0009.08). No decision has been made regarding remediation of subsurface contamination adjacent to the tanks or in the other areas referred to in the comment. Contamination from past tank leaks is beyond the scope of this EIS (see Volume One, Section 3.3 and the response to Comment number 0072.08). Other contamination of soils in the 200 Areas is the subject of the Hanford Remedial Action EIS and subsequent Comprehensive Environmental Response, Comprehensive Environmental Response Compensation and Liability Act (CERCLA) decisions. The TWRS EIS presents the cumulative impacts of the tank waste alternatives and the 200 Areas contamination in Volume One, Section 5.3).

- The retrieval of wastes from the SSTs, DSTs, and MUSTs and their subsequent remediation is considered in this EIS. Tank waste retrieval and treatment is the first step in remediation of the tank farms. The remediation of soil contaminated sites outside the tanks will be considered in other environmental documentation, such as the Hanford Remedial Action EIS. The EIS analyzes a range of alternatives from no waste retrieval to extensive waste retrieval. Each of the alternatives presents differing trade-offs among short-term and long-term environmental impacts, technical uncertainty, and regulating compliance. Additionally, alternatives that involve no retrieval or partial retrieval, such as the ex situ/in situ combination alternatives would influence the closure actions that could be implemented, as discussed in Volume One, Section 3.3. Implementation of these alternatives would limit or potentially increase the cost and complexity of the future closure actions such as remediation of contaminated soils. Extensive retrieval alternatives would provide the least complications and cost impacts on future closure actions.
- The risks to the workers during construction and operation of the retrieval and transfer facilities for the ex situ alternatives have been analyzed for all the alternatives. The results of this analysis are given in Volume Four, Appendix E and in Volume One, Section 5.12. In general, risks to the workers are less when less retrieval and transfer are conducted. Regardless of the alternative selected, DOE would complete a detailed safety analysis of the alternative to determine additional safety measures for implementation. Please refer to the response to Comment number 0098.06 for risk calculation information.
- The technical uncertainty of an alternative is a compilation of numerous factors, such as similarity to other like operations, the history of demonstrated performance of the technology, the ability to construct and operate the alternative given the conditions at the Site, and others. However, if two technologies are operating at roughly the same scale and production rate, the technical uncertainty is not a direct function of the throughput requirement. The ability to design, construct, and operate the Phased Implementation alternative and the ex situ/in situ combination alternatives are approximately the same. Both alternatives have approximately the same degree of

process development, consequently, the two processes will be rated about equal in their technical uncertainty.

- To account for leakage from the SSTs during retrieval, the EIS assumes an average of 4,000 gallons of leakage from each tank (see Volume One, Section 5.2 and Volume Four, Appendix F). It is not expected that all SSTs will leak this amount. Some SSTs will not leak during retrieval, and as the comment suggests, some SSTs will develop unexpected leaks. It has been assumed in the EIS that the total leakage divided by the number of tanks will be bounded by the 4,000-gallon figure. For tanks that are known leakers or that develop leaks during retrieval, the EIS presents technology options to sluicing, such as robotic arm-based retrieval, that would involve substantially lower volumes of liquids (see Volume One, Section 3.4 and Volume Two, Appendix B).
- The purpose is to retrieve the radionuclides that are the chief contributors to long-term risk (i.e., uranium-238, technetium-99, carbon-14, and iodine-129). Neptunium-237, a TRU isotope, is also a contributor to long-term risk, and this alternative shows a calculated retrieval of approximately 93 percent for this isotope. There is a large calculated proportion of other TRU elements that would be retrieved, but do not move quickly enough in the vadose zone and groundwater to contribute to risk within 10,000 years.

Specific Preference for the Phased Implementation Alternative
Comment Number 0012.01 *ODOE*

Comment Governor Kitzhaber and Oregon strongly support the preferred alternative in the environmental impact statement (EIS). This alternative calls for a retrieval of all of the tank wastes technically possible (estimated at 99 percent of the wastes) and vitrifying the wastes. While the vitrified wastes will still be radioactive, they will be safer to store and not susceptible to leakage pending ultimate disposal.

Although we support the preferred alternative, it will not resolve all the issues related to the high-level wastes at Hanford. We believe there will continue to be the need for ongoing monitoring, characterization, and pumping and treating of groundwater contamination caused by waste which has leaked and migrated from the tanks.

Response DOE and Ecology acknowledge the preference of the State of Oregon for the preferred alternative, and will take this preference and other public comments into consideration when selecting the final action for TWRS waste. The issues identified were among the factors considered by DOE and Ecology in identifying the preferred alternative.

The Hanford Site will require ongoing monitoring and characterization relative to past tank leaks and the migration resulting from those leaks into the surrounding environment. The characterization and monitoring programs are discussed in the response to Comment numbers 0072.61, 0072.63, 0072.67, and 0072.70. Each of the alternatives includes continuation of existing programs to characterize

vadose zone and groundwater contamination and long-term monitoring programs that extend beyond the completion of the tank waste action (Volume One, Section 3.4 and Volume Two, Appendix B). As more information becomes available regarding the environmental consequences of past leaks and the nature of residual waste remaining in the tanks following retrieval, DOE will be able to address actions associated with tank farm closure, including the potential for pumping and treating groundwater contamination beneath the 200 Areas (see Volume One, Section 3.3 for a discussion of closure). It is because of the lack of adequate data regarding these issues that the closure of the tank farms is not included in the scope of this EIS. Please refer to the response to Comment number 0072.08.

Comment Number 0012.03 *ODOE*

Comment Leaving wastes in the tanks poses huge risks. The tanks are corroding and failing. As they fail, the radioactive waste is released to the soil and ultimately to the groundwater and to the Columbia River. Vitrifying the tank waste makes it far more stable and greatly reduces the threat to the public and the environment. While the cost of the preferred alternative is substantial, it is the only alternative which satisfactorily deals with the dangers presented by these wastes as quickly as practical.
The phased approach allows USDOE to get on with cleanup while allowing for possible development of better approaches which remove all tank wastes.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The issues identified were among the factors considered by DOE and Ecology in identifying the preferred alternative, Phased Implementation. Please refer to the response to Comment number 0009.19 for reasons the Phased Implementation was identified as the preferred alternative.

Comment Number 0012.07 *ODOE*

Comment The preferred alternative relies on proven technology and a phased approach. This allows a "learn as you go approach" which should identify problems earlier and at a smaller economic and environmental cost.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The issues identified were among the factors that influence the evaluation of alternatives. Please refer to the Summary, Section S.6 and S.7 and the response to Comment numbers 0009.08 and 0009.19.

Comment Number 0012.09 *ODOE*

Comment The current risk modeling and analysis are too simplistic to allow detailed decisions which call for leaving part of the wastes in place and still protect human health and the environment. We

believe the risk assessment in this EIS is sufficient to support the proposed alternative and to conclude that the risks are too large to allow any of the tank waste to remain in the tanks at the end of cleanup.

Response The risk modeling and assessment performed for this EIS used the best available data, state-of-the-art models, and industry standard approaches and techniques and is both comprehensive and detailed. The data generated by the modeling and assessment provided for a balanced and equitable comparison among the alternatives and as such, provided results that were useful in comparing the potential short-term and long-term human health and environmental impacts. To the extent that the risk assessment provided sufficient data to evaluate the preferred alternative, it also provided equally valid data to support the evaluation of all alternatives, including alternatives involving leaving some or all of the waste in place. For the Final EIS, an appendix (Volume Five, Appendix K) was added to the EIS to provide a basis for understanding uncertainties associated with the risk assessment, as well as other areas of uncertainties.

Comment Number 0022.03 *Sims, Lynn*

Comment We know millions of gallons of waste have already leaked from the tanks and migrated towards groundwater. This relentless assault upon the environment will not cease without intervention. We are not certain of the environmental and human health damage which has and will result from leaking tanks, but forecasts are ominous. The only responsible alternative is the preferred alternative which removes as much waste as possible and isolates them from the environment by vitrification.

Response DOE and Ecology acknowledge the preference expressed in this comment and will take into consideration this preference and other public comments when selecting the final action for TWRS waste. DOE has implemented a program to remove as much of the liquids as practicable from the SSTs to reduce the likelihood of future leaks. A discussion of this program is provided in Volume One, Section 3.4 and Volume Two, Appendix B. An analysis of potential cumulative impacts, including past leaks is presented in Volume One, Section 5.13 and new information regarding the extent of migration of past leaks to the vadose zone and groundwater has been included in Volume Five, Appendix K. The ongoing characterization and monitoring program is discussed in the response to Comment numbers 0072.61, 0072.63, 0072.67, and 0072.70.

Comment Number 0032.04 *Heacock, Harold*

Comment We support the Department's preferred alternative of phased implementation of an ex situ intermediate separations process, which provides for the greatest protection of the environment, including protection of the groundwater consistent with a reasonable projected cost, the disposal of the vitrified high-level waste at a national waste repository, and an acceptable degree of risk.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating

the TWRS waste. Pleaser refer to the response to Comment number 0009.19 for a discussion of the reasons Phased Implementation is the preferred alternative.

Comment Number 0035.08 *Martin, Todd*

Comment I would like to address what I think is good in the EIS. We support the pretreatment selection in the preferred alternative.

Intermediate separations is appropriate. HEAL would vigorously oppose any movement towards extensive separations pretreatment process.

The stakeholder community in the Northwest has made it very clear that intermediate separations is responsive to our values. It is available relatively, and it will reduce the waste volume by a satisfactory amount.

Secondly I support the assumption that 99 percent of the waste will be retrieved. The risks in the EIS show very clearly that the only responsible alternative is to retrieve all of the waste.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0005.38 for a discussion of issues related to pretreatment. The response to Comment number 0012.19 contains a detailed discussion of the extent to which the public has made a positive impact on this document.

Comment Number 0036.10 *HEAL*

Comment HEAL supports the full retrieval of Hanford's tank wastes. The preferred alternative's retrieval scenario is responsive to the stakeholder values. It has always been assumed that Hanford's tank wastes post a great risk to future generations. This EIS confirms the assumption. The EIS shows that future risk is directly correlated to the amount of waste left behind. The impact of leaving only a small portion of contamination behind is evidenced by the difference in long-term risk for the preferred alternative where 1 percent of the waste is left and the Ex Situ/In Situ alternative where 10 percent of the waste is left behind. By leaving 9 percent more waste behind, the risk for residential farmer at 5,000 years would increase by a factor of 10. These high risks clearly show that the only responsible solution is to retrieve all of the waste.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Impact to the public welfare, including residential farmers, was a factor analyzed for all alternatives. Please refer to the response to Comment number 0009.05. The environmental impacts of all the alternatives analyzed in the EIS are summarized in Volume One, Section 5.14. Potential long-term health effects are summarized for each alternative in the Summary, Section S.7.

Comment Number 0038.03 *Reeves, Merilyn*

Comment Now, the board supports the full retrieval from Hanford tank waste. The preferred alternative retrieval scenario is responsive to the board's value.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0009.19 for a discussion of the reasons the Phased Implementation alternative is the preferred alternative.

Comment Number 0038.05 *Reeves, Merilyn*

Comment The Board supports the preferred alternative's pretreatment process. And again, we go back to the Tank Waste Task Force, which stated the high cost and uncertainty of high tech pretreatment and R and D threatens funding for higher performance low level waste form vitrification and cleanup.

Use the more practical, timely, available technology while leaving room for future innovations. Keep a folio of technology options and make strategic investments over time to support the limited number of promising options. Give up further research on unlikely options. Again a statement from 1993.

The intermediate separations case is responsive to this value although the difficult challenge of technetium removal in the Phased Implementation alternative is a concern to the Board.

And the Board would strongly oppose any movement towards extensive separations pretreatment technology.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0072.05 for a description of how the alternatives analyzed in the EIS were identified and methods for analyzing technology options in the EIS.

Implementing Phase 1 of the preferred alternative would allow evaluation of existing technologies while moving forward on retrieval and treatment goals. As the demonstration phase progresses, the efficiencies and effectiveness of the retrieval and treatment technologies, including technetium separation, can be evaluated and optimized. Technetium removal could be implemented during Phase 1 using established separations technology or emerging technologies that show promise in keeping with recommendations of the board. One way of removing technetium-99 from alkaline waste solutions is to selectively sorb the isotope, as TcO_4, using a strong-base organic ion-exchanger (WHC 1995a).

Comment Number 0042.01 *EPA*

Comment The EIS addresses the treatment, storage, and disposal of Hanford Tank Waste to meet the requirements of the Hanford Federal Facility Agreement and Consent Order and the Resource Conservation and Recovery Act as amended by the Hazardous and Solid Waste Amendments of 1984. As a signatory to the Agreement and Consent Order, EPA has endorsed the approach identified in the Draft EIS as the preferred alternative.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment numbers 0072.05 and 0005.07.

Comment Number 0043.02 *Hanford Communities*

Comment In its selection of an alternative for the cleanup of tank wastes, we believe that the Department of Energy must comply with State and Federal laws and must also comply with its commitments under the Tri-Party Agreement. We believe that the Department should proceed with an ex situ process of extensive waste retrieval with phased implementation. This process appears to have the strongest backing of people in this area and provides the best long-term environmental solution.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. DOE and Ecology intend to comply with all Federal, State, and local regulations and ordinances applicable to tank waste remediation. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

Comment Number 0076.01 *Blazek, Mary Lou*

Comment I had passed out a comment, or a formal comment that I would like to have read into the record. I won't do that now, it would be lengthy. I just like want to say on the record that Governor Kitzhaber and the Oregon Department of Energy strongly support the proposed alternative in this Environmental Impact Statement. The retrieval for all the tank waste that are technically possible, up to 99 percent we think is critical that occur. The need for this undertaking is compelling in our minds. The potential impact to the Columbia River cannot be impacted in this way.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. DOE and Ecology remain committed to protecting the Columbia River and the analysis of potential impacts of TWRS alternatives includes impacts to the River as presented in Volume One, Section 5.2 and Volume Four, Appendix F. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

Comment Number 0076.02 *Blazek, Mary Lou*

Comment The other alternatives under consideration leave most, or all of the waste in the tanks, with the exception of the in situ vitrification, which is an immature and unproven technology. Other alternatives do little to remove the hazards posed by the waste. The major criteria that must be applied to any decision is the protection of public health and safety and the environment. This criteria eliminates all of the alternatives, which leave all or part of the waste in the tanks, except in situ vitrification. The EIS claims a lower risk for in situ vitrification, although it's an immature and unproven technology. Because the in situ vitrification technology is uncertain, we oppose all of the alternatives, which leaves the waste in Hanford tanks.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives and 0005.18, which discusses tank waste residuals.

Comment Number 0077.03 *ODOE*

Comment Sacrificing Hanford in this way does not adequately reduce the harm and risks to the environment or to future generations. For these alternatives, the risk analyses in the EIS show massive plumes of radioactive material slowly moving across the Hanford site and into the Columbia River for hundreds to thousands of years.

Cost should not be the sole or even predominant criteria used to select among the alternatives. The first criteria that must be applied is protection of public health and safety and the environment. This criteria eliminates all of the alternatives which leave all or part of the waste in the tanks, except in situ vitrification. The EIS claims a lower risk for in situ vitrification, although it is an immature and unproven technology for tank waste. Because in situ vitrification technology is uncertain, the potential for failure is unacceptably high. We strongly oppose all of the alternatives which leave the waste in Hanford's tanks.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Removing, treating, and disposing of the tank waste would be the first step in providing protection to the vadose zone, groundwater, and the Columbia River. Please refer to the response to Comment numbers 0076.02, 0040.01 and 0005.18 for more information. The response to Comment number 0009.16 contains a discussion of the analysis of cost alternatives.

Specific Preference for Vitrification
Comment Number 0047.01 *Ahouse, Loretta*

Comment The wastes that are in the tank farms at Hanford must be dealt with at all costs. My preference is to see that all of the tank waste be removed and vitrified, regardless of whether or not the vitrified logs are ever moved to Yucca Mountain, Nevada.

It is an undisputed fact that the tanks at Hanford have leaked, although there appears to be a question of how far and how fast. Despite this, we do know that the tanks leak and may pose a potential danger to the groundwater under the Hanford site, and ultimately the Columbia River. For this reason, all of the waste that is technically feasible to remove, must be removed and immobilized in a safe manner. This should not be an issue of costs.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. As more information becomes available from the ongoing vadose zone and groundwater monitoring and characterization program, DOE will be able to address issues related to tank farm closure. The EIS has been modified to include information on vadose zone contamination in Volume One, Sections 4.2 and 5.13 and in Volume Five, Appendix K. Vadose zone contamination is also discussed in the response to Comment number 0012.15.

Comment Number 0047.02 *Ahouse, Loretta*

Comment I do not agree with any plans which would leave a portion of the waste behind in the underground tanks.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

The preferred alternative assumes 99 percent retrieval of the tank waste. In a separate NEPA review, DOE intends to consider alternatives to tank farm closure. The EIS analysis addresses a range of alternatives that includes leaving all or a portion of HLW onsite, as well as alternatives that retrieve from the tanks as much waste as practicable (assumed to be 99 percent). Decisions associated with the extent of retrieval will be supported by the TWRS EIS; however, the decisions on closure are not within the scope of the TWRS EIS. Please refer to the response to Comment numbers 0005.18 (assumption used in analysis of alternatives), 0072.08 (a discussion of closure), and 0072.05 (NEPA requirements for analysis of alternatives).

Comment Number 0079.02 *Knight, Page*

Comment One of the proposal alternatives is to take wastes from only from the double-shell tanks which are not yet leaking, vitrify them, and fill the single-shell tanks with sand and in effect walk away. This would possibly push the liquid waste deeper into the ground, hastening the contamination flow to the groundwater, and thus to the Columbia River. Presently, at the T tank farm, plutonium has become bound up in chemicals of the tank waste, and is moving rapidly toward groundwater. This is an inkling of what is to come in the next 100 years if the waste is left in the tanks. This is thus, an unacceptable alternative.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. The TWRS EIS addresses the management, retrieval, treatment, and disposal of the tank waste and does not address closure of tank farm residuals, equipment, or soil contamination. For the purposes of this EIS, closure as a landfill was assumed, but this closure assumption contained in the EIS will not be used to identify a closure alternative in the TWRS ROD. Closure will be addressed in future NEPA documents. Please refer to response to Comment number 0072.05 for additional closure information.

DOE and Ecology remain committed to protecting the groundwater beneath the Hanford Site and the Columbia River. The EIS analyzes the impacts to groundwater associated with each of the alternatives in Volume One, Section 5.2 and Appendix F. The Final EIS has been modified to include a discussion of emerging data on vadose zone contamination beneath the tank farms. This discussion is provided in Volume Five, Appendix K. Please refer to the response to Comment number 0076.02.

L.3.4.1.2 General Preferences

Miscellaneous Preferences Related to Remediation

Comment Number 0009.03 *Broderick, John J.*

Comment Over the past decade, Hanford has demonstrated that it can not complete a project that takes a long time to construct. Grout, the new tank farm and HWVP come to mind in this regard, but there are many others. The many canceled projects have spent hundreds of millions of dollars with nothing to show for the effort. Each time there seems to be a good reason to cancel - but the percentage of canceled projects is very high. For this reason, the remediation of the tank waste must be done in facilities that can be constructed in a short period of time.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Volume One, Section 3.4 and Volume Two, Appendix B contain the implementation and completion schedule for each alternative. The Preferred Alternative

identified in the EIS is consistent with the proposed remedy contained in the Tri-Party Agreement and the remediation schedule milestones in the Tri-Party Agreement. In addition, the existing schedule has been accelerated by approximately two years as a result of concurrent TWRS activities. Please refer to the response to Comment numbers 0009.10 and 0009.18 for a discussion of issues related to implementation of the preferred alternative, including projected construction completion dates. Please also refer to the response to Comment numbers 0055.06 and 0009.16 for a discussion of issues related to the consideration of cost in the alternatives analysis and the applicability of the HWVP to the preferred alternative.

Comment Number 0009.04 *Broderick, John J.*

Comment The National debt is increasing every year. There are strong pressures to reduce the deficit, and the debt itself. We have already seen the DOE budget drop substantially; and there are pressures to cut it even more. For this reason, the remediation of the tank waste must be done at the lowest possible price.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. DOE and Ecology believe that there is a potential to reduce the cost for tank waste remediation by allowing the market place to establish, through the competitive bidding process, the cost for waste treatment. Please refer to the response to Comment number 0036.15 for more information. The environmental impact of all factors analyzed during the evaluation of each alternative included in the EIS is presented in Volume One, Table 5.14.1.

Comment Number 0014.03 *Bullington, Darryl C.*

Comment Further proposals of hazardous chemical processes based upon unproven technology using insupportable assumptions such as a ninety-nine percent retrievability of sludge to generate so much high-level waste that it can not be safely contained in existing repositories continues to erode any credibility that may yet exist between the DOE and the public. Such reports not only wasted resources, they assure continued inaction and indecision.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. For each of the alternatives, technical uncertainties were addressed in Volume One, Section 3.4 and Volume Two, Appendix B. For the Final EIS, Volume Five, Appendix K was added to the EIS to consolidate discussion of uncertainties associated with the analysis of environmental and human health impacts. The EIS also analyzes alternatives involving retrieval of less than 99 percent of the tank waste. These alternatives include the in situ alternatives which would involve minimal waste retrieval and the ex situ/in situ combination alternatives which

would involve partial waste retrieval. For more information regarding the 99 percent retrieval assumption, please refer to the response to Comment numbers 0005.18 and 0089.07. Please also refer to response to Comment numbers 0069.04 and 0037.03 for issues related to regulatory compliance requirements associated with disposal of tank waste and geologic repository availability.

Comment Number 0021.01 *Shilling, Fred E.*

Comment Our concerns regarding the storage of nuclear wastes at Hanford: some of the stuff is leaking and it was not supposed to; some of it presents the threat of explosion, and it was not supposed to; some sort of omnibus cleanup was supposed to be under way by now but it is not; all the while the costs keep escalating while axe grinders argue for use of the plutonium for fuel for their profit and our disposal problem. And there is still no safe disposal.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The TWRS EIS was initiated because DOE needs to manage and dispose of tank waste to "reduce existing and future risk to the public, Site workers, and the environment" (Draft TWRS EIS, Section 2.0). The EIS addresses the DOE proposed action to manage and dispose of tank waste, as well as a range of reasonable alternatives. The use of plutonium for fuel is beyond the scope of this EIS. For each alternative, the EIS analyzes potential impacts to the human and natural environment including potential impacts from future releases to groundwater in Volume One, Section 5.2, releases to the air in Section 5.3, impacts to ecological and biological resources in Section 5.4, impacts to human health in Section 5.11, and impacts from explosions and other accidents in Section 5.12. Each of the alternatives, except No Action and Long-Term Management identify how tank waste would be disposed of. For HLW retrieval from the tanks, disposal would be offsite in the proposed geologic repository. For discussion of waste disposal under each alternative see Volume One, Section 3.4, and Appendix B.

Comment Number 0026.01 *Blazek, Mary Lou*

Comment I see three long-term strategic hazards that must be considered:

1. prevention of dispersal into the environment
2. prevention of direct human exposure (i.e., Site workers, etc.)
3. prevention of misappropriation by terrorist/criminal groups.

These concerns are not limited to high-grade plutonium.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Please also refer to the response to Comment number

0021.01 for a discussion of EIS analysis regarding disposal of water into the environment. Prevention of direct human exposure is addressed for each alternative in Volume One, Section 3.4, and Appendix B. All alternatives would provide for appropriate security to minimize the risk of misappropriation.

Comment Number 0026.02 *Blazek, Mary Lou*

Comment I believe there are reasons to select a variety of processes in management. Some elements will be best served by vitrification, and others by simple long-term storage. I see no reason why at least a portion of the waste should not be stored at ground level, where it can be adequately monitored for leakage or casket deterioration and repackaged as indicated.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The bounding approach to the evaluation of reasonable alternatives provides the option for the decision makers to select a variety of processes in the ROD. The EIS range of alternatives included retrieval from zero to 99 percent of the waste, as well as a discussion of those technologies currently available for retrieval, separations, and immobilization. In addition, the EIS addresses four alternatives (i.e., ISV, In Situ Fill and Cap, and Ex Situ/In Situ Combinations 1 and 2) that include storage and/or disposal of all or part of the waste near surface onsite.

Risks to human health associated with transportation of HLW to the proposed geologic repository were analyzed and compared for each alternative in the accident scenarios discussed in Volume One, Section 5.12, and Volume Four, Appendix E. This analysis in conjunction with the analysis of risks associated with onsite disposal versus offsite disposal of HLW, supports the comparison of alternatives. Long-term risk to human health and the environment specific to onsite and offsite storage and risks in general were discussed in Volume One, Section 5.11 and Volume Three, Appendix D. All ex situ alternatives, except for the Ex Situ No Separations alternative, specify that the LAW be stored onsite in a near surface vault and that the remaining HLW be stored onsite pending disposal at the proposed geologic repository. The Ex Situ No Separations alternative would result in offsite disposal of the tank waste. Please refer to the response to Comment numbers 0026.01 and 0072.05.

Comment Number 0026.03 *Blazek, Mary Lou*

Comment In general I do not favor transfer to other sites. I believe the actual transfer would often times be hazardous, I see no advantage to deep burial over surface interment, and it is generally viewed as a means of "getting it out of my backyard" with all the political overtones and delays involved.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0026.01 for discussion of the

analysis of impacts in the EIS, and 0026.02 for a discussion of a comparison of alternatives relative to onsite verses offsite disposal.

Comment Number 0026.04 *Blazek, Mary Lou*

Comment I see a need for use of a variety of separation/purification techniques, a variety of storage techniques, and a sense of urgency to start the process. We have spent far too long on looking for a single perfect solution and site. Technology will change over the next 50-100 years, and we can neither wait for that to happen nor insist on locking ourselves into a single process.

Response Please refer to the response to Comment numbers 0026.01, and 0026.02 for a discussion of the range options available for the decision makers based on the EIS analysis and the response to Comment number 0072.05 for discussion of NEPA requirements for analysis of a range of alternatives. The response to Comment number 0076.03 addresses modification to technologies over time, and the response to Comment number 0009.01 discusses technology optimization and the urgency associated with tank waste remediation.

Comment Number 0032.02 *Heacock, Harold*

Comment The continued management and minimum waste retrieval alternatives are not acceptable solutions to a major environmental problem since they do not include the retrieval of waste from the single-shell tanks.

We believe that any tank waste remediation program must include removal and processing the waste to an acceptable solid in order to eliminate the environmental threats resulting from any retention of the waste in tanks of questionable integrity and lifetime.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

The EIS analysis presents data to support a comparison of the potential environmental impacts form retention of waste in the tanks (No Action and Long-Term Management alternatives) verses various waste management and disposal strategies represented by the other alternatives analyzed in the EIS. Please refer to the response to Comment numbers 0026.01 and 0026.02 for more information.

Comment Number 0034.02 *Belsey, Richard*

Comment So there are real compelling reasons to do the one thing that will most increase the safety and health issues for workers, people, and the environment. And that is this material needs to be stabilized so it does not and cannot move.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Please refer to response to Comment numbers 0026.01, 0026.02, and 0072.05 for a discussion of the range of alternatives addressed in the EIS, including alternatives involving immobilization of all or portions of the waste.

Comment Number 0034.03 *Belsey, Richard*

Comment Waste management side there are compelling reasons too. Interestingly they are dollars. The cost of sitting or baby-sitting these tanks is the most frustrating thing that I can think of.

It costs -- has costs anywhere from 200 to 300 million dollars a year. Finally, the people in the Tank Waste Remediation System are beginning to bring this mortgage down by a variety of techniques, but it is still the largest single overhead -- and I put it in as overhead because it does not produce any cleanup.

It does not produce any movement. Those resources are needed to do actual cleanup work. And the meter is running. As we sit here, the meter runs every single day.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Reduction in mortgage costs associated with continued management of tank waste was accounted for in the cost estimates for each alternative analyzed in the EIS. The No Action alternative cost estimate represents the 100-year mortgage for tank waste management. Please refer to the response to Comment number 0009.16, which discusses the methods by which cost was incorporated into the alternative analyses.

Comment Number 0034.04 *Belsey, Richard*

Comment And these were because people knew or had learned about the problems in the tanks, and they wanted to do something about it. This was an intense five or six-month period. And the Tank Waste Task Force came out and said we have to change what we were doing. We need to put both the high-low-level activity fractions into glass, different kinds of glass.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. The approach to tank waste identified in the Comment is represented in the EIS in the various ex situ alternatives presented in Volume One, Section 3.4. The ex

situ alternatives provide for varying Volumes of low-activity verses HLW to be vitrified based on the level of separations (i.e., from separations to extensive separations).

Comment Number 0034.06 *Belsey, Richard*

Comment And I say all of this because -- as background to the fact that the committee and the board now has supported the alternative path as the one that is most likely to meet the needs of the Tri-Party Agreement, not the milestones.

The milestones are just indicators of how you are working on health and safety issues, moving toward the ultimate first step, the biggest step, which is taking it from being in a soluble form which can migrate into the ground, into the groundwater, into the Columbia River, and stabilizing that so it will keep in place for thousands of years.

Response DOE and Ecology acknowledge the concern expressed in the comment. DOE and Ecology are fully committed to the intent, as well as the milestone requirements in the 1994 Tri-Party Agreement and amendments to the Tri-Party Agreement.

Comment Number 0074.01 *Sims, Lynn*

Comment I think one of the issues here is that this project that we're talking about is probably the largest civil works project, the most expensive, and the most dangerous project ever attempted by mankind in history. And we're all very concerned about it and want to do the best we can to make it work. And that's, everybody is emotionally involved with this, and there might not be any good solutions, except to try to keep it out of the water, out of the Columbia River.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives and the response to Comment number 0026.02 for a discussion of impacts analyzed in the EIS, including impacts to groundwater and the Columbia River.

Preferences Related to Tank Waste Removal
Comment Number 0012.02 *ODOE*

Comment Oregonians oppose all tank waste options which leave significant amounts of waste in Hanford tanks. The cumulative impacts from all of the past activities at Hanford on public health and safety, the environment and the Columbia River make it inappropriate to consider leaving any of the tank wastes in place. The Northwest has shouldered more than a fair share of the cold war burden and its legacy. Hanford's cleanup mission must proceed.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Cumulative impacts from the TWRS alternatives and other proposed or reasonably foreseeable related actions are presented in Volume One, Section 5.13.

Comment Number 0012.04 *ODOE*

Comment The other alternatives under consideration leave most or all of the wastes in the tanks. With the exception of in situ vitrification, which is an undeveloped and unproven technology, other alternatives do little to remove the hazards posed by the wastes. To reduce the risks to people, these alternatives would require permanent closure of Hanford lands to other uses. Sacrificing Hanford in this way does not adequately reduce the harm and risks to the environment or to future generations. For these alternatives, the risk analyses in the EIS show massive plumes of radioactive material slowly moving across the Hanford site and into the Columbia River for hundreds to thousands of years.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Technical uncertainty of undeveloped or unproven technology, and the long-term risk associated with the various alternatives were factors analyzed by DOE and Ecology for each alternative. This information is presented in Volume One, Section 5.4. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. As stated in Volume One, Section 3.3, decision on closure of the tank farms will be made in the future. Additional analysis will be performed at that time concerning any additional measures that need to be taken to protect the groundwater and its future potential users. The TWRS EIS addresses the management, retrieval, treatment, storage, and disposal of the tank waste and does not address final remediation of the tank farm residuals, equipment, or soil contamination. For more information on closure, please refer to the response to Comment number 0072.08.

Comment Number 0012.05 *ODOE*

Comment Cost should not be the sole or even predominant criteria used to select among the alternatives. The first criteria that must be applied is protection of public health and safety and the environment. This criteria eliminates all of the alternatives which leave all or part of the waste in the tanks, except in situ vitrification. The EIS claims a lower risk for in situ vitrification, but because in situ vitrification technology is uncertain, the potential for failure is unacceptably high. We strongly oppose all of the alternatives which leave the waste in Hanford's tanks.

Also, the cost analyses do not include the lost value of the lands or the costs from harm to future generations or the environment. Ultimately, the costs of these alternatives would prove to be much greater than removing and cleaning up the wastes, as called for by the preferred alternative.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Volume One, Section 5.12 contains discussions of accident risk for each alternative. The EIS discusses long-term loss of land use and immediate and potential future risks to human health impacts. Neither is analyzed in terms of cost because a dollar value to human life and the land cannot be assumed.

Cost and risk to human health and the environment were several factors analyzed by DOE and Ecology for each alternative. Assessing the economic impact due to lost land value or harm to future generations other than health impacts or the environment were beyond the scope of this EIS and were not considered. Each impact was analyzed using a consistent methodology. The results were objectively presented in the EIS for the public and the decision makers. DOE and Ecology are committed to the Tri-Party Agreement requirement that no residual volume greater than 1 percent remain in the given tank, unless this requirement is not technically achievable.

Comment Number 0037.01 *Eldredge, Maureen*

Comment The risks in this EIS show clearly that the only responsible option is retrieving all the waste. This needs to start happening now.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0021.01.

Comment Number 0073.01 *Yazzolino, Brad*

Comment I simply wanted to put this in perspective, in the sense that I'm in the art world. The art world is basically lasts for thousands of years in the same sense that the radioactivity does. And I've been immersed in the geology of the Hanford area for the last year or so, and some other aspects about the river. And basically you need to remove the radioactive material from its proximity to the river because in fact that river valley has been there for about 21 million years. And it's going to persist in that area, and it's going to eventually wash your radioactivity to the sea, and spread it all over the river valley if you leave it there. It needs to be removed.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The long-term impacts associated with tank waste alternatives, including impacts for alternatives that would leave all or part of the waste in place in the tanks and others that would retrieve the greatest extent of waste practicable, were among the factors analyzed in the EIS. This analysis included human health and groundwater impacts that were calculated to 10,000 years in the future, as well as impacts associated with climate changes that potentially would result in the situation described in the comment. The response to Comment numbers 0012.01 and 0012.15 discusses the impact of past

tank leaks and current efforts to determine the extent to which these leaks have impacted the area beneath the tanks.

Comment Number 0090.04 *Postcard*

Comment Please listen to us say no:
to leaving High-Level Nuclear Waste in our ground.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0026.02 for a discussion of the extent to which each of the alternatives would result in onsite disposal of HLW.

Comment Number 0091.02 *Dyson, Jessica*

Comment It is time to stop being in denial and start making public safety your utmost concern. In doing so, you must follow the Tri-Party Agreement and vitrify all the waste in the tank and it is not acceptable to leave any waste in the tank because that could pose a danger to the public in the future.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The DOE and Ecology preferred alternative, Phased Implementation, would comply with the requirement of the Tri-Party Agreement. As indicated in Volume One, Section 2.0, the underlying need for action is to "reduce existing and potential future risk to the public, Site workers, and the environment." DOE also must take action to "ensure compliance with Federal and Washington State laws regulating the management and disposal" of the tank waste and the cesium and strontium capsules. These underlying needs for the proposed action are also the basis for the continued management of the tank waste by the TWRS program, as described in Volume One, Section 3.2. Please refer to the response to Comment number 0026.02 for a discussion of the extent to which each alternative would retrieve waste from the tanks.

Preferences Related to Privatization

Comment Number 0014.04 *Bullington, Darryl C.*

Comment If Congress is really serious about containing existing hazardous wastes along with adequate monitoring and emergency planning it should set aside funds in separate easily identified accounts which are not subject to whatever political whim that comes along to be used exclusively to:

1. Identify the size of all waste streams from all anticipated future sources and then establish a final repository sufficiently large to accommodate the demand for storage as required.
2. Monitor the integrity of all existing tanks and establish plans and funds to reduce the danger of further leakage including emergency plans should further leakage occur.

3. Reduce the options for safely confining stored wastes to several that can be achieved in the time frame established using existing technology and involving a minimum of time consuming and costly research and development. Chosen methods should have a high probability of accomplishing all milestones with the least risk to the public and the workers involved. Funds should also be set aside for insurance purposes should accidents occur. Safety of the public and the environment should take precedence over providing jobs or solving other social needs. These few alternatives, assuming that all the 50,000 curies of plutonium can be excluded from the biosphere, should then be contrasted with the do-nothing alternative. The report should show the costs and consequences of each alternative including a discussion of accidents that may occur along the entire pathway until confinement.

Response The purpose of this EIS is to present and analyze the range of reasonable alternatives that are available to remediate the tank waste at Hanford. Please refer to the response to Comment number 0072.05. DOE Richland Operations Office prepares a budget each year, which includes requests for funds used for cleanup; however, only Congress has the authority to appropriate funds. Congressional funding issues were not included in the scope of this EIS.

There are several ongoing activities involved with collecting and analyzing data on tank contents. Tank inventory data are presented in Volume Two, Appendix A (Tables A.2.1.1, A.2.1.2, and A.2.1.3), and waste projections for future tank waste additions are shown in Table A.2.4.1. Please refer to the response to Comment numbers 0012.14 and 0072.07 for a discussion of the tank waste inventory and characterization methods planned or currently under way.

Establishing a final repository is not included in the scope of this EIS; however, for the purposes of analyzing the alternatives presented in this EIS, a potential geologic repository candidate site at Yucca Mountain, Nevada was assumed to be the final disposal site. A discussion of the requirement for HLW disposal in a geologic repository is provided in Volume One, Section 6.2.

The TWRS program also includes monitoring the integrity of tanks and characterizing the vadose zone around the tank farms to detect leaks. DOE also conducts numerous activities to provide continued safe storage of the tank waste, and emergency plans have been developed and are in place. Descriptions of ongoing programs and tank safety issues are presented in Volume One, Section 3.2 and Volume Two, Appendix B, respectively. All monitoring and safety programs (Section 3.4) would continue through remediation. DOE is required to mitigate all accidents involving releases to the environment and Volume One, Section 5.20 identifies potential mitigation measures that could be implemented to alleviate the environmental impacts of the alternatives.

A range of reasonable alternatives was analyzed for the TWRS EIS, including the No Action alternative and alternatives involving extensive retrieval. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. The purpose of the EIS is to present the results of impact analyses in the most objective manner possible. These results will also be used by the decision makers to select an alternative and prepare the ROD. Volume One, Section 3.7

and Volume Two, Appendix B contain summary discussions of the alternatives comparisons. The Summary, Section S.7 contains an alternatives comparison, based on impact type and Volume One, Section 5.14 summarizes the environmental impacts of each alternative.

Comment Number 0017.01 *Fisk, Charles P.*

Comment Given Westinghouse's, Battelle's, etc. dismal performances, I certainly would not recommend privatization! Government created the mess and government should accept cost of remediation, not some for-profit corporation.

Response DOE and Ecology acknowledge the recommendation expressed in the comment. Although the contracting strategy known as privatization is not addressed in the EIS, the discussion of the Phased Implementation alternative does address the technical strategy of an incremental approach to tank waste remediation. Please refer to Volume One, Sections 3.3 and 3.4 of the EIS for more information on alternatives implementation and the Phased Implementation alternative.

Comment Number 0017.02 *Fisk, Charles P.*

Comment The "preferred alternative" is full of holes, as HEAL has persuasively analyzed far better than I can.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives and the response to Comment number 0009.19 for reasons Phased Implementation is the identified preferred alternative.

Comment Number 0017.03 *Fisk, Charles P.*

Comment The entire amount of waste needs to be vitrified, not just 25 percent of it, regardless of the cost. If, as Republicans propose, we could afford a continuation of "Star Wars", we can be assuredly cancel that wasteful idea and put the money into a completed and thorough clean up of the mess.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Cost was one factor analyzed by DOE and Ecology for each of the alternatives. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. For a discussion of the extent to which each alternative would result in waste retrieval and/or treatment please refer to the response to Comment number 0026.02. DOE and Ecology note that the preferred alternative would result in remediation of all waste practicably or no less than 99 percent.

Comment Number 0017.04 *Fisk, Charles P.*

Comment We have the technology for vitrification; now get with it and DO IT! The Columbia River deserves maximum protection as soon as possible.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. DOE and Ecology are committed to protecting the Columbia River. The response to Comment number 0012.01 addresses groundwater contamination and vadose zone characterization and monitoring. Please also refer to the response to Comment number 0072.05 for discussion of the approach to analyzing alternatives and technologies in the EIS.

Comment Number 0060.01 *Davenport, Leslie C.*

Comment I support the preferred Phased Implementation alternative, but with some changes; primarily that only one separations/LAW/HLW processing facility be built by a private contractor during Phase 1. The primary reason for this choice is that it can meet the Tri-Party Agreement and yet result in the minimization of overall costs and ultimately facilities needing decontamination and disposal. Whether additional separations should remove technetium, cesium, strontium, and TRU elements should be left to engineering judgement, dependent primarily on meeting required LAW product specifications for disposal onsite in near-surface retrievable disposal vaults. The other primary consideration would be to ensure that interim and final disposition methods for TRU elements always are critically safe.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. DOE and Ecology remain committed to compliance with the Tri-Party Agreement under which the general requirements for the preferred alternative were renegotiated in 1994. Specific separations technologies will be evaluated during the detailed design phase that will follow the final remedy selection and the ROD. Separation technologies, along with removal and immobilization technologies, will be tested during the demonstration phase (Phase 1).

Comment Number 0078.07 *ODOE*

Comment USDOE must move forward with cleanup as quickly as possible. USDOE must commit to remove all the waste from the tanks and convert it to a durable and stable waste form.
The privatization alternative is the only alternative of the four acceptable alternatives that can be done soon. All of the others will involve extensive delays.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment numbers 0072.05, 0076.03, and 0009.19.

Miscellaneous Preferences Related to the Alternatives

Comment Number 0032.03 *Heacock, Harold*

Comment We also do not believe the technical feasibility of several of the in situ treatment processes has been demonstrated adequately to seriously consider them as viable alternatives.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. ISV is a relatively new process that has not been tried at this scale previously, but was considered a potentially viable alternative. Implementability issues for each of the alternatives are discussed in Volume One, Section 3.4 and Volume Two, Appendix B. Please refer to response to Comment numbers 0072.10 and 0072.80 for information on NEPA requirement to consider reasonable alternatives in the EIS.

Comment Number 0035.02 *Martin, Todd*

Comment It continues to debate issues that have long been laid to rest, such as what is the waste form that we will use at Hanford. The preferred alternative does not mandate the glasses used. It does not mandate vitrification. It should. We have made that decision. Let's go forward.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Vitrification and glass-types were analyzed for the HLW disposal; however, DOE and Ecology have identified the treatment process for the LAW as immobilization rather than vitrification for the Phased Implementation alternative. As identified in Volume One, Section 3.4 and Volume Two, Section B.3 of the EIS, LAW would be processed using a technology that would meet LAW specifications. These specifications would be performance based, using vitrification as a benchmark, and would have specific requirements for size, chemical composition limits, isotopic content, and physical parameters. Even though the Tri-Party Agreement suggests that certain decisions have been made, NEPA requires an objective analysis of all reasonable alternatives. Please refer to the response to Comment numbers 0060.02, 0005.07, and 0034.05.

This approach to LAW treatment is consistent with the Tank Waste Task Force (HWTF 1993) recommendation to use the most practicable, timely, available technology, while leaving room for future innovation. All HLW removed from the tanks and that remains after separations will be vitrified under the preferred alternative. Please refer to the response to Comment number 0009.19 for a discussion of the reasons Phased Implementation is identified as the preferred alternative.

Comment Number 0036.09 *HEAL*

Comment HEAL supports the preferred alternative's pretreatment process.
The TWRS Task Force values on pretreatment are explicit and strongly held. According to the TWRS Task Force Final Report:

> The high cost and uncertainty of high-tech pretreatment and R&D threatens funding for higher performance low-level waste forms, vitrification, and cleanup. Use the most practicable, timely, available technology, while leaving room for future innovation. Keep a folio of technological options and make strategic investments over time to support a limited number of promising options. Give up further research on unlikely options (TWTF p. 11)

The intermediate separations case is response to this value (although the difficult challenge of technetium removal in the Phased Implementation alternative is a concern). HEAL strongly opposes any movement toward an extensive separations pretreatment technology.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0098.02.

Comment Number 0046.04 *DiGirolamo, Linda Raye*

Comment Yes, encase in glass and bury this "CRUD" and more importantly... Stop all future plutonium fuel rod production at once. New Age Energy must be embarked upon at once to save man and the earth.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste.

Comment Number 0059.01 *James Jordan Associates*

Comment JJA recommends that the Environmental Impact Statement include in its analysis an alternative concept invented by Drs. Morris Reich, James Powell, and Robert Barletta of Brookhaven National Laboratory for the safe immobilization and isolation from-the-environment radioactive waste. This novel concept has the potential of being the safest, least costly, and most expeditious method for the disposal of the various radioactive wastes currently stored in the underground storage tanks at Hanford, including, if desired, the vitrification of the cesium and strontium capsules located at the Hanford Site.

This system which uses modular canisters with integral vitrification capability does not require an upgrade to the tank farm waste transfer system. This system will not require the construction of

extensive buried transfer lines that is included in all of the alternatives except the No Action alternative. Indeed, the elimination of the complex tank farm waste transfer system significantly reduces the potential for short-term impacts of human health and the environment. Using modular canisters with integral vitrification provides for a dramatic reduction in the risk of long-term impacts on the public health and the environment in that the system does not have a large central vitrification facility to deactivate and dispose of at the end of the vitrification campaign. Compared to a conventional vitrifier, the in-can vitrifier does not require the pouring of molten radioactive glass.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The Draft EIS addressed the full range of reasonable alternatives. The alternative identified in the comment is bounded by the alternatives addressed in the Draft EIS. DOE and Ecology therefore believe that including the requested alternative would not provide valuable additional information to the public or decision makers. Please refer to the response to Comment numbers 0072.05, 0072.79, and 0097.01.

Comment Number 0060.02 *Davenport, Leslie C.*

Comment Both continued management alternatives are unacceptable for the long term.

The Minimal Waste Retrieval (In Situ) alternatives do not meet waste disposal laws, regulations, and policies and I feel are unacceptable in the long term. The In Situ Fill and Cap would not immobilize the wastes, only fill the tanks with gravel (creating more contaminated waste) and keep it all onsite in a form that would eventually leach to the groundwater. The In Situ Vitrification alternative is interesting and perhaps could be used on some of the small Multiple Underground Storage Tanks (MUSTs) that contain lower amounts of radioactivity, but the degree of technical uncertainty is too high to consider application to an entire tank farm of up to 20 tanks at once. Verifying that all tanks are completely vitrified down to 60 ft below the ground surface is nearly impossible, and there is no way to immobilize radionuclide plumes below the leaking SSTs.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. NEPA requires that an EIS address the full range of reasonable alternatives, including alternatives that would not comply with laws and regulations. The TWRS EIS addresses 10 alternatives for tank waste, ranging from No Action to extensive retrieval, and four alternatives for the cesium and strontium capsules. Please refer to the response to Comment numbers 0072.80 and 0072.10 for a discussion of the NEPA requirement to include a No Action alternative in the EIS analyses.

Comment Number 0060.03 *Davenport, Leslie C.*

Comment The partial waste retrieval alternatives do not meet waste disposal laws, regulations, and policies because they would retrieve only 90 percent or less of the radionuclides. I feel they will be deemed unacceptable in the future, thereby necessitating additional future operations to finish the job.

Response DOE and Ecology acknowledge the concerns presented in the comment. DOE and Ecology remain committed to compliance with the Tri-Party Agreement, which requires removal of all technically achievable waste or no less than 99 percent of the waste from each tank. Please refer to the response to Comment number 0060.02 and for discussions of the NEPA requirement to address a range of alternatives including alternatives that do not comply with regulations. Refer to the response to Comment numbers 0072.80 and 0072.10.

Comment Number 0060.04 *Davenport, Leslie C.*

Comment The extensive waste retrieval (ex situ) alternatives appear to be the only acceptable methods to deal with the approximately 200 MCi of radionuclides. However, the Ex Situ No Separations alternative appears to be too expensive because all tank wastes would be vitrified and/or calcined, resulting in too many high-level waste packages to ship to and store in a waste repository. The Ex Situ Intermediate and Extensive Separations alternatives are difficult to choose between, because the efficiency of the sludge washing, ion exchange, and multiple complex chemical separations processes are not fully known for the various types of tank wastes. Hence, those two alternatives should be compared in a pilot plant using a Phased Implementation (possibly along with the In Situ Vitrification alternative applied selectively, particularly for MUSTs, and SSTs that have not leaked).

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

Technical evaluation, categorization of tank waste, and application of appropriate technology would be conducted during Phase 1 (demonstration phase) of Phased Implementation and during the detailed design phase of any alternative analyzed in the EIS. Volume One, Section 3.4 includes descriptions of the processes, cost, and Implementability for each tank waste alternative. Volume One, Section 5.14 provides a summary of the environmental impacts for each tank waste alternative. The EIS provides the basis for comparison among the alternatives identified. DOE and Ecology believe sufficient differentiation exists between the alternatives to support a decision on the alternative to be implemented; therefore, a demonstration phase comparison of the two alternatives would postpone remediation.

Comment Number 0072.10 *CTUIR*

Comment The Tri-Party Agreement mandates full retrieval as the goal; only if this is not practicable on a tank-by-tank basis can lower retrieval goals be negotiated. Therefore, the in situ alternatives are not allowed and did not have to be evaluated.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

As required by the CEQ, the TWRS Draft EIS identifies and analyzes a range of reasonable alternatives for the proposed action, including those that are "not within the jurisdiction" of the agency (40 CFR 1502.14). DOE guidance on NEPA requires that EIS alternatives be addressed even if there is "conflict with lawfully established requirements" (DOE 1993d). However, the Agency is required to identify the laws and regulations that apply to each alternative and indicate if the alternative, if selected for implementation, would comply with applicable laws and regulations. This information must be provided to the public and the decision makers. Therefore, the failure to comply with the Tri-Party Agreement is not sufficient basis for excluding an alternative from detailed analysis in the EIS (40 CFR 1502.2d). A discussion of the methods used to develop the alternatives in compliance with NEPA requirements is presented in the response to Comment number 0072.05. Please refer to the response to Comment numbers 0072.80 and 0072.52.

Comment Number 0072.16 *CTUIR*

Comment In situ alternatives were not necessary since they are not allowed under the Tri-Party Agreement.

Response Please refer to the response to Comment numbers 0072.10 , 0072.52, and 0072.80.

Comment Number 0076.03 *Blazek, Mary Lou*

Comment The preferred alternative relies on using proven technology, and using a phased approach. We think a learn as you go approach makes sense, given the history of Hanford. And that should identify problems earlier, and at smaller economic and environmental cost.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The Preferred Alternative would allow DOE to proceed with tank waste remediation. System modifications would be evaluated as waste inventory, removal method, separations, and disposal data are collected and analyzed during the Phase 1 demonstration. This continuous improvement is the cornerstone of the "learn and improve while doing" approach cited in

the comment. Please refer to the response to Comment numbers 0060.04, 0060.02, and 0009.19 for more information on the preferred alternative.

Comment Number 0077.02 *ODOE*

Comment Leaving wastes in the tanks poses huge risks. The tanks are corroding and failing. As they fail, the radioactive waste is released to the soil and ultimately to the groundwater and to the Columbia River. Vitrifying the tank waste makes it far more stable and greatly reduces the threat to the public and the environment. While the cost of the preferred alternative is substantial, it is the only alternative which satisfactorily deals with the dangers presented by these wastes as quickly as practical.
The phased approach allows USDOE to get on with cleanup while allowing for possible development of better approaches which remove all tank wastes.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Please also refer to the response to Comment numbers 0076.03 and 0060.04. The response to Comment number 0091.01 addresses protection of the Columbia River in relation to the preferred alternative.

Comment Number 0078.02 *ODOE*

Comment Unacceptable Alternatives
The EIS evaluates the alternatives USDOE believes are available for the tank waste. Four alternatives are unacceptable because they could allow exposures to the environment and the public at levels higher than allowed. These include:

1. Two alternatives manage the waste as is; in failing tanks,
2. Two alternatives leave all or most of the tank waste in the tanks covered with sand and a complex barrier to keep rain water out,
3. One alternative proposed vitrifying all of the waste in the tanks in place.

A sixth alternative was added as the EIS went to print. This alternative is included in the cover letter for the EIS and is not analyzed in depth in the EIS. It would leave most of the waste in the SSTs, fill the tanks with sand and cover them with a barrier.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. NEPA requires an EIS address a comprehensive range of reasonable alternatives. The TWRS EIS fully addresses 10 alternatives for tank waste, which includes no action, long-term management, in situ, ex situ, and combination alternatives. NEPA also requires that these alternatives be analyzed regardless of regulatory compliance to allow an even-handed analysis of all factors, as

discussed in the response to Comment number 0072.80. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

Comment Number 0078.03 *ODOE*

Comment
Unacceptable Alternatives
The EIS includes four alternatives which meet legal requirements. These are:

1. Retrieve all of the waste, glassify it and sent it to a national high-level nuclear waste repository,
2. Retrieve all of the waste, use extensive chemical processes to separate the nonradioactive portions from the radioactive portions, glassify them and send the glass to a national high-level nuclear waste repository,
3. Retrieve all of the waste, use less extensive separations of the waste into high-activity and low-activity fractions, glassify, both, bury the low-activity fraction at Hanford and send the high-activity fraction to a national high-level waste repository (Government owned and contractor operated),
4. Do the same as three, but do it in phases using private companies to build and operate the plants. (This is the preferred alternatives in the EIS).

If privatization fails, the Tri-Party Agreement requires USDOE to revert to government owned and operated vitrification plants.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Please also refer to the response to Comment number 0072.80 for a discussion of the NEPA requirements to analyze a full range of alternatives in an EIS regardless of regulatory compliance.

Comment Number 0079.01 *Knight, Paige*

Comment Hanford Watch supports the phased implementation plan, not because it's so great, but because it gets the waste out of the tanks. It is our conviction that waste must be removed from the tanks and put in a stable form. If this new preferred alternative reaches a point of failure, you must be prepared to turn back immediately to the path outlined in the Tri-Party Agreement, and follow the advice given by the Tank Waste Task Force, in the summer and fall of 1993. That advice can be summed up in the words get on with cleanup. The public has stated time and time again that the DOE must get on with it. Hear us. Do not change paths again.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating

the TWRS waste. Please refer to the response to Comment numbers 0072.05 and 0076.03. Please also refer to the response to Comment numbers 0009.19 and 0060.02 for more information on the reasons Phased Implementation was identified as the preferred alternative.

Comment Number 0079.03 *Knight, Paige*

Comment The alternative of long-term management also is unacceptable because according to the TWRS EIS that document will end in, that management will end in 100 years. This possibility the amount of time previous to the waste plumes becoming a severe health risk to the public and the environment.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Please refer to the response to Comment number 0040.02 and 0101.01 for a discussion of the 100-year administrative control period.

Comment Number 0079.04 *Knight, Paige*

Comment The in situ alternative is also unreasonable, because again no protection of the groundwater is offered, and security and external control will end in 100 years. And that's when the contamination, theoretically, is going to become a real problem for the health and environment, health of people and environment. Further, the use of riprap basalt is suggested. And we fear that this material will be taken from sites at Hanford, that are sacred to the Indian tribes.

In short, any plan to leave this deadly brew of wastes in the tanks is totally unacceptable, and will meet with the resounding opposition from the citizens of the region. Water is sacred, and must be protected at all costs.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Please refer to the response to Comment numbers 0091.01 and 0012.01 for discussions of groundwater issues related to current and planned monitoring programs and protection of the Columbia River.

Volume One, Section 5.7 describes the land-use impacts of the various alternatives, including impacts to potential borrow sites. Volume One, Section 5.5 describes the cultural resources impacts, including prehistoric and historic sites, and issues of potential concern to Native Americans. DOE and Ecology remain committed to protecting the groundwater beneath the Hanford Site and the Columbia River and impacts to groundwater and the Columbia River are addressed in Volume One, Section 5.2 and Volume Four, Appendix F. Please see the response to Comment number 0019.03 for a discussion of borrow

site issues. Please refer to the response to Comment number 0040.02 and 0101.01 for a discussion of the 100-year administrative control period. Response to Comment numbers 0091.01 and 0012.01 discuss groundwater issues related to current and planned monitoring programs and protection of the Columbia River.

Comment Number 0085.01 *Klein, Robin*

Comment Except to say that the no action alternatives, including long-term management are unacceptable options. They are not within the range of reasonable alternatives as the Draft EIS states. But are imprudent, hazardous, and in violation of the Tri-Party Agreement.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Please also refer to the response to Comment numbers 0072.52, 0072.05, 0078.02 and 0072.80.

Comment Number 0087.04 *Tewksbury, Ross*

Comment And I think that they should do the extensive waste retrieval and vitrify all, or nearly all of it, and whether it's stored on the site, or off the site is not really the major thing. The major thing is to get it in a form where it's not able to leak out into the groundwater and soil and the river, and everything else, and to do that as fast and as safely as possible. And I think that you should not really be concentrating on this waste separation idea that you were going over tonight, except what's absolutely necessary for the technical, chemical, and safety purposes. Because all of it has to be taken care of for hundreds, if not thousands of years. Thank you.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment numbers 0072.05 and 0078.02. The phased approach to the alternative implementation is discussed in the response to Comment numbers 0060.04 and 0076.03. Groundwater protection issues are discussed in the response to Comment numbers 0091.01 and 0012.01.

Comment Number 0088.01 *Porter, Lynn*

Comment I guess I support the preferred alternative because it sounds better than the others.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment numbers 0014.04, 0072.05, 0078.02,

0009.19, and 0060.02 for a discussion of the reasons Phase Implementation has been identified as the preferred alternative.

Comment Number 0089.01 *Nez Perce Tribe ERWM*

Comment The Nez Perce Tribe ERWM favors protection of the Columbia River and its ecosystem through removal and disposal of tank wastes from 200 Area tanks as supported by the EIS. ERWM believes groundwater and the Columbia River are at risk from potential radionuclide or toxic chemical releases from the tanks. We endorse the alternative calling for removal of tanks wastes through one of the Ex Situ Separations alternatives or Phased Implementation.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment numbers 0014.04, 0072.05, and 0078.02.

DOE and Ecology remain committed to protecting the groundwater beneath the Hanford Site and the Columbia River and its ecosystem. An analysis of impacts to groundwater and the Columbia River are provided in Volume One, Section 5.2 and Volume Four, Appendix F. Discussions related to groundwater and protection of the Columbia River are contained in the response to Comment numbers 0091.01 and 0012.01.

Comment Number 0093.02 *Devoy, Tiffany*

Comment I also would like to say that I do think the Tri-Party Agreement should be followed in this case and actually in most cases and it seems odd that there is always someone trying to get out of it. It was signed and I think it should be followed. I think that they need to vitrify as much waste as possible and to leave as little waste behind as possible and I do not think that is an unrealistic expectation. There are 177 tanks and I do not even remember what was quoted to me as to how many gallons each those tanks were but it is pretty amazing and to think of all that waste concentrated and to just leave it there, I know that is not your preferred alternative, but I think some of your alternatives are not that much better. So vitrify it as much as possible, leave as little behind as possible, and follow the Tri-Party Agreement. That is about it.

Response DOE and Ecology acknowledge the preference for extensive waste retrieval, treatment, and disposal within the context of the Tri-Party Agreement expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating TWRS waste. The inclusion of alternatives in the EIS that do not comply with the Tri-Party Agreement complies with the NEPA, which is the Federal law requiring the preparation of this EIS. Please refer to the response to Comment numbers 0072.10 and 0072.80 for a discussion on requirements for inclusion of alternatives in an EIS analysis.

L.3.4.2 Elements Common to Tank Waste Alternatives

Comment Number 0098.03 *Pollet, Gerald*

Comment The public deserves to know how much money is going to be taken out of the authorization for Hanford clean up for the so-called privatization reserve. This process is a sham so long as an undisclosed amount of your Hanford clean up dollars are being removed in the future. Let us face it, basically the President and Congress have said you are going to have less money for Hanford clean up. we know what the President's projection is, it is seriously less than it used to be. and out of that a future chunk is going to privatization in a liability reserve but you and I can not see what it is. At the same time, the Department of Energy has target budgets now through the year 1998 which fail to fully fund essential safety and Tri-Party Agreement activities such as characterizing the wastes in these tanks. As the General Accounting Office has said, If you fail to properly characterize, you can not expect the contractors to be able to vitrify and, in fact, anyone can see down the road that the contractors are liable to say, You did not characterize properly, therefore, you owe us the full cost we put out for building the plant and our anticipated profit, we will take that 1.4 whatever billion dollar reserve it is, put it in our corporate pockets, the government will be out that money, you will have a plant that will not work because wastes were not characterized. Currently, the Department of Energy is planning in its budgets to be at least 3 years behind the Tri-Party Agreement requirement for characterizing the wastes. This can not be allowed to go forward.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The privatization contracting strategy and the budgetary process for funding the alternative selected are outside the scope of this EIS. DOE Richland Operations office prepares a budget each year, which includes funds required for cleanup; however, only Congress has the authority to appropriate funds. Please refer to the response to Comment numbers 0012.14 and 0072.14 for discussions of issues related to the tank waste inventory and ongoing efforts to characterize the tank waste.

Comment Number 0101.01 *Yakama Indian Nation*

Comment Unrealistic Assumptions Regarding Institutional Controls Restricting Future Human Actions --Design basis assumptions associated with the disposal of waste at Hanford optimistically assume protective conditions will exist in the future in connection with the estimation of impacts to the public health and safety and the environment. Specifically, we consider the assumption of institutional controls restricting intruder actions or inadvertent intruder actions beyond about 130 years hence is invalid.

Response DOE and Ecology concur that intruder or trespasser activities could not be monitored or restricted beyond 100 years. The 100-year administrative control period is a bounding assumption used during the analysis of the alternatives. For all alternatives analyzed in the EIS, post-remediation risks assume that institutional controls would not exist beyond 100 years. Please refer to the response to

Comment numbers 0040.02 and 0040.03 for more information regarding administrative controls. Because the information contained in the text was correct, no change was made to the document.

Comment Number 0101.04 *Yakama Indian Nation*

Comment Consideration of Low-Impact Waste Management Alternatives--Alternatives which evaluate impacts associated with the minimization of the volume of waste retaining a long-lived hazard (hazardous for 130 years or more) and large cask storage of stabilized wastes was not accomplished. We believe such options which were addressed in preliminary impact analyses, should be presented in the impact statement to allow full assessment of options. We consider that DOE (OCRWM) actions in preparation of the EIS to require consideration of small casks with no apparent technical or economic basis is unwarranted and capricious.

For example, the use of 10 cubic meter capacity (m^3) (360-cubic foot [ft^3] casks for storage and/or disposal of stabilized high-level radioactive wastes should be evaluated. Furthermore, consistent with evaluating alternatives which minimize the volume of waste for disposal, the option of using waste processes that would purify sodium salts (making up about 85% of the solids in the tanks) to a specific activity and hazard equivalent to Class A low-level radioactive waste with the calcination of the remaining high-level radioactive waste stream should also be specifically compared with processing options that produce larger volumes of long-lived hazardous wastes.

We note that the an additional benefit of removing sodium is the added stability of potential high-level radioactive waste forms without significant sodium, making this processing option desirable for disposal performance assessments.

Response The Ex Situ No Separations Vitrification and Ex Situ No Separations Calcination alternatives have been revised for the Final EIS to use a 10-m^3 (360-ft^3) canister for HLW storage and disposal. The size assumptions are presented in Volume One, Section 3.4 and Volume Two, Appendix B. These canister sizes have been used for impact analysis presented in Volume One, Section 5.0, Volume Three, Appendix D, Volume Four, Appendices E and F, and Volume Five, Appendices G and H. Please refer to the response to Comment number 0081.02 for related information.

The use of crystallization to remove sodium salts from the waste stream is included in the Ex Situ Extensive Separations alternative as a technology that could potentially reduce the LAW volume. This technology was not included as a primary treatment technology because it was not sufficiently mature to allow detailed evaluation. The focus of the EIS was to evaluate alternatives, rather than specific technologies, to allow sufficient flexibility to evaluate and implement emerging technologies in the future. Please refer to the response to Comment number 0072.05 for information on NEPA alternatives analysis requirements.

DOE and Ecology agree that removal of the sodium from the waste stream prior to immobilization potentially would reduce the volume of HLW for the Ex Situ No Separations Vitrification alternative and LAW for the ex situ alternatives that include separating the HLW and LAW for treatment. It would be expected that removal of the sodium would result in increasing the waste loading such that either waste form would meet waste form performance criteria. Please refer to the response to Comment numbers 0027.11 and 0008.01 for more information related to waste loading and the response to Comment numbers 0008.01 and 0009.08 for more information regarding consideration of canister (cask) size in the Draft and Final EIS.

Comment Number 0101.07 *Yakama Indian Nation*

Comment On another scale the impacts associated with the disposal of waste streams generated by the actions being considered must also be considered in a integrated manner. The issue associated with waste minimization and waste package sizing greatly affects disposal costs and other impacts, particularly those associated with the high-level radioactive waste deep repository at Yucca Mountain. Integration of the disposal facilities under the office of Civilian Waste Management (OCRWM) and the TWRS in DOE's overall environmental management actions should be evaluated and assessed from a systems engineering approach to resolve this issue.

We consider large savings (several billion dollars) are possible if valid systems integrations are accomplished compared to the base-line alternatives currently being pursued by DOE. These estimates stem from cost evaluations accomplished by the authors of the subject EIS.

Response Large canisters have been addressed in the Final EIS.

Please refer to the response to the following comments for more information:

- Comment numbers 0004.01 and 0081.02 - coordination with Office of Civilian Radioactive Waste Management (OCRWM) and revisions to repository cost calculations
- Comment number 0008.01 - canister size re-evaluation decision
- Comment number 0027.02 - systems engineering approach to the alternatives evaluation
- Comment number 0037.04 - relationship of the TWRS EIS to other Sitewide NEPA and programmatic documents.

The cost estimates in the EIS include contingency and a range of uncertainty based on the conceptual nature of the alternatives and standard industry practice for large capital projects. DOE expects that as detail design progresses, progress in technology optimization will result in cost savings. Please refer to response to Comment numbers 0052.04 and 0081.03.

L.3.4.2.1 Issues Related to Disposal Costs Calculations and Repository
Comment Number 0004.01 *Boldt, A.L.*

Comment References:

1) DOE, 1996, *Draft Environmental Impact Statement for the Tank Waste Remediation System*, DOE/EIS-0189D, U.S. Department of Energy, Richland, Washington and Washington State Department of Ecology, Olympia, Washington, April, 1996.

2) DOE, 1995, *Analysis of the Total System Life Cycle Cost of the Civilian Radioactive Waste Management Program*, DOE/RW-0479, U.S. Department of Energy, Washington D.C., September, 1995.

3) *Nuclear Waste Policy Amendments Act of 1987*, Public Law 100-203, December 22, 1987, 42 USC 10101 et seq.

4) Federal Register Notice, *Civilian Radioactive Waste Management; Calculating Nuclear Waste Disposal Fees for Department of Energy Defense Program Waste*, pp. 31508-31524, Vol. 52, No 161, August 20, 1987.

5) TRW, 1995, *Assessment of Pre-Closure System Cost and Health and Safety Impacts of Hanford HLW Vitrification Options on the Civilian Radioactive Waste Management System*, A00000000-01717-5705-00003, Rev. 0, TRW Environmental Safety Systems, Inc., Vienna, Virginia, April 27, 1995.

The geologic disposal costs presented in section B.3.0.8 of the draft TWRS EIS (ref 1) are based on a linear extrapolation of the unit container disposal costs provided by reference 2 for a specific scenario. The linear extrapolation of the unit container disposal cost from reference 2 to all the TWRS alternatives does not meet the requirements of the Nuclear Waste Policy Amendments Act (ref 3) and Federal Register Notice 52-161 (ref 4).

Federal Register Notice 52-161 identifies, in detail, the method to be used in estimating the disposal fees for the Department of Energy defense program HLW (HLW) share of total Civilian Radioactive Waste Management System (CRWMS) costs. Federal Register Notice 52-161 cost allocation is based on the concept of full cost recovery with sharing formulas applied to all fixed and variable system cost components.

The assumption of linear extrapolation of unit container disposal costs in the draft TWRS EIS greatly underestimates the disposal costs of the extensive separations alternative and greatly overestimates the disposal costs of the no separations alternative. Example disposal cost variability for alternate HLW container sizes and HLW volumes resulting from no separations, intermediate separations, and extensive separations using the methodology specified in Federal Register Notice 52-161 are provided in reference 5.

I am requesting that the draft TWRS EIS be revised to incorporate HLW disposal costs calculated with the methodology specified by Federal Register Notice 52-161.

Response As stated in Volume One, Section 3.4, the repository fees are based on the 1995 Analysis of the Total System Life Cycle Cost (1995 TSLCC) of the Civilian Radioactive Waste Management Program. The Draft EIS also acknowledges that the 1995 TSLCC was based on a single scenario and one repository. It is acknowledged that there is uncertainty in identifying a disposal fee prior to the final licensing of a national repository. Additional uncertainty results from analyzing various options considered in the EIS as the number of canisters varies from the baseline. However, DOE will comply with the provisions of the Nuclear Waste Policy Act requiring full cost recovery. The purpose of the cost analysis is to provide a basis for comparison among the alternatives (TWRS Draft EIS, Volume Two, Appendix B, page B-40).

In response to public comment, for the Final EIS, DOE and Ecology have reevaluated the estimate of disposal costs presented in the Draft EIS, using the 1987 methodology to more accurately reflect possible costs associated with disposal for the various canister options presented. This effort was coordinated through the OCRWM. Please refer to the response to Comment numbers 0081.02 and 0008.01 for additional information.

Comment Number 0005.44 *Swanson, John L.*

Comment I do not get the point of the sentence on page 3-37 "The use of a standard-sized canister does not consider waste loading, which ranges from 113,000 curies per canister to about 300-."

Response The use of the term "waste loading" here certainly could be confusing as it also refers to the waste loading of the glass with respect to percent sodium or waste oxides. Individual chemical entities such as sodium were considered in the "waste loading" of the glass. The quantity of radioisotopes and curie content was not limited in the glass formulations because the maximum heat load per canister was below the limit of 1,500 watts set for the repository.

The Final EIS was revised to include larger HLW canisters, which eliminates the need for the subject discussion in Volume One, Section 3.4. Please refer to the response to Comment numbers 0008.01 and 0081.02 for more information.

Comment Number 0008.01 *Evett, Donald E.*

Comment First, Current planning also assumes that this waste could be contained in approximately 18,000 standard-sized canisters. Also, there is insufficient capacity in the first repository to accept all Hanford Site -high-level waste under almost every alternative. Your study states that an estimated $360,000 cost per canister disposed of at the repository. The report alludes to the feasibility of using much larger canisters whereby the repository fees could be substantially reduced. In my opinion, I would think that the Department of Energy would vigorously pursue the much larger canisters.

Response Larger HLW canisters result in fewer waste packages for disposal at the geologic repository and offer substantial cost savings over the use of standard-sized HLW canisters. DOE is pursuing the use of HLW canisters that are larger than the standard-sized canister currently defined in the repository Waste Acceptance Systems Requirements Document (DOE 1994g). Since the Draft EIS was published, DOE-RW has acknowledged the technical feasibility of a larger canister for HLW and an independent technical review team convened to review the waste loading and blending assumptions used in the Draft EIS. The recommendations of the independent technical review team, along with the larger HLW canister specifications, have been incorporated into the ex situ alternatives for the Final EIS. The use of larger canisters and revised estimates for HLW volumes have been incorporated into the repository fee estimates shown in the Summary, Volume One, Section 3.0, and Volume Two, Appendix B. Section 3.4 describes the common assumptions for canister size and waste loading and additional detail is provided in Appendix B. Please refer to the response to Comment number 0081.02.

Comment Number 0008.02 *Evett, Donald E.*

Comment What happens if the Yucca Mountain project is defeated? What happens next and where will the canisters be disposed? If the year 2015 is the earliest date for acceptance of the high-level waste in canisters, where will the canisters be stored until this time? It is assumed that the use of canisters can commence much earlier than the year 2015.

Response DOE fully intends to comply with the Nuclear Waste Policy Act of 1982 as amended, which requires development of sites suitable for long-term disposal of spent nuclear fuel and HLW, and with DOE Order 5820.2A, which requires that HLW be processed and disposed of in a geologic repository. Therefore, disposal of HLW in a geologic repository was assumed and used as the basis for all alternatives involving HLW retrieval. The in situ and combination alternatives would result in onsite HLW disposal and the EIS analyzes the impacts associated with those actions. See Volume One, Section 6.0 for a discussion of the regulatory requirements and Volume One, Section 3.4 for assumptions associated with the geologic repository included in the EIS. Onsite storage at the Hanford Site for the HLW under the ex situ alternatives for up to 50 years is analyzed in the EIS. If longer-term storage is required due to delays in opening the geologic repository for disposal, appropriate NEPA analyses will be conducted.

Comment Number 0012.06 *ODOE*

Comment A large part of the cost shown for the vitrification alternatives included charges to dispose of the waste to the national high-level waste repository. These charges should not be used to decide whether to put the waste in a stable and durable form.

Several alternatives call for removal of all wastes from the tanks and vitrification. They differ in the methods used, complexity, speed and cost. The repository charges should be used as one criteria in deciding among these alternatives.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The cost estimates developed for each ex situ alternative presented in Volume One, Section 3.4 list the treatment cost, the estimated repository fee, and a total alternative cost range that combines treatment cost and estimated repository fee. The estimated repository fees, as acknowledged in the Draft EIS, have a high degree of uncertainty. Please refer to the response to Comment numbers 0004.01, 0008.02, and 0081.02 for more information concerning repository costs, canister size, and related uncertainties.

Comment Number 0027.02 *Roecker, John H.*

Comment Technical Data Manipulation
In Chapter 3 (page 3-33) DOE discusses the wide range of HLW canisters that could be produced and it makes reference to a WHC document for the low end of the range and a DOE document for the high end. The WHC document is an engineering document containing factual technical data and the DOE document is a set of comments on the TWRS System Requirement Document, which are not supported by technical data. This is another example of DOE Headquarters continuing to manipulate the technical data to support and satisfy their agenda rather than letting facts tell the story openly and honestly. Incidentally, the TWRS System Requirements Document has not yet been approved, to my knowledge, but yet here we are reviewing EIS alternatives which are supposed to be based on systems engineering. More on that later. I would request that in the Final EIS such manipulations of the technical data be eliminated and that all data be presented in accordance with standard systems engineering techniques and principles.

Response Because the alternatives evaluated in the EIS are conceptual at this time, engineering feasibility is limited to an Implementability review for each alternative. This is consistent with CEQ guidance that NEPA analysis occur as early in the decision making process as possible and always before irreversible and irretrievable commitments of resources have been made (40 CFR 1500). Following the publication of the Final EIS and approval of the TWRS ROD, a systems engineering and safety analysis of the preferred alternative will continue during the detailed design phase of the demonstration facilities. DOE intends to continue using systems engineering as a method for evaluation and implementation of the TWRS mission. It is anticipated that the detailed design of the waste retrieval, transfer, treatment, and storage demonstration facilities will be conducted using the system engineering and safety requirements currently being developed for TWRS (and concurrently with the TWRS Draft EIS).

The EIS presents an unbiased evaluation of each of the alternatives using the best available information. More information on canister assumptions and revisions to the EIS in response to revised information on canister size can be found in the response to Comment number 0008.01

Comment Number 0027.05 *Roecker, John H.*

Comment Repository Cost
I am not a lawyer, but in my reading of the Nuclear Waste Policy Act (NWPA) of 1982 as amended in 1987 and the Federal Register Notice 52-161 I believe it is quite clear on how the repository fee for disposal of HLW should be calculated. The use of linear extrapolation of a unit container cost for a specific disposal scenario to calculate the repository fee for all alternatives is completely wrong, misleading and totally obscures the real cost of each alternative. The use of a linear extrapolation of unit container cost greatly understates the cost of disposal for the extensive separations alternative and greatly overstates the cost for the No Separations alternative. This is a blatant example of data manipulation to make a particular alternative look attractive and misleads both the public and decision makers.

Response Please refer to the response to Comment numbers 0004.01, 0008.01, and 0081.02.

Comment Number 0027.07 *Roecker, John H.*

Comment Use of 0.62 m^3 HLW Canister
Requiring Hanford to use the 0.62 m^3 canister is overly restrictive and ridiculous particularly in light of the fact that a larger canister will be required for spent nuclear fuel. A larger HLW canister is a significant advantage for Hanford waste disposal and should be utilized.

Response DOE and Ecology recognize the potential benefits of using a larger canister for HLW. The use of larger HLW canisters has been included in the Final EIS. The size assumptions are presented in Volume One, Section 3.4 and Volume Two, Appendix B. These canister sizes have been used for impact analysis presented in Volume One, Section 5.0 and Appendices D, E, F, G, and H. Please also refer to the response to Comment number 0008.01 for more information on canister size and related impact on repository costs.

Comment Number 0035.04 *Martin, Todd*

Comment A clear stakeholder value has been that Yucca Mountain should not drive decision. We have said that the best waste form should determine which waste form is used, not the site, nor size, nor cost of a speculated national repository.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Repository considerations associated with the size, location, and cost of the potential repository did not drive the EIS analysis of waste form. The waste forms analyzed in the EIS are discussed relative to their ability to comply with existing waste acceptance criteria at the proposed repository; however, the analysis shows that the only waste form acceptable at the proposed repository is the one presently identified in the Tri-Party Agreement. This waste form is a borosilicate glass.

Further, the information regarding timing is presented to provide a base case plan for analysis of impacts as required under NEPA. Information regarding the size of the repository is presented to inform decision makers and the public of the potential impact of TWRS waste on planning for the repository and the potential need for a second repository. In all cases, the EIS assumes, for purposes of impact analysis, that the waste would be stored on an interim basis at the Hanford Site and ultimately shipped for disposal at a geologic repository. The Final EIS has been revised to provide for up to 50 years of interim storage onsite. Each ex situ alternative includes interim onsite storage large enough to hold all HLW produced. This allows the waste treatment program to move forward with out relying on the geologic repository. The interim storage method provides for shielded storage of the immobilized HLW, protective of human health and the environment.

This is consistent with the Tank Waste Task Force value that DOE "accept the fact that interim storage, at least, of the waste in an environmentally safe form will occur for some time at Hanford" (HWTF 1993). Later in the Tank Waste Task Force report when addressing waste storage, a discussion is included that advises DOE to "assume temporary storage will occur at Hanford but don't assume that all radionuclides should be here forever." Please refer to the response to Comment numbers 0008.02, 0004.01, 0038.10, 0052.01, 0035.04, 0012.11, and 0055.03 for all issues related to tank waste disposal and the TWTF.

Comment Number 0035.05 *Martin, Todd*

Comment I would like to address the cost estimates and how they effect the TWRS EIS, particularly in regards to Yucca Mountain.

If you look at some of the simple technical assumptions that are made in the EIS, such as waste loading, the amount of waste that gets into the glass, it dramatically affects cost.

The waste loading has been altered by a mere factor of a little bit more than 10 percent over the last couple of months. Some of the blending assumptions have been changed.

What does that do to cost? If you look at the preferred alternative, it changes the repository cost from four billion dollars all the way up to 12 billion dollars. That is a big impact for such a small change.

The no separations options, change the canister size. What does that do to the cost? It changes the repository cost from about 13 billion all the way up to over 250 billion dollars.

These overly conservative assumptions and the uncertainty with the repository are driving the costs that we see in this EIS. That is inappropriate, and the stakeholders have made that clear in the past.

Response The repository fees presented in the Draft EIS for the ex situ alternatives were overly conservative, but consistent with the published information DOE had at the time the Draft EIS was published. The Final EIS has been modified based on new guidance from the repository and an

independent technical review of the Draft EIS. Please refer to the response to Comment numbers 0004.01 (repository fees and associated uncertainty), 0008.01 (canister size assumptions and associated changes in repository costs), 0027.11 (HLW waste loading), 0035.04 (comprehensive repository issues), and 0081.02 (separation of respository costs from alternative costs).

Comment Number 0036.01 *HEAL*

Comment Unfortunately, the repository plays an important role in the cost analysis of EIS alternatives. The EIS does include the speculated repository cost as a separate cost item, allowing the careful reader to see the role the repository plays in cost. This is an improvement. But many will not read beyond the Summary -- where the total cost is the only number available. The EIS itself makes a very good case for removing the repository cost numbers:

> (The estimate of repository disposal costs)"... is an estimate based on numerous assumptions. Nor should the assumptions used in the analysis be interpreted as final DOE policy. The program is in the early stages of development and design concepts for items such as the repository surface facility, underground layouts, and waste packages are very preliminary. The techniques used to estimate the total system cost were appropriate to the limited level of design development and entail a corresponding level of uncertainty ... There is a high degree of uncertainty in using a fixed cost per canister for geologic disposal over the wide range in the number of canisters that would be produced for the TWRS alternatives." (p. 3-37)

In other words, there is almost no basis for the repository disposal costs and they should not be trusted.

The continued high-profile role of the speculated repository is unacceptable. It goes against past stakeholder values and common sense. Further, the EIS itself says that DOE will bring the program to a safely stored state at Hanford, regardless of the repository's existence. Each of the ex situ alternatives will include onsite storage sufficient for ALL the waste. According to the EIS, "This would allow each of the alternatives to operate independent of the acceptance schedule for the potential geologic repository" (p. 3-38). The Final EIS must be rewritten in such a way as to clearly put the repository in perspective and dramatically reduce the role the repository plays in the document.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The Final EIS has been revised to discuss HLW disposal at the geologic repository and the associated cost separately. See Volume One, Section 3.7 and Volume Two, Section B.9 for the revised discussion of HLW disposal at the geologic repository. Please refer to the response to Comment numbers 0004.01, 0008.02, 0035.04, and 0081.02.

Comment Number 0036.02 *HEAL*

Comment The EIS is biased to maximize the cost impact of the national repository. Over the last few months, changes in waste loading, blending, and canister assumptions have maximized repository costs. The assumption changes are a radical departure from past TWRS assumptions and are not based on any evident engineering data.

Assuming waste loadings similar to those in Tri-Party Agreement studies results in the following repository fees:

- about $4 billion dollars for the "Phased Implementation" alternative.
- about $13 billion for the "no separations" alternative.

After the assumptions were changed, the "Phased Implementation" repository fee rose to about $12 billion and the "no separations" skyrocketed to over $250 billion. Meanwhile, the repository fee for extensive separations stayed relatively constant.

These assumptions may seem minor, but obviously have a large -- and inappropriate -- impact.

Response DOE and Ecology acknowledge that the repository fees presented in the Draft EIS for the ex situ alternatives were overly conservative. The data to support the TWRS EIS assumptions, analysis, and calculations were cited in the Draft EIS and engineering data packages, and calculations were provided for public review in DOE Reading Rooms and Information Repositories. The Final EIS has been modified based on new guidance from the repository and an independent review of the Draft EIS. Please refer to the response to Comment numbers 0004.01, 0008.02, 0035.04, and 0081.02.

Comment Number 0037.03 *Eldredge, Maureen*

Comment I am concerned about the cost estimates in the program, particularly including repository costs. It does not make any sense. It is ludicrous: We do not have a repository. DOE needs to wake up to that fact.

We are not going to get a repository any time soon, not by 2015. It is just not going to happen. We do not know what the repository, if we ever get one, will look like. We do not know what its loading requirements will be. We do not know what its technical capabilities will be. We do not know what its size will be.

Any predictions of cost for a repository are highly speculative. Even if Yucca Mountain by some chance happened to open in any kind of reasonable time frame, the first people in line are the commercial nuclear utilities.

And believe me, they are going to make sure they keep their place first in line. And they are going to make sure all of their waste gets into the facility before any defense waste gets a chance.

Even if defense waste gets in the door, only 10 percent of the repository is slated to be for defense high-level waste. And I am afraid that we are going to run out of space at Yucca Mountain at least very soon, if it opens at all.

Then we are looking at a really fun option of going for a second repository. It is just not going to happen. And it is time to start making plans and start looking at the future with more reasonable expectations.

Response The siting, design, and licensing of a geologic repository to isolate spent nuclear fuel and HLW for long-term protection of public health and safety of the environment is a highly technical and complex process. As stated in Volume One, Section 6.2, the current program planning assumption is that any DOE material qualified and selected for emplacement in the first repository would be disposed of beginning in the year 2015.

As stated in the EIS, current national policy calls for the disposal of spent nuclear fuel and HLW in a geologic repository. The ex situ alternatives presented in the TWRS EIS were developed to be consistent with this policy. Current projections for commercial spent nuclear fuel and defense HLW exceed the statutory limit of 70,000 equivalent metric ton heavy metal (MTHM) in the first repository. The need for a second repository will not be addressed until between January 1, 2007 and January 1, 2010 when the Secretary of Energy is required to report to the President and Congress under the Nuclear Waste Policy Act. Please refer to the response to Comment numbers 0004.01, 0008.02, 0012.20, 0035.04, and 0069.04 for additional information.

Comment Number 0038.10 *Reeves, Merilyn*

Comment The cost of the national repository, which you have heard about tonight, it should be removed from the EIS. The hypothetical, national repository has been a driver for the tank waste treatment and disposal decisions. And this is not in the best interest of cleanup at Hanford.

The Tank Waste Task Force of 1993 was very clear, quote, let the ultimate best form for the waste drive decisions, not the size, nor the timing of the national repository.

The repository costs are not broken out in the summary, misleading the reader by not communicating the importance of repository costs for each option. And the speculated cost of repository should be removed from the EIS.

Response The presentation of the cost estimates has been revised for the Final EIS by separating the cost and discussion regarding HLW disposal. See Volume One, Section 3.7 and Volume Two, Section B.9 for HLW disposal costs. There are real costs associated with disposal of HLW at the

geologic repository, and removal of these cost estimates from the EIS would not allow for an equitable comparison among the alternatives as required under the NEPA process. It is necessary to show these costs in the EIS to fully inform the public and the decision makers of the total cost of the alternatives. Please refer to the response to Comment numbers 0004.01, 0008.01, 0035.04, 0052.01, 0069.04 and 0081.02 for additional information on issues related to cost estimates, the geologic repository, waste loading and waste forms, and interim onsite storage.

Comment Number 0050.01 *Boldt, A.L.*

Comment I have a comment on the Draft EIS disposal cost. The geologic disposal cost presented in the Draft EIS are based on the linear extrapolation of the average container disposal cost provided by the document from DORW0479 referenced in the EIS, Analysis of Total System Life Cycle Cost of the Civilian Radioactive Waste Management Program. This analysis cost in this document was for a specific scenario of waste in a number of canisters. The linear extrapolation of this average container cost - disposal cost from this previous reference to all the TWRS alternatives does not meet the requirements of the Nuclear Waste Policy Amendments Act of 1987 and the Federal Register Notice 52161, the Civilian Radioactive Waste Management Calculating Nuclear Waste Disposal Fees for the Department of Energy Defense Program Waste.

Federal Register Notice 52161 identifies, in detail, the method to be used in estimating the disposal fees for the Department of Energy Defense Program HLW share of the Civilian Radioactive Waste Management System costs. The Federal Register Notice 52161 cost allocation is based on the concept of full cost recovery with sharing formula supplied to all fixed and variable cost system or system cost components. The assumption of the linear extrapolation of average container disposal cost in the Draft EIS, greatly under estimates the disposal cost for the Extensive Separations alternative and greatly over estimates the disposal cost of the No Separations alternative. Example, disposal cost variability for alternate HLW container sizes and high-level waste volumes resulting from No Separations, intermediate separations, and extensive separations using the methodology of the Federal Register Notice 52161 are provided in a document by TRW for Environmental Safety Systems and it has long numbers on the copy I will give you but it is assessed on the pre-closure system cost health and safety in facts of Hanford high-level vitrification options on the civilian radioactive waste management system. This document is dated April 27, 1995.

I am requesting with the Draft TWRS EIS be revised to incorporate high-level waste disposal costs calculated with methodology specified in Federal Register Notice 52161.

Response Please refer to the response to Comment numbers 0004.01 (repository costs related to canisters) and 0081.02 (separation of repository, retrieval, and treatment costs).

Comment Number 0052.02 *Pollet, Gerald*

Comment What we need to remove from your total cost estimates is the entire set of repository fees. It is not sufficient to say that we broke out the repository fee in the details because you are still presenting a total range of cost estimates that the public and media and the decision makers are actually going to look at and they're going to say by gosh, that No Separations alternative costs a quarter trillion dollars. What kind of lunatic wanted No Separations? And what the decision makers, public, and media will not know is that, in fact, No Separation alternative actually has a rather reasonable price tag of below 30 billion dollars and that 211 billion dollars is a hypothetical repository fee for a hypothetical repository. A fee charged by the department to itself for repository which it admits in the EIS will never have the capacity for this. So it is a hypothetical fee for a hypothetical repository that the one certainty is does not have the capacity for it ever opened. There is something wrong with that picture and presenting it to decision makers, the public, and the media, it is apparent to the casual observer that someone is trying to skew the results.

Response DOE and Ecology have revised the Final EIS in response to public comment and put the costs of the repository into a separate presentation. The estimated costs for disposal of the HLW at the potential geologic repository are included in the Final EIS because there would be real costs associated with packaging, transport, and placement of HLW in a geologic repository. Eliminating the repository fees from the cost estimates presented in the EIS would not provide all of the costs associated with the alternatives and would bias presentation of the alternatives. Please refer to the response to Comment numbers 0038.10 and 0081.02 for discussion of repository costs as these issues relate to the alternatives analysis and the response to Comment numbers 0037.03 and 0008.02 for a discussion of the proposed geologic repository availability and statutory capacity.

Comment Number 0052.05 *Pollet, Gerald*

Comment One last closing thought for our comments tonight which is if you have a hypothetical repository fee for the hypothetical space at a hypothetical repository and the hypothetical land, then for the very real cost to the three tribes to the future generations of this region why isn't there assigned a cost for the permanent use of land in the leave it in place alternatives that are clearly being shown a preference through out all the cost estimates in this EIS. You need to consider internalizing the externalities and I would say that is less hypothetical and I think that the public could provide you and the tribes some very real cost estimates for creating a sacrifice found under the leave it there scenarios.

Response The cost estimates for the in situ or ex situ alternatives do not include cost associated with permanent land commitment, or land use restrictions associated with groundwater contamination. The amount of land committed to waste management and disposal was estimated for each of the alternatives, as was the extent of a groundwater contamination and associated human health impacts. The costs associated with long-term loss of land use or groundwater use can be understood within the overall context of the relative difference among various alternatives land use and groundwater use restrictions. The more land or groundwater is restricted the higher the cost. So while absolute dollar

estimates are not provided the EIS does provide an appropriate level of analysis to support the comparison of alternatives. Land use issues related to Tribal Nation concerns are described in Volume One, Sections 5.5 and 5.19. Please also refer to the response to Comment numbers 0072.26, 0072.22, and 0036.18.

Comment Number 0055.04 *Martin, Todd*

Comment A third point would be that the repository should not be driving decision making at Hanford.

Response DOE and Ecology acknowledge the concern expressed in the comment. NEPA requires that all reasonable alternatives be evaluated. Consideration of geologic repository availability was included in the evaluation of the ex situ treatment alternatives in the EIS to the extent that availability was assumed; a limit would be placed on the accepted volume, type, and final waste form of Hanford materials, and the interim storage facilities would include a 50-year design life to provide sufficient time for availability. Data that support the impact analysis of each alternative are presented in an objective and unbiased format for comparison by the decision makers and the public during the comment period. Please refer to the response to Comment numbers 0008.02, 0035.04, 0037.03, 0038.10, and 0052.01.

Comment Number 0055.05 *Martin, Todd*

Comment I want to address cost estimates in Yucca Mountain. I think people have heard that several times but I want to address some of the specifics. In looking at the numbers, you change a few assumptions here and there and it is amazing what it does to those cost numbers. For example in Phased Implementation when we look at the repository cost. You shift the waste loading, the amount of waste that goes into the glass by a mere 10 percent into essentially a percentage that is much lower than I have ever seen in any documents. What does that do to the repository cost for that option. Moves from 4 billion dollars to 12 billions dollars. Just a little assumption like that. Let us look at the no separation option. You take a fairly large canister, your repository cost is about 13 billion dollars. Shrink that canister down a bit and it jumps to 252 billion dollars. These are the kind of assumptions that I think that Mr. Pollet pointed out appeared to have been skewed to maximum the impact of the Yucca Mountain on the EIS. And I would agree with that assertion.

Response The changes in repository cost were a result of changes to the waste loading, HLW canister size, and use of a blending factor to account for uncertainties in the ability of the retrieval operations to deliver a uniformly blended waste feed stream to the treatment facilities. The variation in estimated repository cost based on waste loading and canister size is included in the cost ranges presented in the EIS. Please refer to the response to Comment numbers 0035.04. 0038.10, and 0081.02.

Comment Number 0057.04 *Garfield, John*

Comment The logic of the repository cost for example in the intermediate separations adding up to $12 billion dollars does not make sense from even the simplest technical that any member of the public can understand. The Hanford contribution to the repository in total is about 1 percent of the total radionuclides if all the high-level wastes goes to the repository and about 1 percent of the heat. Whether or not content into the small number of canisters or leave it in a large number of canisters will not significantly drive the repository costs. That is a fairly straight forward and simple approach or way of thinking about that problem that everyone can understand. Attributing $12 billion dollars to that repository or $211 billion dollars for the No Separations case does not stand up to the simplest scrutiny.

Response The amount of HLW that ultimately could be accepted at a national repository is a function of available subsurface area and emplacement constraints among HLW and spent nuclear fuel (SNF) within this area. In addition, there is a statutory limit on emplacement of HLW and SNF in a first repository (70,000 MTHM) until a second repository is in operations. As a planning basis, the Department has allocated 10 percent of that statutory capacity of the first repository for defense SNF and HLW.

The physical amount of available subsurface area for HLW and SNF disposal, and the associated number of packages of HLW and SNF, would be defined through repository design and performance assessment activities, based on information collected during repository scientific investigations. Neither of these activities are completed. However, for planning purposes, the repository Advanced Conceptual Design assumes that 12,900 canisters of defense HLW, each containing 0.5 MTHM, can be accommodated within the statutory limit.

A number of factors are important in estimating disposal costs including number and size of canisters handled, number of waste packages, operation and capital costs, and number of shipments to a repository. In addition, there are common costs that must be allocated among waste generators, such as development and evaluation costs, to ensure full cost recovery. Using radionuclide inventory of Hanford HLW relative to other wastes would not provide an equitable basis for cost estimating. For more information on this issue, refer to the response to Comment number 0005.08.

A number of factors go into the repository cost estimate including heat load, canister size, waste package design, and number of waste packages. Looking at Hanford contribution of the repository cost solely from the standpoint of radionuclide contribution to the repository would not provide a straightforward and understandable basis for cost estimating. Please refer to the response to Comment numbers 0004.01, 0008.01, and 0081.02 for additional information on repository cost estimates.

Comment Number 0062.05 *Longmeyer, Richard*

Comment One of the things that would need to be re-looked at is if the Yucca Mountain facility is not going to become a reality, how would that affect the prioritization of these different plans. And my guess is that the Yucca Mountain facility, or any national repository for nuclear wastes, will never receive any nuclear wastes from across state lines in my lifetime, and probably not in the lifetime of my children. And so that means that we need to re-look at this, and prioritize them again. Doing so would probably leave us with three options. The in situ vitrification, the ex situ vitrification with onsite storage, and the Phased Implementation, which you have now with onsite storage. And so, those would be the three that I would recommend we look at more closely.

Response Current national policy calls for disposal of spent nuclear fuel and HLW in a geologic repository. DOE and Ecology developed the ex situ alternatives in accordance with this policy. In response to concerns regarding the timing and availability of the geologic repository to accept HLW from the Hanford Site, the Final EIS has been revised in Volume One, Section 3.4 and Volume Two, Appendix B to include the impacts associated with onsite interim storage of treated HLW for 50 years. The environmental impacts associated with the in situ alternatives identified in the comment are provided in the EIS in Volume One, Section 5.0 and associated appendices. Volume One, Section 5.12, and Volume Three, Appendix D contain discussions of the transportation risk associated with offsite disposal. Please refer to the response to Comment numbers 0008.02 (repository availability and related uncertainties) and 0037.03 (statutory limits), and 0052.01 (interim HLW onsite storage) for more information.

Comment Number 0072.84 *CTUIR*

Comment P3-28: PP 5: Does this mean you are only going to use one multi-purpose canister? Please explain in more detail in order for the readers to grasp how many and how much.

Response One type of multi-purpose canister was assumed as an overpack used for handling and interim onsite storage. This multi-purpose canister is referred to as a Hanford Multi-Purpose Canister (HMPC) throughout the document. The text has been revised in Volume One, Section 3.4 to discuss the relationship between the primary HLW canisters and the HMPC.

Comment Number 0077.05 *ODOE*

Comment A large part of the cost shown for the vitrification alternatives included charges to dispose of the waste to the national high-level waste repository. These charges should not be used to decide whether to put the waste in a stable and durable form.

Several alternatives call for removal of all wastes from the tanks and vitrification. They differ in the methods used, complexity, speed, and cost. The repository charges should be used as one criteria in deciding among these alternatives.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Please also refer to the response to Comment numbers 0004.01, 0035.04, 0052.01, and 0081.02 for more information regarding disposal costs, assumptions, and presentation in the Final EIS.

Comment Number 0079.05 *Knight, Paige*

Comment Repository costs must not be included in the total cost of any plan implemented. Cleanup dollars must go first towards stabilizing waste in a quality form that is not water soluble. Repository room must be considered. If Yucca Mountain is ever a viable option, it will only hold a small portion of Hanford waste. So the form of the waste must be not only stable, but retrievable. My reasoning there is that more than likely the waste in any kind of form is going to be sitting at Hanford for at least 40 years, and I would suspect much more than that.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment numbers 0008.01, 0038.10, and 0081.02.

Comment Number 0081.05 *Pollet, Gerald*

Comment More importantly is the next bullet in our advice. Accept the fact that interim storage at least, at least, of the waste in an environmentally safe form will occur for some time at Hanford. Select a waste form that will ensure safe interim storage of this waste. The message was, Hanford is going to be the home for the high-level nuclear waste. Select the best form, and don't even put into the mix the theoretical cost of the repository, which the Department will charge itself, nor the theoretical capacity of it, because it doesn't have the capacity to handle it anyway, under any scenario here. We request that this advice be addressed, and placed in the front of this EIS. And it be addressed in the summary and throughout. We request that the repository costs be relegated to an appendix, and the total cost summaries be redone to show the total cost without the theoretical hypothetical self-dealing charge for replacing waste in the repository. When that is done, we should examine carefully the no separation versus the extensive separation scenarios. And we should see how much we pay for unproven technology under extensive separation, versus no separation and intermediate separation.

Response The storage of the HLW at the Hanford Site for 50 years has been included in the ex situ alternatives. Please refer to the response to Comment number 0089.18. Current national policy calls for the disposal of spent nuclear fuel and HLW in a geologic repository and the ex situ alternatives were developed to be consistent with this policy. DOE and Ecology have revised the presentation of the cost estimates for HLW disposal for the Final EIS in Volume One, Section 3.4 and Volume Two, Appendix B. This will allow the reader to readily compare the estimated cost for waste treatment among the alternatives. There are real costs associated with packaging, transport, and placement of

canistered HLW into a geologic repository, and failure of the EIS to present these costs would provide an incomplete picture for the decision makers and public. Please refer to the response to Comment numbers 0004.01, 0035.04, 0038.10, and 0069.04.

The EIS presents in Volume One, Section 3.4 and Volume Two, Appendix B, alternatives that are based on 99 percent retrieval with no separations (the Ex Situ No Separations alternative), intermediate separations (the Ex Situ Intermediate Separations alternative), and extensive separations (the Ex Situ Extensive Separations alternative). A summary comparison of these alternatives is provided in the Summary and a summary of the environmental impacts of each alternative is presented in Volume One, Section 5.14.

Comment Number 0089.18 *Nez Perce Tribe ERWM*

Comment Since the possibility exists that Yucca Mountain repository may not open, the design life of the onsite facility storing the vitrified high-level waste must be sufficient for the permitting and construction of an alternate high-level waste repository.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Volume One, Section 3.4, the Summary, and Volume Two, Appendix B.3 have been revised to include reference to the 50-year design life for the interim HLW storage facilities, which is based on a conservative estimate for approval and availability of the geologic repository. Please refer to the response to Comment numbers 0008.02, 0035.04, and 0052.11.

L.3.4.2.2 Alternatives Costs

Comment Number 0005.12 *Swanson, John L.*

Comment I applaud you for giving cost RANGES in comparing the different alternatives, but I am very surprised that you did not include the (large) uncertainties in HLW repository disposal costs in many of these ranges. In recent years, there have been reports of attainable cost savings through the use of higher waste loadings in HLW glass and the use of larger canisters; such savings could give estimated repository disposal costs only ~ one-fourth as large as the values you give.

Response DOE and Ecology considered HLW disposal fees in the total cost range (treatment cost + repository fee) for the ex situ alternatives presented in the EIS. For example, when comparing the treatment cost range to the total cost range, the total cost range is not the sum of the treatment cost range and the repository fee. This methodology addressed only TWRS-specific parameters, mainly waste loading and canister size, in the cost uncertainty analysis. Uncertainties in the repository program are not within the scope of the EIS. However, 50 years of storage of the HLW is included in the ex situ alternatives to account for the uncertainty of when a repository may be available to accept waste for disposal. Please refer to the response to Comment numbers 0081.02, 0072.80, and 0008.01 for further discussions of repository and canister issues.

Comment Number 0005.13 *Swanson, John L.*

Comment Because of the large uncertainty in HLW repository disposal costs, I feel that it would be a more fair comparison of the costs of the alternatives in the Summary if you split out those estimates-something like "The cost of this alternative, exclusive of the HLW repository fee, is estimated to be in the range of ___ to ___. Based on the assumptions adopted for this EIS, the HLW repository fee for this alternative is estimated to be __; the use of other assumptions regarding higher waste loading in glass and the use of larger canisters could lower this estimated fee to ___."

Response DOE and Ecology recognize the concern regarding the cost uncertainty associated with the repository. The Final EIS has been revised to discuss HLW disposal at the geologic repository, the associated cost separately, and potential impacts (e.g., accidents during transportation). The Summary, Section S.8, Volume One, Sections 3.7 and 6.0, and Volume Two, Section B.9 contain a discussion of HLW disposal at the geologic repository. Please also refer to the response to Comment numbers 0081.02, 0008.01 and 0005.12 for further information regarding repository availability, cost estimate methodology, and assumptions.

Comment Number 0005.14 *Swanson, John L.*

Comment The more I look into your cost ranges, the more confused I become. For example; a) Footnote (3) to Table S.7.6 says that the relatively large ranges in costs for three of the alternatives is primarily a result of assumptions made for repository fee, but two of the three alternatives identified in this footnote do not fit this situation. b) Tables 3.4.13 and 3.4.14 contain footnotes indicating that the cost ranges are dependent on the canister size used, but the tables themselves give only individual values for the repository fees. Why aren't the repository fee ranges used given in the tables? Also, if the cost ranges resulting from canister size increase are given for this/these alternative(s), why aren't they given for the other alternatives as well? The way you have it is a mixture of "apples and oranges." c) Section B.8.3 ("Cost Uncertainty") does not do anything to help me, either-except to emphasize that "assumptions drive conclusions."

Response The footnote in question (footnote number 3 of Table S.7.6) is intended to provide the reader a summary-level explanation of why the cost ranges vary widely for the ex situ alternatives. The difference between the high and low cost range for the Ex Situ No Separations (Vitrification) alternative is $184 billion, the range for the Ex Situ No Separations (Calcination) alternative is $47 billion, and the range for Ex Situ Intermediate Separations and Phased Implementation alternatives is approximately $10 billion. The ranges estimated for these alternatives are greater than the other alternatives mainly because of repository fee assumptions. Technical assumptions regarding the HLW canister sizing have been revised for the Final EIS, which reduce the large cost ranges associated with the ex situ alternatives that produce large volumes of HLW. Additional detail on how the cost uncertainty and ranges were estimated is provided in Volume Two, Appendix B. Please refer to the responses to Comment numbers 0081.02 and 0005.03 for more information on uncertainty.

The Volume Two, Appendix B discussion on cost uncertainty is intended to provide an overview of the methodology and the analysis results. The detail input output data are included in the technical backup data that is publicly available as part of the TWRS EIS Administrative Record.

As noted in the response to Comment number 0005.12, the uncertainty in HLW disposal fees that would result from a variation in the number of HLW packages is included in the total cost range for each ex situ alternative. This allows for an equitable comparison among alternatives.

Comment Number 0052.03 *Pollet, Gerald*

Comment The costs have some other strange anomalies. For instance, some of the cost estimates for vitrification alternatives today are basable upon some market considerations in terms of what vendors are saying they believe they will be able to bid.

Response None of the cost estimates for the alternatives presented in the Draft EIS were based on privatization of the tank waste treatment. Privatization is an implementation strategy and as such was not addressed in the EIS. For a discussion of this, see Volume One, Section 3.3. All of the cost estimates were developed using the same methodology to provide an equitable comparison among the alternatives. Privatization issues are discussed in the response to Comment number 0060.01.

Comment Number 0052.04 *Pollet, Gerald*

Comment But what is kind of incredible in this EIS is continuing the historic practice at this site of having a capital contingency built into all the cost estimates of not just 30 percent here but 30 to 50 percent. It is really hard to talk about how the TWRS program is reaming in its costs when its capital cost estimates have a contingency added in of 30 to 50 percent. It is very disturbing and from point of view of how this is then presented to Congress, what we have is a set of alternatives that may emerge that are the ones that are necessary to meet the legal requirements of removal, retrieval, and treatment which are inflated because of their capital considerations by 50 percent and which are inflated by up to $211 billion dollars by a hypothetical repository fee and then we wonder why Congress may not want to fund vitrification.

Response The use of contingencies in cost estimates is standard practice throughout the public and private sector. This is especially true of conceptual estimates for any large construction projects. The use of a contingency in the capital cost estimates is a means to quantify the uncertainty inherent with conceptual designs. The use of contingencies is appropriate for all construction projects, especially projects involving the complexity of the TWRS program. Cost estimates associated with the repository are provided in response to Comment numbers 0004.01 and 0081.02. Capital construction costs are discussed in the response to Comment numbers 0055.06 and 0081.03. DOE-Richland Operations Office (DOE-RL) prepares an annual budget, which would include the budget required for the TWRS cleanup for that year. However, only Congress has the authority to appropriate funds.

Comment Number 0055.06 *Martin, Todd*

Comment On the costs more generally, I trust the costs in this document about as far as I can throw this document which needless to say without doubt is not very far. Most of the people in this room remember the Hanford Waste Vitrification Plant. This was a 1-ton a day high-level waste vitrification facility. This was the cornerstone of Hanford cleanup that as I recall is supposed to be running in about 3 years but we canceled the program. That was projected to cost about 1.3 billion dollars. Pretty hefty. I look at this EIS and I see that a low-level waste facility (vitrification facility) it is 20 mt per day. Twenty times the throughput is going to be built for 248 million dollars. I do not get it. I do not see the basis for those costs and I simply do not buy it. Further, to compare more of an apples to apples, we look at the high-level waste vitrification facility that is in the EIS. This a 1 metric ton a day facility, it is essentially HWVP. The 1.3 billion dollar facility. What is it in this EIS? 232 million dollars. I can not imagine that it can be built for that. In other words, total for the Phased Implementation alternative, DOE is going to built two low-level waste vitrification facilities with an agent pre-treatment on both of those and one high-level waste facility for 1.4 billion dollars. Essentially the cost of HWVP. I say no way. If that is true, why are we doing privatization? We can take the budget authority that has been given about 2 years and we have got the full cost of one of these facilities. This does not assume any efficiencies from privatization. These are government-owned, contractor-operated facilities, built under a traditional contracting mechanism. Essentially, until a formal credible data package has been done to support the Phased Implementation, the preferred alternative in this EIS, this EIS should go forward no further. Should go no further.

Response DOE and Ecology acknowledge this concern regarding the cost estimates and have reviewed and revised the Phased Implementation cost estimate as appropriate for the Final EIS. These revised cost estimates are shown in Volume One, Section 3.4 and Volume Two, Appendix B and are reflected in the Summary. The Hanford Waste Vitrification Plant (HWVP) cost estimate is not directly comparable to the capital cost estimate for the Phase 1 HLW facility because it includes support facilities and infrastructure that are estimated as separate components for Phased Implementation.

The Phased Implementation alternative was developed by scaling appropriate components from the Ex Situ Intermediate and Extensive Separations alternative. The capital cost was estimated using the "six-tenths rule" and the relative plant capacities for Phased Implementation were estimated in the absence of more definitive data. DOE and Ecology acknowledge that there is uncertainty introduced into the cost estimates by scaling and this is captured in the cost uncertainty analysis. The cost uncertainty analysis results in a cost range within which the final cost would be expected to fall. Total capacity cost breakdowns for a combined separations LAW facility and a detached HLW treatment facility are generally 35 percent equipment, 20 percent material, and 45 percent labor (WHC 1995j).

The cost estimates input data, methodology, and calculations are available in the reference documents included in the EIS and available for public review in DOE Reading Rooms and Information Repositories.

Comment Number 0057.06 *Garfield, John*

Comment There are a few other less important comments that I will make. One is with regard to the cost estimates for the combination case and to some degree the Phased Implementation case. Parsons has used 6/10ths power rule to arrive at those costs for lack of any conceptual design basis to make those estimates. That rule is applicable in the commercial industry for chemical processes because those plants are largely equipment-driven. 50 to 85 percent of those plant costs are equipment and when you vary the capacity that the capital cost of the facility does, as a rule, from varied by the 6/10ths power rule. Nuclear facility equipment costs only amounts to 10 to 20 percent of the total capital cost. That same 6/10ths power rule can not be used for a shielded nuclear processing facility. It makes no sense to do that and the cost have been skewed for using that. That adjustment should be made and can be made fairly easily.

Response The Phased Implementation alternative and combination alternatives were developed by scaling appropriate components from the Ex Situ Intermediate Separations and Ex Situ Extensive Separations alternatives. The capital cost was estimated using the "six-tenths rule" and the relative plant capacities for the Phased Implementation alternative in the absence of more substantive data. Some uncertainty is introduced into the cost estimates by scaling and this is captured in the cost uncertainty analysis presented in Volume Two, Appendix B. The cost uncertainty analysis results in a cost range within which the final cost would be expected to fall. Total capital cost breakdowns for a combined separations LAW facility and a detached HLW treatment facility estimated for the Ex Situ Intermediate Separations alternative are 35 percent equipment, 20 percent material, and 45 percent labor (WHC 1995j).

The cost estimating methodology has been reviewed and revised cost estimates have been completed for the Phased Implementation and combination alternatives, and for other alternatives as appropriate. These revised costs are shown in Volume One, Section 3.4 and in Volume Two, Appendix B.

Comment Number 0069.04 *Pollet, Gerald*

Comment The TWRS EIS skews the costs of the alternatives as well. This, coupled with the risks, presents a very biased picture in the EIS of the alternatives. First off, you see this is how their rank ordered in the EIS, as it will be presented to decision makers, and is being presented to you, the public. Leaving waste behind has a cost range of 23 to 28 billion. Extensive separation comes in close behind it, 27 to 36 billion. This is the Tri-Party Agreement path, called Phased Implementation, 32 to 42 billion, building just one plant basically with multiple melters, and calling it all high-level waste, glassifying it all, this astonishingly high price tag. Anyone rational would throw it out.

The repository fee, once it's removed ... excuse me, what I was saying was, the Nuclear Waste Policy Act does, indeed say how you should calculate a repository fee if your going to use it here.

It is not the way it is calculated here. Secondly, it should not be used at all because this waste will never fit into the proposed hypothetical repository at Yucca Mountain. So what is the fee for? It's a hypothetical fee the Department charges itself for a hypothetical repository that will not have room.

So all of a sudden, we have a drastic change in the order of the alternatives. In fact, what we get is, let me just present the conclusion, the Ex Situ/In Situ Combination goes from being least cost by 4 to 8 billion, to only being 1 to 7 billion dollar lower cost then getting all the waste out of there. The Extensive Separations goes from number 2 to number 4 and number 5. It goes from having a cost advantage of 5 to 6 billion dollars over the Tri-Party Agreement, to having a 5.4 to 6.4 billion dollar disadvantage over the Tri-Party Agreement path. It is an effort to skew the data here, and present it in a skew manner to decision makers. And the No Separations alternative, which gets wastes out of tanks fastest, with least research and development, actually shows up as having potentially the lowest range costs. Thank you.

Response The Phased Implementation alternative involves building two separations and LAW treatment facilities and one HLW vitrification facility during Phase 1 to demonstrate the treatment technologies. Following Phase 1, Phase 2 would be implemented, which would involve building full-scale treatment plants to treat the remainder of the tank waste. For a description of the Phased Implementation alternative, please refer to Volume One, Section 3.4.

The purpose of the Nuclear Waste Policy Act is to: 1) establish a schedule for the siting, construction, and operation of repositories that will provide a reasonable assurance that the public and the environment will be adequately protected from the hazards posed by high-level radioactive waste and such spent nuclear fuel as may be disposed of in a repository; 2) establish the Federal responsibility, and a definite Federal policy, for the disposal of such waste and spent fuel; 3) define the relationship between the Federal Government, State and affected Indian Tribal governments with respect to the disposal of such waste and spent fuel; and 4) establish a Nuclear Waste Fund, composed of payment made by the generators and owners of such waste and spent fuel, that will ensure that the costs of carrying out activities related to the disposal of such waste and spent fuel will be borne by the persons responsible for generating such waste and spent fuel. The Nuclear Waste Policy Act does not provide a methodology for calculating the repository fee for disposal of HLW in a geologic repository. For the Final EIS, repository fees were recalculated. For more information, please refer to the response to Comment numbers 0004.01 and 0036.01.

Current national policy calls for the disposal of spent nuclear fuel and HLW in a geologic repository. The current inventory of commercial spent nuclear fuel and defense HLW exceeds the statutory limit for the first repository. The disposal of all commercial spent nuclear fuel and defense HLW will require increasing the limit of the first repository or constructing a second repository. DOE is currently characterizing one site, Yucca Mountain, Nevada, for a geologic repository. The law requires that the Secretary of Energy report to the President on or after January 1, 2007, but not later than, January 1, 2010, on the need for a second repository. Within this context, none of the alternatives addressed in the TWRS Draft EIS exceed the capacity for geologic disposal, even though

many of the alternatives would generate more canisters of HLW than the repository program is currently using for planning purposes. Based on revised canister size and other recalculations completed for the Final EIS, the EIS has been revised in Volume One, Sections 3.4 and 6.0, and Volume Two, Appendix B, to address the repository capacity issue relative to TWRS alternatives.

Failure to recognize that each of the ex situ alternatives would have cost impacts associated with HLW disposal would provide unequal information for the reader. Please see the response to Comment numbers 0081.01, 0081.02, and 0035.04.

Comment Number 0072.92 *CTUIR*

Comment P 3-36: PP 4: S 2: By what factor? Or by a factor of what?

Response Capital cost contingencies were included in the alternative cost estimates as described in Volume One, Section 3.4 and Volume Two, Appendix B. These contingencies are included to account for the uncertainty associated with the conceptual-level designs developed for analysis in the TWRS EIS. The contingency factors used ranged from 25 to 50 percent with a typical value of 40 percent. The higher contingencies were applied to the more conceptual facilities and the lower contingencies were applied to the more defined facilities. This is consistent with industry standards and practice. Please refer to the response to Comment numbers 0052.04, 0055.06, and 0057.06 for related information on the use of contingencies in cost estimating.

Comment Number 0072.93 *CTUIR*

Comment P 3-36: PP 6: Please explain how the R&D cost is to be assumed for the phased alternative.

Response Because Phase 1 would be a demonstration process, the research and development cost for the treatment process was assumed to be an integral part of the Phase 1 operating cost. The research and development cost associated with the waste retrieval and transfer function was included at the same level as the other ex situ alternatives. There are development programs currently ongoing at the Hanford Site that are covered under the TWRS program or other programs.

Comment Number 0077.04 *ODOE*

Comment Also, the cost analyses do not include the lost value of the lands or the costs from harm to future generations or the environment. Ultimately, the costs of these alternatives would prove to be much greater than removing and cleaning up the wastes, as called for by the preferred alternatives.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Analyzing the harm to future generations from an economic

standpoint is not included in the EIS; however, lost habitat, health risks, health consequences, and probabilities of accidents to future generations were among the impacts analyzed by DOE and Ecology. Land use commitments are addressed in Volume One, Section 5.7, anticipated health effects in Section 5.11, and comparison of potential consequences from accidents in Section 5.12. For the Final EIS, a Native American scenario was added to the analysis presented in Volume One, Section 5.11. Please refer to the response to Comment numbers 0036.18, 0052.05, 0072.22, 0072.55, 0072.198, 0072.225, and 0072.34 for related discussions..

The information requested in the comment represents a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0081.01 *Pollet, Gerald*

Comment We are concerned that the Department of Energy falsely inflated the costs of waste removal and glassification options to justify leaving waste in the tanks. We are also concerned that the rate the costs have been presented would erroneously lead policy makers to the conclusion, when combined with the use of erroneous assumptions as to risk, lead to the conclusion that in fact it would be cost affected to leave waste behind.

Response The cost estimates are an equal analysis of the total life-cycle costs of each alternative and reflect the best available cost information given that the engineering is still at a conceptual stage. The estimates are available for inspection by the public in the TWRS EIS Administrative Record. Please refer to the response to Comment number 0081.02 for a discussion of how the repository costs were recalculated for the Final EIS. For responses to specific comments regarding risk assumptions, please refer to the response to Comment numbers 0069.08, 0069.09, 0069.03, 0069.06, 0069.07, 0081.07, and 0069.11.

Comment Number 0081.03 *Pollet, Gerald*

Comment And what is interesting is it has the least technical question. And the EIS is based, in terms of these costs, costs include a 30 to 50 percent capital cost contingency. This is pretty bazaar. We're spending 10's of millions of dollars on research development design phased approach.

We are spending 10's of millions of dollars on design, which ought to drive down contingencies. 30 to 50 percent contingency is the way Hanford has done business with capital construction projects in the past. It is sinful. It is not going to be able to continue. If we eliminate, and we use different factors for contingency, take a look at the fact that a no separation alternative means you build one plant with the simplest technology, vitrification. You vitrify everything. You don't try to separate. You just vitrify. You do not have to build a multi-billion dollar separation plant. You do not have to build separate low activity and high activity vitrification plants. You could, and this EIS fails to consider the alternative which was eliminated earlier in this process, of having a very simple separation of low activity and high activity, in terms of which melter waste is directed too, at the front-end of such a

plant. If we look at the cost issue alone, the no separation option actually drives down into the cost range, and perhaps will compare more favorably than the Ex Situ/In Situ Combination even.

The cost assumptions, as with all other assumptions, are critical. Building in 30 to 50 percent contingencies for one set of options is not acceptable for this type of policy decision making. And we can't afford to continue with 30 to 50 percent contingencies for capital costs at Hanford.

Response As noted in the response to Comment number 0052.04, the use of contingencies in capital cost estimates is standard practice throughout the public and private sector. All of the alternatives presented in the EIS include contingencies in the capital cost estimates. During design development for the alternative selected, the cost estimate would be refined and the contingency reduced. The cost estimate for a large facility would typically have some contingency remaining at the start of construction. The capital cost estimate as well as the contingency estimated for the Ex Situ No Separations alternative is smaller than the Ex Situ Intermediate and Extensive Separations alternatives because one treatment facility is constructed instead of two. The contingency factor for the Ex Situ No Separations alternatives provides an equal presentation to the public and the decision makers. Capital construction costs are also discussed in the response to Comment numbers 0055.06, 0057.06, and 0081.03.

A single facility designed to vitrify both HLW and LAW would not be precluded by the EIS for any of the alternatives that include separation of the HLW and LAW. The impacts associated with a single treatment facility would be bounded by the alternatives presented in the EIS. The separations processes included in the EIS cover a reasonable range of representative technologies. The separation of the waste into HLW and LAW streams is bounded with no separations on the low end, extensive separations on the high end, and intermediate separations in the middle.

The Draft EIS addressed the full range of reasonable alternatives. As the alternative identified in the comment is bounded by the alternatives addressed in the Draft EIS, DOE and Ecology believe that including the requested alternative would not provide valuable additional information to the public or decision makers. Please also refer to the response to Comment number 0072.05 for a discussion of the development of the alternatives for analysis in the EIS.

Comment Number 0089.04 *Nez Perce Tribe ERWM*

Comment Purification and removal of sodium nitrate and other major wastes from tanks prior to segregation of LAW and HLW should be considered for volume reduction and cost savings. Possible removal of sodium nitrate for industrial or certain agricultural use should be considered. Another option may be reacting the sodium nitrate with an organic reducing agent to produce sodium carbonate, nitrogen, ammonia and water, greatly facilitating waste reduction. Options such as these need to be considered to reduce vitrification volumes.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Volume reduction measures for the waste have been considered, including calcination and the clean salt process. These measures are addressed in Volume Two, Appendix B, Section B.3. Removal of sodium nitrate, such that this compound would be safe and suitable for industrial or agricultural uses would be limited because complete radionuclide removal to form a purified waste would be extremely difficult.

The Draft EIS addressed the full range of reasonable alternatives. As the alternative identified in the comment is bounded by the alternatives addressed in the Draft EIS, DOE and Ecology believe that including the requested alternative would not provide valuable additional information to the public or decision makers. Please refer to the response to Comment number 0072.05 for related discussion.

Comment Number 0090.01 *Postcard*

Comment Please listen to us say no:
to falsely inflating the cost of glassifying Hanford's High-Level Nuclear Wastes by $211 billion.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Please refer to the response to Comment numbers 0004.01, 0009.04, 0008.01, 0038.10, 0081.01, and 0081.02, for discussions regarding how repository costs were calculated and presented in the EIS..

Comment Number 0092.01 *Hanson, Mary*

Comment I certainly feel that as a lay person, I have every right to the most conservative principles being used in this situation and I certainly, personally and I think I stand for others here, do not consider cost to be important. Money can be made, the environment can not be remade. Now the total defense budget for this country is somewhere around 260 billion dollars per year. That is a lot of waste. In my opinion, that it is throwing money at defense. Most of it. Playing games, testing this and that and so forth. This is a real problem. This is a real security problem and if it were up to me I would put probably half the defense budget on it. So I do not consider money to be something that you can quote, "balance against health." I do not think money is something you balance against the environment. You can not balance a nonrenewable resource like the environment against a renewable resource like money. So I am very strongly in favor that this be done in the economic, in a conservative manner, economically speaking but I certainly feel that if the public really was as aware as everyone in this room is of what the issues are, they would vote very high amounts of money to deal with this threat to our security.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Cost estimates presented in the Draft EIS have been reviewed and revised, as appropriate in the Final EIS.

The alternatives and impact analysis presented in the EIS were based on conservative principles, consistent with the requirements of NEPA to bound the potential impacts and to address a range of reasonable alternatives. For more information on this topic, please refer to response to Comment number 0072.05 or in the EIS Volume One, Section 3.3. Please also refer to the response to Comment number 0081.01 for a discussion of issues related to the presentation of costs.

Comment Number 0098.01 *Pollet, Gerald*

Comment The Department of Energy's presentation tonight and at prior meetings and in these materials show ... say ... claim that this unproven technology of so-called in situ vitrification, sticking electrodes into the ground and melting the ground into glass. The presentation said that this would comply with Washington State law. Nothing could be further from the truth. Washington State first off has in the model toxic control act and our dangerous waste regulations a presumption that we will favor removal. That is the law. Leaving it in place when you have an alternative of removal and retrieval is never allowable under Washington State law. We have a set of priorities for dealing with waste. Hanford does not get to make an exception for itself although it sure does try most of the time.

Response The disposal of HLW by ISV would comply with Washington State law if the hazardous waste components are adequately treated to remove the hazardous characteristics or immobilize the hazardous components. The treatment and disposal would be subject to review and permitting by Ecology. Washington State law does not apply to disposal of the radioactive components of the HLW. For a discussion of regulations applicable to the HLW, see Volume One, Section 6.1. For related discussion regarding technical uncertainty, please refer to the response to Comment number 0012.04. Because the information contained in the Draft EIS is correct, no change to the text was made.

L.3.4.2.3 Assumptions

Comment Number 0005.39 *Swanson, John L.*

Comment The paragraph beginning at the bottom of page 3-31 is interesting. It starts out by saying that the residual contaminants would be insoluble, and then goes on to make the conservative assumption that 1 percent of the water-soluble contaminants would also be present. This conservative assumption drives conclusions, as discussed in (18) above [Comment number 0005.18].

Response DOE and Ecology recognize the concern expressed in the comment regarding conservative assumptions used in the impact analysis and the extent to which these assumptions affect the calculated risk values. The analysis performed for the Draft EIS assumed, for the ex situ alternatives, that

1 percent of the original inventory would remain in the tanks as residual waste that could not be retrieved. This assumption is bounding (e.g., provides a reasonable upper limit) with respect to the impact analysis, because it includes 1 percent of the water soluble contaminants. The Final EIS has been revised to include Volume Five, Appendix K, which will provide a nominal case analysis using best estimate assumptions. The nominal case analysis was based on 1 percent residual volume that was modified to reduce the inventory of soluble constituents. Using this assumption will result in a risk range and will enable the reader to see the variation in the long-term risk as a function of nominal and bounding assumptions. Please refer to the response to Comment numbers 0072.59, 0072.51, and 0072.05.

Comment Number 0005.40 *Swanson, John L.*

Comment On page 3-34 it is said that the assumption of cullet in a matrix material as the waste form for onsite LAW disposal "--provides a conservative analysis of the long-term impacts--." This statement is true only if conservative assumptions were made regarding the performance of the matrix materials. Were those assumptions conservative? Are they spelled out somewhere? (Page 3-66 contains a statement in opposition to the one on page 3-34; "The potential benefits of a matrix material and glass cullet combination as a disposal form are reduced contaminant release rates and--." Thus, the assumption of cullet in a matrix material does NOT provide a conservative analysis of the long term impacts, as is stated on 3-34).

Response In order to bound the impacts associated with the LAW disposal vaults, the releases from the LAW vaults were calculated under the assumption that the matrix material provided no reduction in the release rates from the LAW disposal vaults. DOE and Ecology believe that using a matrix material with glass cullet would reduce the release rates from the LAW disposal system. The two statements do not conflict with each other. Cullet, as opposed to monolithic pours, would be more easily leached; therefore, cullet is considered the more bounding (higher) approach in the environmental impacts analysis. Assumptions associated with release rates and associated impacts to groundwater are discussed in Volume Four, Appendix F.

Comment Number 0005.42 *Swanson, John L.*

Comment The last sentence on page 3-35 says that it has been determined that a bleed stream would be required to avoid a continuous buildup of Tc-99 in the vitrification off-gas stream. I do not believe that is necessarily true, and wonder who made that determination (and on what basis). The data I have seen indicate that some melters can retain a significant fraction of the Tc in the glass; thus, Tc in the off-gas from such melters would stop building up when that in the feed plus recycle equals that in the glass.

Response DOE and Ecology acknowledge the concern regarding the constituents that would require the use of a bleed stream for the off-gas recycle system. The EIS discussion includes technetium-99 and mercury as representative examples of the type of volatile constituents that could build up in the

off-gas recycle streams. The LAW vitrification processes addressed in the EIS are based on a combustion fired melter. This melter type raised the concern regarding retention of volatiles and semivolatiles in the glass during technical review of the Preliminary Draft EIS. The requirements for a bleed stream were noted and included in the EIS.

As indicated in the comment, a bleed stream may not be necessary to avoid a continuous buildup of technetium-99 in the off-gas recycle stream, but based on available information, it appears probable that a bleed stream would be required. The functional requirements and sizing of the off-gas recycle system would be developed during the detailed design phase following selection of an alternative.

Comment Number 0012.20 *ODOE*

Comment Vitrification of the wastes greatly reduces the risk to the public and the environment. Even the least capable glass waste forms represent a dramatic improvement over the current conditions. Wise selection of pretreatment and segregation options and glass specifications may greatly reduce the long-term costs and risks to the public. These should not however delay decisions to proceed with cleanup and vitrification of Hanford's tank wastes.

There is no assurance that any of the vitrified waste will leave Hanford. As a consequence, it is essential that the vitrified waste contain all of the radioactive wastes for so long as they remain hazardous.

The vitrification alternatives do not specify the physical or chemical properties or requirements for the glass products. There is no specification for how durable the glass waste form must be, or for how long the glass must contain the radioactive wastes. Specifications must require the product glass be durable enough to contain the radioactive components for as long as they remain hazardous. This requirement is relatively easy to meet for short half-life isotopes such as strontium-90 and cesium-137. It is more difficult for long half-life isotopes which easily migrate in water, such as cesium-135, iodine-129, technetium-99, and neptunium-237. These isotopes are volatile and are difficult to incorporate into glass. Additionally, the long lived actinides also must be retained until they are no longer hazardous.

The common glasses used for the immobilization of high-level nuclear waste are not durable enough to contain these materials for the times needed. The borate content of these glasses is often controlled at high levels to reduce the melt temperature of the glass and to lower its viscosity. As the borate content is increased, the durability of the glass decreases. Glasses are attacked by organic acids such as humic and fulvic acids from the decay of vegetation which are often found in surface waters. Because the repository is expected to be deep underground, the water which may reach the repository is unlikely to contain large amounts of organic acids. Accordingly, the performance and durability studies of waste glasses for disposal to a national high-level nuclear waste repository have not analyzed the impact of organic acid corrosion on glass wastes, however this is particularly important if the glass waste remains at Hanford and may be subject to corrosion by surface waters.

If the durability of the glass cannot be assured and other barriers provide inadequate protection for the glassified wastes which may remain at Hanford, the radioactive isotopes with half-lives over one thousand years should be removed from the water soluble fraction of the wastes. These should be incorporated into better waste forms, or blended and glassified with the waste which will be sent to the national high-level nuclear waste repository. These isotopes include cesium-135, iodine-129, technetium-99, neptunium-237, and all long half-life actinides.

The durability requirements for glassified wastes to be sent to the proposed national high-level nuclear waste repository are not sufficient to assure protection of human health and the environment at Hanford. The physical conditions onsite are vastly different, and the geologic isolation provided by a deep repository is not available. The EIS must consider changing climate conditions. Hanford cannot be assumed to remain an arid area for as long as these wastes remain hazardous.

As the geologic barrier is not present at Hanford, and the glass wastes may exhibit more rapid corrosion from surface water, additional barriers to contain the waste should be included. The containers for the glass should be of sufficient chemical resistance and durability to protect the glass from the environment for as long as the wastes remain hazardous. The containers should be resistant to corrosive attack and embrittlement from exposure to the glassified wastes. Welding or other sealing of the containers should be done in such a manner as to avoid creating brittle areas in the container. Embrittled containers are likely to fail far more quickly.

Type 309 and 304L stainless steels have been proposed for use at Savannah River and West Valley, New York for containing glassified waste. High-carbon 309 stainless steel is easily embrittled by chloride ions. It should not be used. Low-carbon 304L stainless steel has insufficient molybdenum content to allow long term corrosion protection from the waste. If corrosion resistant stainless steel is used, it should contain at least three weight percent molybdenum to minimize corrosion from chloride and fluoride. It should also be very low carbon steel. Other high resistance alloys should be considered.

Response The alternatives presented in the Draft EIS provide a range of treatment, including disposal of HLW onsite as part of the in situ and combination alternatives. To be consistent with current national policy, all ex situ alternatives that include retrieval and treatment of the tank wastes are based on the assumption that the HLW would be disposed of in a geologic repository. The EIS does analyze permanent near-surface disposal of LAW under the ex situ and combination alternatives and disposal of HLW in place under various in situ and combination alternatives. To address public concerns with the availability of the geologic repository, all ex situ alternatives have been revised in Volume One, Section 3.4 to include interim onsite storage of the immobilized HLW for 50 years.

The ex situ alternatives that produce borosilicate HLW glass comply with the DOE OCRWM Waste Acceptance Systems Requirements document, which requires that the waste form meet performance criteria. The alternatives that do not produce a borosilicate HLW glass are identified as non-

conforming to the geologic repository and are potentially not as acceptable and require resolution to make them acceptable which would make them subject to delayed acceptance.

Alloy specification for the HLW canisters would be accomplished during final design of the waste package. Embrittlement, corrosion, and material incompatibility are issues that will be evaluated during canister design and material selection. However, please note that the HLW canister presently has no long-term disposal function. This function is allocated primarily to the waste package disposal container.

DOE and Ecology acknowledge that technical issues requiring evaluation remain before the long-term impacts associated with permanent near-surface disposal of canistered HLW can be assessed. Please refer to the response to Comment numbers 0008.01 and 0008.02.

Comment Number 0019.04 *WDFW*

Comment The author states that "for the analysis performed in this EIS, a Hanford barrier was used to bound impacts." At this point in time, a cursory effort to bound impacts (resources) of a Hanford barrier should only require volume of soil needed and/or potential acreage impacted. A supplemental EIS can discuss borrow sites and alternatives.

Response DOE and Ecology acknowledge the concern expressed in the comment. However, the Hanford Barrier is the most extensive system for a surface barrier proposed for use on the Hanford Site. The assumption to apply this multi-layered barrier technology serves as the basis for comparison of the impact of changes within an alternatives, as well as between alternatives. The selection of borrow sites is an issue that would be addressed for tank farm closure which will be the subject of a future NEPA analysis. Please refer to the response to Comment number 0019.03. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0027.11 *Roecker, John H.*

Comment Waste Oxide Loading
The use of a 20 percent waste oxide loading is overly conservative and biases the alternatives analysis. A waste oxide loading of 25 percent has normally been used for design and analysis purposes. Studies are also underway for loadings in the 30-35 percent range.

Response The TWRS EIS uses bounding assumptions for HLW oxide loadings for all ex situ alternatives to provide a comparable and bounding analysis in the absence of definitive information. DOE and Ecology are aware that higher HLW oxide loadings have been used for process design and acknowledge, in Volume One, Section 3.4 of the EIS, that current development work may result in higher waste loading factors. Given the uncertainty associated with the characterization data and assumptions made for separations efficiencies, DOE and Ecology believe that a 20 weight percent waste oxide loading is a reasonable assumption for the purpose of calculating impacts. Waste loading

is also discussed in the response to Comment numbers 0035.04 and 0027.11. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0040.02 *Rogers, Gordon J.*

Comment The 100-year limit for retaining administrative control is ridiculous, and is not applied to any other human activity.

Response Federal regulations (40 CFR 191) state that to provide the confidence needed for long-term compliance with the requirements for the disposal of HLW, active institutional controls over disposal sites should be maintained for as long as is practical. However, institutional controls are limited to 100 years when considering the isolation of the wastes from the accessible environment. As is stated in Volume One, Sections 3.4.2 and 3.4.3, the 100-year period is an assumption that has been applied to all alternatives analyzed in EIS to provide an equitable basis for comparison of impacts among alternatives. As required by the regulations, the administrative controls would be maintained by DOE and Ecology as agencies of the Federal and state governments. For related discussions, please refer to the response to Comment numbers 0101.01 and 0040.03. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0052.01 *Pollet, Gerald*

Comment Going to start tonight by asking that a little more attention be paid in the materials and the Final EIS through the advice of the Tank Waste Remediation System Task Force. The Task Force urged the three agencies from our putting together this EIS to explicitly not utilize a hypothetical repository in assessing costs and it is nice to go right after someone else whose commented on the same issue.

The TWRS Task Force said we have to assume canisters stay at Hanford. That is not only a reasonable alternative, unfortunately it is the realistic alternative, and it is not appropriately considered in the EIS. So what we need to see is - what are the long-terms costs and impacts from having canister storage here at Hanford.

Response The Tank Waste Task Force report recommended that DOE "accept the fact that interim storage, at least, of the waste in an environmental safe form will occur for some time at Hanford." The report also directed DOE to "assume temporary storage will occur at Hanford but did not assume that all radionuclides should be here forever" (HWTF 1993). The EIS, for all ex situ alternatives, assumes interim storage at the Hanford Site in an environmentally safe manner for up to 50 years and ultimate disposal of HLW offsite at the potential repository. If HLW storage extended beyond 50 years, appropriate NEPA review would be required. Please also refer to the response to Comment numbers 0035.04, 0081.02, 0038.10, 0008.02, and 0004.01 for related information.

Comment Number 0062.03 *Longmeyer, Richard*

Comment We've talked a little bit about the new tanks that are being filled with wastes from current tanks that are leaking. That also raises a safety concern in that, as was stated, this sludge that remains behind in the single-shell tanks that did leak, actually becomes more dangerous than when there was water in the tank. Dangerous in terms of the material itself, and danger of actual exposure to the outside from explosions, and so forth. So that is a concern.

Response A description of the saltwell pumping program, which is a required action under the Tri-Party Agreement, is provided in Volume One, Section 3.4 and Volume Two, Appendix B. An analysis of safety issues is performed prior to removing liquids to ensure that removal can be performed safely. The SSTs in question that have been pumped have been included in the accident and consequence analysis presented in Volume One, Section 5.12 and Volume Four, Appendix E. The unit liter doses from these tanks were compared with the unit liter doses from the rest of the SSTs and all of the DSTs. The bounding unit liter doses were used to calculate the consequences to bound the analysis.

Comment Number 0064.01 *Roecker, John H.*

Comment The second point I'd like to bring out is what I call data manipulation. There are examples throughout the EIS where data has been, what I call, manipulated to present a specific case, or to present certain agendas. I can give you some examples, in fact I will give you written comments on the ones that I have found. But as an example, where you talk about the high-end and the low-end of the number of canisters for the two different processes. The low-end you reference a Westinghouse document, and for the high-end you reference a DOE document. Being a little suspicious, and having a little experience with what was going on, I went back to look at those specific documents.
The Westinghouse document is an engineering document, which has some pretty good estimates in it. The DOE document is a review of a systems requirements document of DOE that had a high number in it to make some very specific points. To use those numbers in the EIS, I think, is misleading. Because they do not accurately represent the engineering and technical data that is available.

Response The EIS presents an unbiased assessment of the potential impacts associated with each alternative. Please refer to the response to Comment number 0027.02 for a discussion of this same issue and Comment numbers 0081.02, 0008.01, 0069.04, 0035.04, and 0038.10 for a discussion of cost estimates.

Comment Number 0072.85 *CTUIR*

Comment P3-31: PP1: It should be assumed that there will be leaks and more leaks from the SST's and DST's during the administrative control.

Response DOE and Ecology realize that it is difficult to accurately predict the number or severity of tank leaks that will occur in the future. There are factors that will increase the number of leaking tanks, primary of which is the age of the tanks. As the tanks get older, the probability of a leak increases. There also are factors that will decrease the number of leaking tanks. The primary factor in decreasing leaks is the interim stabilization of the tanks by removal of the free liquid from the pore space and other voids in the tank solids; sealing the entrances to the tanks to prevent fresh liquid from accidentally entering the tanks; and placing covers over the tanks to inhibit the infiltration of precipitation. Once these measures are in place, leaks from the tanks would be very small. Because there was no inherently accurate method of determining future leaks, the assumption was made that at some predetermined time in the future (after the loss of administrative control), all the tanks of a given type would leak. This assumption allows an equitable comparison of the long-term environmental impacts of the various proposed alternatives. Please refer to the response to Comment numbers 0005.37, 0029.01, and 0072.70 for related information.

Comment Number 0072.86 *CTUIR*

Comment P 3-31: PP: Is the required depth to ground water, in the case of leaking tanks, at the minimum to the bottom of the leakage? Or is the required depth from the bottom of the tank? Please explain this with a description of the reasoning involved.

Response Releases for the tanks, whether from in situ or ex situ alternatives, are assumed to be from the bottom of the tank. This is a bounding assumption that results in the highest predicted contaminant concentration in groundwater.

Comment Number 0072.88 *CTUIR*

Comment P 3-31: PP 6: The efficiency goal should state no more than 1 percent of the solid-dry tank inventory would remain as a residual and no more than .1 percent liquid tank inventory remain as a residual following waste retrieval activities.

Response The Tri-Party Agreement (Ecology et al. 1994) includes a milestone that directly impacts the TWRS program. Milestone M-45-00 requires tank residues not exceeding 10.2 m^3 (360 ft^3) in each 100 series tank, and tank residues not exceeding 0.85 m^3 (30 ft^3) in each 200 series tank. This milestone provides the basis for the TWRS EIS assumption of 99 percent removal for ex situ alternatives. An overview of retrieval and transfer from the tanks is provided in Volume Two, Section B.3.5.3. Further evaluation of the residual inventory would be performed in a future NEPA analysis on closure of the tank farms. Please refer to the response to Comment number 0089.03, 0089.07, and 0005.18 for related residual waste information. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0072.89 *CTUIR*

Comment P 3-34: PP 7: Assuming that a LAW activity waste cullet provides the basis of conservatism is wrong. The technical staff of the SSRP suggests that all LAW waste be vitrified into glass and poured into canisters for the lowest risk levels.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste.

The referenced language in Volume One, Section 3.4 is a discussion of waste composition for the various alternatives. A disadvantage of cullet is its high surface to volume ratio, which results in lower long-term performance. Therefore, the calculations of leach rates are higher (more bounding from an impact assessment standpoint) for cullet than for other glass forms. In the area of long-term environmental impacts, this lower long-term performance manifests itself as greater amounts of contaminants leaching from the cullet. Changing to another waste form that would have potentially better long-term performance may be achieved during the final design of the alternative selected. Because the information contained in the Draft EIS is correct, no change to the text was made. Please refer to the response to Comment number 0005.40.

Comment Number 0072.90 *CTUIR*

Comment P3-3: PP 8: The public has stated numerous times that grout for use as a way of stabilizing tank waste in any form is unacceptable.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Grouting liquid waste streams is included in Volume Two, Appendix B as a reasonable immobilization technology in the EIS; however, it is not a technology included in the preferred alternative. For a discussion of NEPA requirements to analyze reasonable technologies, please refer to the response to Comment number 0072.05. Grout is discussed in the response to Comment numbers 0005.18, 0009.03, and 0072.179.

Comment Number 0072.178 *CTUIR*

Comment P B-37: Sect.B.3.0.6: Please explain how soda lime glass can be upgraded to the standards of the only standard HLW form, borosilicate glass in terms of leachability, thermal-breakdown, expansion, and ability to capture and isolate radionuclides.

Response Soda-lime glass would have different characteristics than borosilicate glass in terms of leachability, thermal expansion, and physical processing parameters. As stated in Volume Two,

Section B.3, borosilicate glass currently is identified as the only standard HLW form to be accepted at the potential geologic repository. Other types of glass could be selected for the vitrification of HLW or LAW; however, they would have to meet the NRC waste form requirements and support the repositories ability to meet long-term performance requirements.

Under the Ex Situ No Separations alternative, all of the sodium present in the tank waste would be included in the vitrified waste stream. Because of this, the glass more closely approximates a soda-lime glass. The repository Waste Acceptance Systems Requirements Document currently includes only borosilicate glass as an acceptable glass composition; however, it identifies that other waste forms may be addressed in the future. The acceptability of alternative glass compositions would be based on waste form performance testing. Please refer to response to Comment numbers 0012.20, 0012.11, and 0035.04 for a related discussion.

Comment Number 0072.179 *CTUIR*

Comment P B-38: The use of grout is unacceptable and has been thoroughly denounced by the public. The grouting of LAW which will contain discrete particles of hi-activity radionuclides is unacceptable.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0072.90, which addresses the consideration of grout as a waste form in the EIS.

Comment Number 0072.194 *CTUIR*

Comment P B-157: Sect. B.5.0: The information on how closure activities would affect remediating the tank waste should include carrying all of the listed closure options through the alternatives process in order to adequately present the information. Simply choosing a single representative approach to tank closure (closure as a landfill) is insufficient and in the light of the importance of this retrieval EIS. The closure options presented must indicate whether they do or do not preclude one or more of the alternatives. Additionally the closure options must necessarily conform to the law ALARA conditions for the purposes of reducing risks to future generations. This information is simply not here and raises doubt that the representative approach is truly representative.

Response Please refer to the response to Comment number 0072.08 for a discussion of the reasons closure alternatives cannot be assessed at this time and 0072.50 for information on alternatives that would preclude closure options. Closure of the tank farms will be addressed in a future NEPA analysis when sufficient information is available on past practice releases, releases during retrieval, and tank residuals. Please refer to the response to Comment number 0101.06 for a discussion of issues related to analysis that would be required to support closure alternatives analysis. Because the analysis requested in the comment is not within the scope of the EIS, no modification to the document is warranted.

Comment Number 0072.195 *CTUIR*

Comment P B-158: Sect. B.6.0: The inclusion of the Hanford Barrier and the exclusion of all other closure activities may preclude adequate justification of the alternative section due to the fact that providing one option is not providing a choice of options. Please insert the other closure activities options or remove section B.5.0 tank closure because it is not within the scope of this EIS.

Response Closure is not included in the scope of this EIS because there is insufficient information concerning the amount of contamination to be remediated. However, Volume One, Section 3.3 and Volume Two, Section B.5 address how tank waste remediation and closure are interrelated because some of the decisions made regarding how to treat and dispose of tank waste may impact future decisions on closure. To provide information on how closure activities would be affected by remediating the tank waste, a representative approach to tank closure (closure as a landfill) has been included in each of the TWRS alternatives to allow an equitable comparison of the alternatives. The Hanford Barrier described in Volume Two, Section B.6 is included as a representative approach to tank closure. Please refer to the response to Comment numbers 0101.06, 0019.03, 0019.04, 0052.01, 0072.50, and 0101.05 for related discussions. Because the analysis requested in the comment is not within the scope of the EIS, no modification to the document is warranted.

Comment Number 0081.04 *Pollet, Gerald*

Comment The Tank Waste Task Force, convened by the Department of Energy, U.S. EPA, and Washington Department of Ecology, urged that the Department of Energy abandon making decision making on the basis of high-level nuclear waste canisters, and their theoretical costs for being placed into a repository. Our advice was, now I need to turn to the appropriate page, on page 11 of the Task Force Report under Values, under Waste Form and Storage. Let the ultimate best form for the waste drive decisions, not the size or timing of the national repository. This EIS has failed to consider that advice.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment numbers 0081.02, 0008.02, 0035.04, 0038.10, and 0052.01 for a discussion regarding task force advice.

Comment Number 0089.03 *Nez Perce Tribe ERWM*

Comment Listed below are our general statements regarding the EIS.

Some necessary topics are not properly considered in the EIS. An example is the proposal to leave 1 percent of the waste in the tanks. We believe that with the technology currently proposed, if 99 percent of the waste can be removed, then it is also possible to remove much of the remaining 1 percent of the tanks wastes. This question will definitely be pursued by ERWM during soil and

groundwater remediation, which are not part of the EIS. For proper soil remediation, beneath the tanks following closure or tank removal, it is imperative that no waste be left in the tanks.

Response The amount of residual waste that ultimately remains after retrieval will depend on the effectiveness of the retrieval technology. For the purposes of NEPA analysis, the assumption that 1 percent of the waste would remain in the tanks was assumed in the EIS analysis. For a discussion of this issue, please see the response to Comment numbers 0005.18 and 0089.07. Further experience with waste retrieval will be required before the issue of the extent of retrieval can be fully resolved. Please refer to the response to Comment numbers 0101.06, 0072.08, and 0072.88 for related information concerning tank waste residuals, soil and groundwater contamination, and closure.

L.3.4.2.4 Miscellaneous Issues

Comment Number 0005.41 *Swanson, John L.*

Comment The word "grouting" at the start of the last paragraph on page 3-34 appears to be out of place, and appears to belong instead at the start of the first paragraph on the next page.

Response "Grouting" does belong with the paragraph at top of page 3-35 of the Draft EIS. The two sentences following the word "grouting" are out of place. The text of the Final EIS has been corrected.

Comment Number 0005.43 *Swanson, John L.*

Comment On page 3-36 is discussed the use of sodium from the FFTF to make sodium hydroxide for use during enhanced sludge washing. Is this really worthy of mention? Was the cost of conversion of sodium to sodium hydroxide (which has some safety problems) included in the cost estimates?

Response Fast-Flux Test Facility (FFTF) sodium disposal is worthy of mention because of the potential amount of material that may require disposal considerations in the near future. A cost analysis of the conversion facility and the process safety issues were not performed and would need to be addressed before a decision was made to use FFTF sodium as a source of material for separations chemicals. The use of sodium from FFTF was included in the EIS as an example of Sitewide waste minimization activities that could be considered.

Comment Number 0008.04 *Evett, Donald E.*

Comment On the subject of groundwater, I believe the method of retrieval using the articulated arm to reach into the tanks and recover waste would be an excellent method and it would reduce the amount of leakage, which is of paramount importance.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. As indicated in Volume One, Section 3.4, the articulated arm retrieval method would

be used in situations where conventional technology is not effective or inefficient for the particular tank waste type or form. Using the articulated arm technique and others is also key to removing as much of the tank waste as possible to minimize or eliminate any materials that could be released to the environment. DOE and Ecology will analyze the data collected during the demonstration phase to select the most effective removal method for the tank and tank waste type.

Comment Number 0068.03 *Martin, Todd*

Comment The last point I want to make is that a clear lesson that we've learned from Hanford and from the nuclear weapons complex is that postponements and delays lead to greatly increased obligations in the future. We've learned that in spades, at least I hope we've learned that. And I'm not sure that the Federal government has learned that. The American people are certain of that. That means we need to get on with it now, otherwise it's going to cost that much more in the future.

Response DOE and Ecology share the desire to proceed with remediation at the earliest possible date. Delays can be costly. DOE intends to allow sufficient time to design adequate actions that are supported by factual information, that incur a reasonably acceptable level of technical risk (i.e., high probability that the action will work and accomplish the desired result), and that are implemented in a managed and cost-effective way. Please refer to the response to Comment numbers 0009.19, 0060.02, 0098.02 and 0078.07.

Comment Number 0072.82 *CTUIR*

Comment P 3-27: Sect. 3.4.1.1: First bullet: What exactly is "managing operations" and are these the operations included in the 1997 RDS for fail-safe management?

Response Managing operations, as listed in the first bullet in Volume One, Section 3.4, includes the activities listed in the bullets that follow as well as tank farms and associated facilities management (as a program), and the relationship of the TWRS program to the Hanford Site Operations system. Consequently, the management issues relevant to each activity (e.g., personnel, safety, quality, and milestone status) are relevant on a programmatic level across Tank Farm Operations. Tank farms management is one operation described in the 1997 Risk Data Sheet (RDS) for fail-safe management. The 1997 RDS was prepared for the Hanford Site as a single operation.

Comment Number 0072.83 *CTUIR*

Comment P 3-28: PP 4: how much exactly will these controls increase the cost of maintenance and monitoring activities.

Response The operating cost and schedule impacts associated with placing all 177 tanks under flammable gas controls (if this were to occur) is not fully known at this time. One of the factors that

will influence the cost and schedule impacts would be resolution of the flammable gas safety issue for the tanks.

Comment Number 0072.87 *CTUIR*

Comment P 3-31: PP 4: How can you fill a tank full of liquid with rocks and not have liquid overflow?

Response As discussed in the description of the alternatives in Volume One, Section 3.4 and Volume Two, Appendix B, for the In Situ Fill and Cap alternative, as much water as possible would be removed from the liquid waste streams through evaporation at the 242-A Evaporator. The amount of water that can be removed from a liquid waste stream at the evaporator is limited by the saturation concentration of the evaporated waste stream. Following transfer of the evaporated liquids back to the tank, salt-cake formation would begin in the DSTs similar to what has already happened with the DSTs. This would allow for additional evaporation of the liquids. If the In Situ Fill and Cap alternative were selected for implementation, further analysis may indicate a need for additional evaporation using in-tank technologies for selected tanks.

Comment Number 0072.91 *CTUIR*

Comment P 3-36: PP 1: Exactly what is "some low temperature process"? How much will this process cost? Is this process figured in the privatization process, and what are the risks associated with this? How much extra waste is going to be generated with this process? What will this waste be classified as?

Response Calculations performed for the Ex Situ Intermediate Separations alternative off-gas recycle bleed stream resulted in an estimate of 3,500 m^3 (930,000 gallons) of liquid waste. This waste stream would be dilute and the volume could be reduced by evaporation. The stabilization of this waste stream would require a low-temperature stabilization and treatment technology such as encapsulation, hydraulic cements, or organic polymers to immobilize the waste and limit further volatilization. The development and selection of this process would occur during the detailed design phase. An individual cost estimate for this process was not included in the alternative cost estimates developed for the EIS. The cost would be minor compared to the total alternative cost and would be well within the estimated cost range.

Each of the alternatives that involve high temperature waste treatment technologies, such as vitrification, would have to deal with the volatile chemical and radionuclide emissions in the off-gas system. The risks during remediation are included in the analysis performed for each of the alternatives in Volume One, Section 5.11 for health impacts during remediation. The post-remediation risks that would result from disposal of the stabilized off-gas recycle bleed stream is assessed in the Performance Assessment for the Disposal of Low-Level Waste in the 200 West Area Burial Grounds.

An estimate for the total volume of immobilized waste that would be generated has not been made for the alternatives. A volume estimate would be made during the detail design phase when the characteristics of the bleed stream were developed and the immobilization technologies were evaluated.

Following stabilization, this waste stream would be classified as LAW. The classification and handling of this waste stream would be consistent with established Hanford Site solid waste disposal practices.

Comment Number 0072.180 *CTUIR*

Comment P B-39: S 2: Please explain how the amount of tertiary waste generated would be primarily a function of the number of operating personnel.

Response The primary component of tertiary waste is personal protective equipment. Therefore, because the number of operating personnel required to wear personal protective equipment when the potential exists for contact with hazardous or radioactive substances is higher for the alternatives that include the more complex remediation activities, the amount of tertiary waste generated also would be higher.

Comment Number 0089.05 *Nez Perce Tribe ERWM*

Comment Offsite disposal of LAW should be considered in the EIS.

Response DOE and Ecology acknowledge the recommendation expressed in the comment. Offsite disposal of all waste at the potential geologic repository is addressed in the EIS under the Ex Situ No Separations alternative. Offsite disposal of the LAW was not considered to be a reasonable alternative because of the cost and human health impacts of transporting the waste and because there would be no compensating benefits to offsite disposal. Please refer to the response to Comment number 0005.03 for a discussion of the assumptions used in the alternative analyses.

Comment Number 0089.11 *Nez Perce Tribe ERWM*

Comment Page B-72, Paragraph 1
We have some questions about the plan for the cross-site transfer line. Apparently this line will be sloped to at least 0.25 percent grade to preclude accumulation of solids. ERWM questions the thought behind those plans, the elevations at 200 West and 200 East are nearly the same but 5 miles apart. How will the line be constructed and this slope engineered?

Response Specifications for the cross-site transfer line are not included in the scope of this EIS; however, the SIS Final EIS addresses the cross-site transfer line in detail (DOE 1995i). The SIS EIS was referenced during preparation of the TWRS EIS. According to the SIS EIS, the line would slope up from the 200 West Area to a midpoint, and then down to the 200 East Area to ensure that the line will drain.

L.3.4.3 No Action Alternative (Tank Waste)

Comment Number 0072.94 *CTUIR*

Comment P 3-40: Sect 3.4.2: No Action Alternative: Technical staff of the CTUIR do not agree that this alternative is a responsible action, given that the contents have half lives that number in the thousands.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

NEPA requires that all reasonable alternatives be evaluated, regardless of cost, compliance to existing regulations, potential risk, or any other factor used in the analysis of alternatives. Furthermore, the CEQ requires that the TWRS Draft EIS identify and analyze a range of reasonable alternatives for the proposed action, as well as for the No Action alternative. All data that support the cost and impact analysis of each alternative are presented in an objective and unbiased format for comparison by the decision makers and the public during the comment period. Please refer to the response to Comment numbers 0072.80 and 0072.10 for more information concerning the No Action alternative and NEPA requirements for reasonable alternative analysis.

Comment Number 0072.181 *CTUIR*

Comment P B-41: Sect. B.3.1: A one hundred year administrative control period does little to protect human health and environmental impacts from long lived (> 10,000 year 1/2 life radionuclides).

Response Although DOE has no plans to abandon the Site after 100 years, it is not reasonable to assume that administrative controls will extend to 10,000 years. In order to show potential impacts that could occur if administrative controls were lost, a 100-year administrative control period was assumed. This assumption is consistent with standard impact assessment methods for hazardous and radioactive waste sites. Please refer to the response to Comment numbers 0072.80, 0040.02, and 0101.01 for discussions related to DOE assumptions associated with the 100-year administrative control period and the analysis of long-term impacts resulting from the loss of institutional controls.

Comment Number 0072.182 *CTUIR*

Comment P B-43: Sect. B.3.1.4: Please insert the statement 'some tanks may not last fifty years'.

Response Volume Two, Appendix B addresses actions that would be taken in the event that a tank leaks within the estimated design life of 50 years, as well as the integrity testing to be conducted within any applicable 50-year design life. "Continued management would include maintaining spare DST space to accommodate leak recovery in the event of a DST leak. Tank conditions would be continually

monitored, and those tanks determined to be leaking would require recovery of the leakage from the tank annulus." Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

L.3.4.4 Long-Term Management Alternative

Comment Number 0038.01 *Reeves, Merilyn*

Comment I would like to point out that one of the things that the Hanford Advisory Board did was to commission a special report, a report to look at whether or not we should build six new massive tanks, double-shelled to hold waste because we were not looking at any other end point.

A report was prepared by Dr. Glen Paulsen, Dr Frank Parker, and Dr. Michael Cavanaugh, noted experts in the field.

And from this report it became clear that they recommended that no new monies be spent for the construction of new tanks to store the tank waste at Hanford.

The Board adopted this. This is a savings of approximately 300 to 400 million depending on which report you look at.

I think that this also puts in place the Long-Term Management alternative in the EIS that would have required replacement of all the double-shelled tanks in the year 2035, and again in the year 2085.

And so I believe that our consensus advice, which was listed as consensus advice number 22 in which we endorsed the recommendations of this report should put to rest whether or not we should embark on any scheme to just continue to build double-shell tank for storage of these wastes.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste.

NEPA requires DOE and Ecology to examine a full range of alternatives in the EIS. The range of alternatives must include a No Action alternative and then may include other reasonable alternatives to allow an analysis of a full range of alternatives. Within the range of considered alternatives is the Long-Term Management alternative, which contains the provision for building two sets of DSTs at 50 and 100 years in the future. Including this alternative in the EIS serves a useful purpose, because while it does not contain provisions for immobilizing the tank waste, it does contain provisions for maintaining the SSTs in a relatively dry condition and for retanking the wetter DST wastes on a periodic basis. Please refer to the response to Comment number 0072.05 for a discussion of how the alternatives were developed to comply with NEPA requirements to analyze a range of reasonable alternatives.

Comment Number 0072.95 *CTUIR*

Comment P 3-43: PP: The argument for long term management seems poor given that a large amount of SST waste has already leaked to the ground, and that the transfer of tank waste simply for maintenance reasons has inherent risks that are unacceptable.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste.

NEPA requires that all reasonable alternatives be evaluated, regardless of cost, compliance to existing regulations, potential risk, or any other factor used in the alternatives evaluation process, which would include the Long-Term Management alternative evaluated in the EIS. Please refer to the response to Comment numbers 0072.05 and 0038.01 for related discussions. All data that support the cost and impact analysis of each alternative are presented in an objective and unbiased format for comparison by the decision makers and by the public during the comment period. DOE and Ecology are aware that the vadose zone has been contaminated beneath the tanks. Existing contamination is presented in Volume One, Section 4.2, and cumulative impacts of existing contamination, TWRS alternatives and other Hanford Site actions are presented in Volume One, Section 5.13. The potential risks associated with moving waste from one tank to another one are analyzed in the EIS in Volume One, Section 5.11 and Volume Three, Appendix D for routine operations during remediation and Volume One, Section 5.12 and Volume Four, Appendix E for accident risks.

Comment Number 0072.96 *CTUIR*

Comment P 3-45: Sect. 3.4.3.5: Post Remediation: this section needs to have an account of the remediation of the extra ground used.

Response This comment refers to the post remediation section for the Long-Term Management alternative. The extra ground would be the surface area overlaying the 26 new DSTs that would be constructed as part of this alternative. As explained in Volume One, Section 3.4.3.1, this alternative is similar to the No Action alternative in that administrative controls over the Hanford Site are assumed to be maintained for 100 years. No remediation activities would be performed. The consequence is stated in Section 3.4.3.5 that there would be no post-remediation activities associated with the Long-Term Management alternative. Because there is no remediation of the extra ground, no account of this activity has been provided in the EIS.

Comment Number 0072.183 *CTUIR*

Comment P B-44: Is there a sludge well pumping operation ongoing?

Response DOE and Ecology believe that the comment is referring to saltwell pumping. Saltwell pumping of the SSTs to remove interstitial liquids is an ongoing operation that is scheduled to be completed in the year 2000. Saltwell pumping is an activity that would be a part of continued operations under all alternatives as indicated throughout Volume One, Section 3.4.

L.3.4.5 In Situ Fill and Cap Alternative

Comment Number 0072.184 *CTUIR*

Comment P B-48: Sect. B.3.3: This alternative is unacceptable as are all in situ alternatives. Language clearly defining that in situ alternatives are against the law must be inserted here.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The Summary, Section S.7, discusses regulatory compliance for each alternative and indicates which alternatives would fail to comply with applicable laws and regulations. Regulatory compliance also is addressed in Volume One, Sections 3.4 and 6.2 and Volume Two, Appendix B. In each of the sections cited, it is clearly stated that this alternative would not comply with certain laws and regulations. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

L.3.4.6 In Situ Vitrification Alternative

Comment Number 0014.01 *Bullington, Darryl C.*

Comment It is impossible to take seriously any document that includes a proposal to spend 16 to 23.8 billion dollars and use one-quarter of the available electricity of the Washington Public Power Supply System to vitrify 73 million curies of hazardous radioactive solids and surrounding soils contaminated with thousands of gallons of cesium-137 containing liquid (a volume of over 20,180 cubic yards per tank) to a depth of sixty feet by inserting electrodes and heating to 2,600° to 2,900° F. Before I would even waste the paper to evaluate such a scheme I would have to see some demonstration using noncontaminated materials at a place and in a way that would not be a hazard to the public and people involved. To design any system that could contain all of the gases that would be suddenly released from such an event or a heat shield needed to protect the operating deck above the tanks, and enclosed, should melting such a mass even be possible, is beyond all imagination. To perform such a full-scale demonstration for $70 million is also highly suspect.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. ISV is a commercially available technology that has been successfully demonstrated on a smaller scale and is a reasonable alternative for analysis in the TWRS EIS. The EIS does discuss the technical uncertainties associated with implementing this alternative in the Summary, Section S.7, Volume One, Section 3.4, and Volume Two, Appendix B. Please refer to the response to Comment

numbers 0072.80 and 0072.05 for discussion of NEPA requirements for reasonable alternatives analysis.

Comment Number 0023.01 *Geosafe*

Comment The ISV alternative should provide an objective evaluation for selecting the size of the tank farm containment facility. The confinement facility as shown in Figure 3.4.5, which encloses an entire tank farm, may have some distinct advantages but it poses significant design and construction difficulties. A smaller containment facility could be more easily constructed that encloses only one tank at a time. The smaller facility could be moved into position using a crawler system similar in design to that proposed for the decommissioning of the 100 Area Reactors (WHC MLW-SVV-037106). Two sets of crawlers could be used to move multiple containment facilities. Although not stated in the EIS, it is presumed the need to enclose an entire tank farm was based on the premise that a structural load could not be supported by the dome structure of the tanks and would result in their collapse. For the ISV alternative, the void spaces in the tanks will be filled with sand or other material and can be made suitable for load bearing. The smaller confinement facility would be significantly easier to construct, maintain and decontaminate after project completion. In addition, the smaller facility should significantly reduce the degree of technical difficulty in implementing the ISV alternative and potentially lower its cost as well.

Response Alternative configurations for the tank farm confinement facility for ISV are possible. The configuration proposed in the comment is smaller than the facility depicted in the TWRS EIS. This proposed size reduction ultimately could result in a confinement facility that would be mobile, and could be moved from tank to tank within a tank farm. A large facility would not impose a bearing load on the individual tanks because its perimeter would lie outside of the tank farm. Because a smaller confinement facility potentially would impose a bearing load on adjacent tanks, a design solution to this problem would have to be formulated before the smaller confinement facility could be considered practicable. Filling the adjacent tanks with sand would be among those considered.

One potential problem area not discussed in the comment is the off-gas collection and treatment equipment and facilities. With a large confinement facility, the off-gas would be ducted to stationary treatment facilities. With the smaller, mobile confinement facility, the solution might be to move the off-gas treatment facility when the confinement facility is moved, or alternately, to re-route the off-gas ducting when the confinement facility is moved. This is one of a number of areas where further detailed study potentially could result in an improved process. In these areas of potential improvement, the configuration selected for inclusion in the EIS represented a bounding condition, which would result in environmental impacts that were likewise bounding. These bounding impacts are those presented to the decision makers.

The Draft EIS addressed the full range of reasonable alternatives. The alternative is bounded by the alternatives addressed in the Draft EIS, and DOE and Ecology believe that including the requested alternative would not provide valuable additional information to the public or decision makers. For a

discussion of the approach used in the EIS to develop and analyze alternatives, please see Volume One, Section 3.3 and refer to the response to Comment number 0072.05.

Comment Number 0023.02 *Geosafe*

Comment An objective evaluation should be provided for selecting the size of the ISV equipment. The evaluation should discuss the advantages and disadvantages of using a large ISV system versus using a smaller system more closely resembling commercially available equipment.

The concept of treating a tank with extremely large melts significantly increases the difficulty and the technical Implementability of the ISV alternative. The ISV system proposed in the EIS is 40 times larger (4 Mw vs. 160 Mw) than existing equipment and is capable of treating a tank in one setting. Geosafe believes treating tanks in large settings may pose significant operational problems. We believe a more workable approach is to treat tanks with smaller multiple ISV settings so as to have better control on the release of vapors from in and around the tank.

Another factor to consider with a large-scale ISV systems is power level fluctuations caused by startup or shut down. It is envisioned that power line fluctuations caused by a 160 Mw system may be unacceptable for the regional power grid unless special arrangements are provided.

In summary, smaller ISV units that treat tanks in multiple settings would greatly increase the technical Implementability of the ISV alternative and potentially reduce costs. Schedule requirements could be maintained by using multiple ISV systems operating simultaneously at various tank farms. In addition, the research and development time required for the smaller ISV unit would be significantly shorter than the 160 MW unit.

Response Alternative configurations for the power supply facility for ISV are possible. The configuration proposed in the comment is smaller than the facility depicted in the EIS. A large facility potentially could impose load fluctuations on the regional power grid, although with proper planning these fluctuations could be effectively managed. Because a smaller power supply facility potentially would melt only a portion of a tank and its contents, a solution to this problem would need to be formulated before the smaller power supply facility could be considered practicable. Using multiple power supply units would be one solution among those considered. That multiple smaller power supply units potentially would reduce costs may be premature. For the majority of process equipment, purchasing a single large unit rather than multiple smaller units is generally more economical. To state that the research and development time required for the smaller power supply facility would be significantly shorter than for the larger unit also may be premature. Using multiple ISV settings would allow better control on the release of vapors from in and around the tank also would be considered premature until further studies have been completed. These are a number of areas where further detailed study potentially could result in an improved process. In these areas of potential improvement, the configuration selected for inclusion into the EIS represented a bounding condition,

which would result in environmental impacts that were likewise bounding. These bounding impacts are those presented to the decision makers.

The Draft EIS addressed the full range of reasonable alternatives. As the alternative identified in the comment is bounded by the alternatives addressed in the Draft EIS, DOE and Ecology believe that including the requested alternative would not provide valuable additional information to the public or decision makers. Please refer to the response to Comment numbers 0023.01 and 0072.05.

Comment Number 0023.03 *Geosafe*

Comment Two techniques should be evaluated for reducing the processing depth of ISV which is specified in this document as 60 ft. Implementation of one or both of these techniques will decrease the technical difficulty of implementing the ISV alternative.

The first option would involve the removal of overburden to expose the dome structure of the tank. The overburden could be subsequently added to the tanks to eliminate internal void spaces. This would decrease the required processing depth of ISV to approximately 45 ft for the largest volume tanks.

The second option would involve the intentional lowering of the tank dome structure into the tank to reduce the effective processing depth from 45 ft to 33 ft for the largest tanks. This would be accomplished by first covering the contents of the tanks with an adequate depth of soil to provide radiation shielding. Next the center portion of the tank would be cut into pieces and lowered into the tank on to the soil. Following the removal of the dome structure, additional soil would be placed in the tank to provide a level surface to begin ISV operations. It is recognized that cutting into a tank will present some added risk that will need to be evaluated.

Response Further research and investigation associated with ISV is possible. This particular comment deals with potential solutions to the problem of having ISV operate at depths of approximately 60 feet. The suggestions for using the tank overburden to reduce tank voids; and subsequently lowering the tank dome into the tank before vitrification are examples of areas where further investigation may prove to be of value; however, substantial safety considerations would need to be overcome. Added risk from exposing and cutting into the tanks has not been evaluated. These are several areas where further detailed study could potentially result in an improved process. To address this issue, the cost estimate includes additional costs for technology development for this alternative. In these areas of potential improvement, the configuration selected for inclusion into the EIS represented a bounding condition, which would result in environmental impacts that were likewise bounding. These bounding impacts are those presented to the decision makers. Please refer to the response to Comment number 0023.01.

Comment Number 0023.04 *Geosafe*

Comment Following treatment of the tanks with ISV, there is no need for the tanks to be capped with the Hanford barrier. A simpler and less expensive cover to minimize the downward percolation of

water could be used. The Hanford barrier is designed to provide plant, animal and human intrusion into a waste zone using a thick zone of crushed rock and to prevent the downward percolation of water. Since the ISV monolith is already a rock "cap" of considerable structural strength the need for a biointrusion zone is unnecessary.

Response ISV will leave the tank contents in a form unique to that alternative. However, the remaining waste form is still radioactive and some means must be employed to prevent access by humans, animals, and plants. The Hanford Barrier was used for this purpose as a potential form of closure, which is applicable to all the alternatives. Closure or dispositioning of the tanks is further discussed in Volume One, Section 3.3 and in Volume Two, Section B.5.0 of the EIS. Tank waste remediation and tank farm closure issues cannot be separated; therefore, an assumption common to all alternatives was included in the alternatives evaluation, but not evaluated as a single, specific action. Because the information contained in the Draft EIS is correct, no change to the text was made. Please also refer to the response to Comment number 0019.04 for a discussion of the Hanford Barrier.

Comment Number 0023.05 *Geosafe*

Comment The ISV cost estimate should discuss the following costing assumptions: (a) are individual tank depths being taken into consideration for estimating treatment volumes, e.g. the 500,000 gal tanks are 18 ft deep and the million gal tanks are 32.5 ft deep, (b) is the area between tanks being vitrified and (c) is soil beneath the tanks being treated.

Response DOE and Ecology have presented life-cycle cost estimates for each alternative. These estimates are based on conceptual designs for the alternatives. Because of the conceptual nature of the alternatives, there is a level of uncertainty associated with the life-cycle cost estimates. To account for the variations cited in the comment, such as variations in tank sizes and variability of the volume of treated material, an uncertainty analysis has been completed for the tank waste alternatives. The resultant cost range for each alternative is shown in Volume Two, Section B.8.0 of the EIS. Other information on the cost estimates is contained in Volume One, Section 3.4.1.7 and Volume Two, Section B.3.0.8 of the EIS. Only the contaminated soil between the tanks and immediately around and below the tanks is assumed to be vitrified. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0023.06 *Geosafe*

Comment Page 3-52, 4th par. "Each vitrification system ... consuming 160 Mw of power." Power consumption rates should be discussed for all alternatives and not be specifically limited to the ISV alternative. ISV is an extremely efficient vitrification technology. On average ISV consumes 800 Kw-hrs of electricity to vitrify a ton of material which is considerably lower than other vitrification technologies. The power consumption rates as listed in Table B.11.0.3 for the ISV alternative is 7,690 Gwh, which is less than the "ex situ no separation" alternative (8,800 Gwh) and the "ex situ extensive separation" alternative (41,600 Gwh).

Response The preliminary calculations used in the EIS show that ISV has a power consumption lower than other alternatives. To provide a side-by-side comparison of the resource consumption of the alternatives, DOE and Ecology have presented the material in summary form in Volume Two, Table B.11.0.3. To provide a complete narrative description in Volume One, Section 3.0, the EIS presents the information for each alternative under six headings: Process Description; Construction; Operation; Post Remediation; Schedule, Sequence and Costs; and Implementability. The Process Description for each alternative describes the major pieces of equipment for each process, giving a description of some of the major equipment used in the process. The section to which the comment refers is the Process Description for ISV, and the power supply was described as one of the major equipment items of this process. For other alternatives, the major equipment items will be different because the process is different. Because this section is a process description, it should not be interpreted as attempting to portray ISV as having obvious advantages or disadvantages. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0023.07 *Geosafe*

Comment Implementability: 1st bullet, The degree of uncertainty of the ISV alternative will be significantly reduced by using smaller ISV units as discussed above.

Response The concept of treating tank waste with large-volume melts may have more technical issues associated with the implementability of the ISV alternative. The configuration proposed in Comment number 0023.01 is smaller in size than the facility depicted in the EIS. This is one of a number of areas where further detailed study potentially could result in an improved process with fewer issues regarding technical implementability. In these areas of potential improvement, the configuration selected for inclusion into the EIS represented a bounding condition, which would result in environmental impacts that were likewise bounding.

Comment Number 0023.08 *Geosafe*

Comment Implementability: 2nd bullet, We agree that substantial research and development activities would be required to implement the 160 MW ISV system and for this reason have recommended using smaller ISV units closer to the scale of our commercial 4 MW system. Geosafe has already proposed a concept to DOE for treating the single shell and double shell storage tanks using our 4 MW ISV system (see attached white paper dated December 1995). The 60 ft depth limitation for processing the large volume tanks can be reduced by implementing the techniques discussed in comment A 3. [Comment number 0023.03]

Response Alternative configurations for the power supply facility for ISV are possible. The configuration proposed in the comment is smaller than the facility depicted in the EIS. It should not be inferred that the use of a smaller power supply is a feature of any particular vendor or that the use of a smaller power supply constitutes an endorsement by DOE or Ecology. Because a smaller power supply facility would potentially melt only a portion of a tank and its contents, a solution to this

problem would have to be formulated before the smaller power supply facility could be considered to be practicable, and substantial research, development, and demonstration activities still would be required. There are a number of areas where further detailed study potentially could result in an improved process. In these areas of potential improvement, the configuration selected for inclusion into the EIS represented a bounding condition, which would result in environmental impacts presented to the decision makers as bounding. The EIS analysis bounds the information suggested by the commentor. For a discussion of the technique of reducing the depths of the tanks, please refer to Comment number 0023.03. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0023.09 *Geosafe*

Comment Implementability: 3rd, bullet, The possibility of an uncontrolled reaction occurring in a tank is mainly limited to 38 tanks containing organics or ferrocyanide material. The DOE Radioactive Tank Waste Remediation Focus Area is currently evaluating the explosive issue concern. Potentially, ISV treatability testing will be required to fully address this concern.

Response Further treatability testing will be required to fully address the concern of uncontrolled reactions in the tanks if the contents were vitrified. There may be answers to the situation that are inherent with ISV, which is that extensive mixing of contents of different tanks to mitigate potential uncontrolled reactions is not included in the process. At present, the testing of the heating of tank contents has been limited, and it may be premature to state that the problem is mainly limited to 38 tanks containing organics or ferrocyanide material. Until further investigations have been completed, DOE and Ecology believe that the statement in the EIS that further analysis is required remains correct. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0023.10 *Geosafe*

Comment Implementability: 4th bullet, We agree that the tank farm containment facility is highly conceptual and recommend that it be scaled down in size from the proposed 500 ft wide by 600 ft long facility to an approximately 120 ft square facility which covers only one tank. The technical difficulties of constructing the smaller facility are minimal.

Response The large tank farm confinement facility is highly conceptual in nature. The area discussed at this point is that further development would be required before any confinement facility, regardless of size, would be expected to comply with current DOE facility design requirements. A confinement facility that is 120 feet on a side is still sufficiently large that additional design study would be required. The technical difficulties that may be expected in designing and constructing the smaller confinement facility would be less than those expected in designing and constructing a much larger confinement facility. It may be optimistic to state that these technical difficulties would be minimal. This is one of a number of areas where further study potentially could result in a process with fewer issues regarding technical implementability. In these areas, the configuration selected for inclusion into the EIS

represented a bounding condition, which would result in environmental impacts that were likewise bounding. These bounding impacts are those presented to the decision makers. The EIS bounds the information suggested in the comment. Please refer to the response to Comment number 0023.01 regarding the use of smaller ISV units.

Comment Number 0023.11 *Geosafe*

Comment Implementability: 5th bullet, The use of a smaller tank containment facility will eliminate most of the construction difficulties. Using a smaller mobile containment facility will allow construction activities to take place in a clean area, thereby eliminating the risks and added expense of working in or around a tank farm exclusion zone.

Response The large tank farm confinement facility may be more difficult to construct. The area being discussed in the EIS at this point is the atypical nature of the design of the large confinement facility and restrictions associated with working in and around the tank farms. While a smaller confinement facility could be constructed adjacent to the tank farms and then moved into position to assume that this will eliminate the risks and added expense of working around the tank farms would be considered premature. This is one of several areas where additional design study potentially could result in process improvements and potentially could result in a process with fewer issues regarding technical implementability. In these areas, the configuration used in the EIS represented a bounding condition, resulting in environmental impacts that also were bounding. Please refer to the response to Comment number 0023.01 regarding the use of smaller ISV units.

Comment Number 0023.12 *Geosafe*

Comment Implementability: 6th bullet, Inspection of the final waste form can be done by core drilling through the vitrified monolith after a period of cooling. Core drilling is routinely performed on commercial ISV projects to verify waste treatment for project closure. In the past, core drilling has been used to sample untreated tank wastes and should be easily adaptable to sampling a vitrified waste form which is easier to handle. Secondary wastes generated from the drilling can be recycled to future melts. If a core sample fails to meet waste acceptance testing, the area from which it was taken can be retreated by ISV.

Response Methods exist for the sampling of the in situ vitrified product. Many cores would likely be necessary for each tank and the cuttings from the core would require special handling and disposal. While the secondary wastes generated can be returned to the untreated tanks, other problems may be encountered during the development and operating phases of the core drilling system. The core drilling of vitrified HLW is an area that would require additional research and development to investigate further and determine its workability. If core drilling becomes an accepted technique for determining the acceptability of the waste form, the design of the confinement facility would include provision for equipment to accomplish the core drilling. Inspection and potential pretreatment of the final waste form are implementability problems that remain to be solved.

Comment Number 0023.13 *Geosafe*

Comment Implementability: 7th bullet, Use of the proposed smaller tank confinement facilities will be significantly reduce decontamination and decommissioning problems.

Response The large tank farm confinement facility may be difficult to decontaminate and decommission and these difficulties should be fewer for a smaller facility. Further study could result in an improved process. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0023.14 *Geosafe*

Comment B-53, 3rd par., last sent., A reference should be provided for the current research which is addressing depth-enhancement techniques.

Response A reference has been added to the last sentence of the referenced paragraph in Volume Two, Appendix B.

Comment Number 0023.15 *Geosafe*

Comment B-53, 4th par., Elimination of interstitial spaces between soil particles is not the only mechanism for volume reduction. During ISV treatment a significant volume of tank wastes will be vaporized due to the decomposition of nitrates, nitrites, carbonates and sulfates. This will result in a volume reduction that is expected to exceed 50 percent by volume. In addition, the ISV process will not produce significant quantities of No_x that require special off-gas treatment. The high operating temperature of the ISV melt and its reducing environment will decompose nitrate and nitrite into N_2 and O_2 gas.

Response Elimination of interstitial spaces between soil particles is not the only mechanism for volume reduction. A reduction in volume due to decomposition of the tank wastes will occur. However, at this time, no ISV facilities have been designed for use at the Hanford Site. Until design and testing have been completed, to consider that the ISV process will not produce significant quantities of nitrogen oxides requiring special off-gas treatment is premature. ISV most closely resembles a batch process, where the nature of the reacting materials and the reaction products change as a function of time. Temperature also changes with time during ISV, starting with the cool tank wastes and glass formers and ending with molten glass at a very high temperature. Therefore, while extremely high temperatures will enhance the dissociation of nitrate and nitrate, nitrogen oxides will be produced until those temperatures are reached, and the off-gas treatment system must be able to treat all of the vapors evolved. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0023.16 *Geosafe*

Comment B-56, Figure B3.4.3., The NO_2 burner is configured as a lime spray dryer.

Response The essential function of the nitrogen oxide burner is correctly depicted on the flow diagram in Volume Two, Appendix B. The streams entering and leaving the unit are shown correctly. Because the essential function of the unit has been depicted, no changes to the EIS have been made.

Comment Number 0023.17 *Geosafe*

Comment B-57, 1st par., Treating the area between the tanks unfairly increases the cost of the ISV alternative and should not be included unless other alternatives address this concern. Potentially, an ISV option could be included which addresses the treatment of contamination below and around the tanks.

Response The inclusion of extra material in the zone of vitrified material is unique to the ISV alternative. Treating the area between the tanks would occur as a consequence of the nature of the ISV process, and doing so would not unfairly increase the cost of the ISV alternative. Because of the in situ nature of the process, ISV must have a vitrified zone that extends beyond the tank dimensions to ensure that the tank and its contents have been vitrified. This zone would not exist for the ex situ alternatives, for which retrieval activities will be performed that would be bounded by the tank walls. Because of the technical uncertainty in determining the dimensions of the zone of vitrified material during the melting operation, the preparers of the engineering data package (WHC 1995f) made the assumption to extend the dimensions of the vitrified zone beyond the tank dimensions to include the extent of the tank farms. Using this assumption ensured that the preconceptual costs, energy consumptions, and glass former usages were reasonable. For use in the EIS, these conservative assumptions and resulting calculations form a bounding condition. The use of this bounding condition will result in environmental impacts that are likewise bounding. NEPA requires that bounding conditions be equally compared for the environmental impacts that potentially may result from all alternatives evaluated. Please refer to the response to Comment numbers 0023.01 and 0001.01 for other discussions of subsurface barriers.

Comment Number 0023.18 *Geosafe*

Comment B-63, last par., The ISV flow diagram (Figure B.3.4.3) does not show a water quench system, venturi scrubber, solids separator, chiller or mist eliminator, which are the standard ISV off-gas treatment system components.

Response Figure B.3.4.3 depicts the major features of the ISV process. At the point when further engineering design potentially would be done, an expanded set of process flow diagrams would be developed. Because the description of the process in Section 3.4.3 of Appendix B refers to the water quench, scrubber, solids separator, chiller, and mist eliminator, no changes to the EIS have been made.

These treatment systems were included in the design for the process, but were considered too much detail for presentation in the EIS. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0023.19 *Geosafe*

Comment B-64, 3rd par., The degree to which organics and ferrocyanides present an explosive issue in the tanks is presently unknown and is currently being researched by DOE. At most an estimated 38 tanks potentially contain high enough concentrations of these contaminants to be of concern (PNL 10773).

Response The degree to which organics and ferrocyanides present an explosive issue currently is under investigation. There may be answers to the situation that are inherent with ISV, which is that extensive mixing of the contents of different tanks to mitigate potential uncontrolled reactions is not included in the process. At present, the testing of the heating of tank contents has been limited, and it may be premature to state that the problem mainly is limited to 38 tanks of organics or ferrocyanide material. Until further investigations have been completed, the statement in the EIS that safely treating reactive materials requires further analysis is correct. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0023.20 *Geosafe*

Comment 1st bullet, Geosafe agrees that the proposed ISV alternative is more conceptual in design than the ex situ vitrification alternative but has made the following recommendations to significantly decrease the degree of uncertainty associated with cost, schedule and resource requirements.

- Use smaller ISV equipment and multiple melts to treat tanks
- Use a smaller moveable tank containment building
- Reduce tank effective height to lower treatment depth and volume.

Response Additional areas for further research and investigation associated with ISV are possible. Using smaller ISV equipment and multiple melts, smaller, moveable confinement facility, and tank overburden to fill voids and lowering the tank dome into the tank are areas where further investigation may be valuable. The configuration selected for inclusion into the EIS represented a bounding condition, which would result in environmental impacts that also were bounding. These bounding impacts were presented to the decision makers. Please refer to the response to Comment numbers 0023.01, 0023.03, and 0023.11. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0023.21 *Geosafe*

Comment 2nd bullet, The degree of uncertainty for the ISV alternative can be reduced by using smaller equipment which is considered highly feasible given the current understanding of the technology.

Response Alternative configurations for the tank farm confinement facility for ISV are possible. The configuration proposed in Comment number 0023.01 includes a confinement facility that is 120 feet on a side. The area under discussion in the EIS is the higher degree of uncertainty for the exact equipment required for ISV versus ex situ alternatives. The 120-foot confinement facility is still several times larger than that used in current development work for ISV. To state that this configuration is highly feasible could be considered premature. Comment number 0023.01 discusses concerns related to the movement of a smaller confinement facility and its off-gas facilities. Because these concerns remain as issues and problems to be resolved, the EIS is correct in referring to the degree of uncertainty involved. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0023.22 *Geosafe*

Comment 3rd bullet, Implementing the recommendation to use a smaller containment facility will eliminate all these concerns except for the need to characterize the tanks. Tank waste characterization is a generic concern that is applicable to all treatment alternatives and is not limited to the ISV alternative.

Response Vitrifying one tank at a time will not require the characterization of an entire tank farm if a smaller, mobile confinement facility were to be used. ISV by its very nature does not retrieve the tank contents. Consequently, there is no opportunity to advantageously blend the tank contents; as would be the case if several tanks were retrieved at the same time as in the ex situ alternatives. To consider the smaller confinement facility will eliminate all these concerns except the need to characterize the tanks would be premature. Still, ISV is basically a batch process (or potentially a semi-continuous process). One characteristic of a batch process is the changing nature of the reactants and products as a function of time. The system must be able to process the expected products, and this requirement does not change with the size of the confinement facility. Further detailed study would result in an improved process; however, no changes to the information presented in the EIS are required. Please refer to the response to Comment number 0023.01.

Comment Number 0023.23 *Geosafe*

Comment 4th bullet, An estimated 20 tanks potentially contain organics at concentrations that may represent an explosive concern. Research on treating these problem tanks could be conducted while other non-effected tanks are being processed.

Response The degree to which organics present an explosive issue is currently under investigation. Extensive mixing of waste from different tanks to mitigate potential uncontrolled reactions is not included in the process. At present, the testing of the heating of tank contents has been very limited, and it may be premature to state that the problem mainly is limited to 20 tanks containing organics. Concurrent research and testing on treating these problem tanks could be conducted while other non-affected tanks are being processed. This research must be successfully completed before this method could be used to remediate tanks that may present an explosive concern. Until further investigations have been completed, the statement in the EIS that the safety of drying some waste types is uncertain remains correct, and as a result, no changes to the EIS have been made. The potential for fires and explosions in the tanks is addressed in Volume One, Section 5.12 and Volume Four, Appendix E. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0023.24 *Geosafe*

Comment 5th bullet, Geosafe recommends using smaller ISV units which should significantly reduce the uncertainties associated with off-gas treatment. The high operating temperature of ISV has been demonstrated to effectively decompose nitrogen compounds without the formation of NO_xS and greatly reduces off-gas treatment concerns. The calcium sulfate waste stream should not be recycled because the sulfates will be reintroduced back into the off-gas.

Response There is the potential for the production of a secondary waste stream of potentially contaminated calcium sulfate from ISV. This waste stream should not be recycled because the sulfates may not be incorporated into the melt and may be reintroduced into the off-gas. However, at this time, no ISV facilities have been designed for use at the Hanford Site and none have been designed of the size needed to vitrify the tank waste anywhere in the world. Numerous ISV facilities have had problems with off-gas treatment and fires. Until development work has been completed, to state that the high operating temperature of the ISV process would effectively decompose nitrogen compounds without the formation of nitrogen oxides and greatly reduce off-gas treatment concerns would be considered premature. ISV most closely resembles a batch process, where the nature of the reacting materials and the reaction products change as a function of time. Temperature changes also occur with time during ISV, starting with the cool tank wastes and glass formers and ending with molten glass at a very high temperature. So while extremely high temperatures will enhance the dissociation of nitrate and nitrate, nitrogen oxides will be produced until those temperatures are reached. The off-gas treatment system must be able to treat all of the vapors that are evolved. Because these uncertainties will remain regardless of the size of the ISV units, no changes to the EIS have been made. Please also refer to the response to Comment number 0023.01 for a discussion of smaller ISV units.

Comment Number 0023.25 *Geosafe*

Comment 6th bullet, The 60 ft depth limitation is overly conservative and can be reduced by removing overburden from the tanks and lowering the effective height of the tank as discussed in comment A 3. [Comment number 0023.03]

Response Please refer to the response to Comment numbers 0023.03 and 0023.08.

Comment Number 0023.26 *Geosafe*

Comment 7th bullet, The use of the proposed smaller tank containment facility (120 ft by 120 ft) will eliminate structural design and costing uncertainties.

Response The EIS addresses only the uncertainty that remains in the design of the large (i.e., 500- by 600-foot) confinement facility. At this time, no ISV facilities have been designed for use at the Hanford Site. Until additional technology development has been completed, it would be considered premature to state that the use of the smaller confinement facility will eliminate structural design and costing uncertainties. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0023.27 *Geosafe*

Comment 8th bullet, Verification of the ISV monolith can be performed by core sampling which is a well demonstrated technology. Allowances will have to be made for coring of a radioactive glass monolith but it is feasible given an enclosed system and sufficient concern for safety issues. Secondary wastes generated from coring can be directly recycled to future melts thus eliminating waste disposal concerns.

Response DOE and Ecology agree with the comment that methods exist for the sampling of the in situ vitrified product. The core drilling of vitrified HLW is an area that would require additional research and development to determine its workability. If core drilling becomes an accepted technique for determining the acceptability of the waste form, the design of the confinement facility would include provision for equipment to accomplish the core drilling. While the comment is correct in stating that the secondary wastes generated can be returned to the untreated tanks, it is possible that other problems will be encountered during the development and operating phases of the core drilling system. The text referred to in the comment discusses the fact that inspection and potential pretreatment of the final waste form are problems of implementability that remain to be solved. Despite the fact that methods are available for sampling the vitrified waste form, the technical problems associated with this issue remain to be solved. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0023.28 *Geosafe*

Comment 9th bullet, The use of the smaller ISV system will eliminate concerns regarding movement of the off-gas system.

Response The EIS addresses the uncertainty that remains in the design of the off-gas treatment facilities. Until additional technology development has been completed, to state that the use of the

smaller ISV system will eliminate concerns regarding movement of the off-gas system would be considered premature. Please refer to the response to Comment number 0023.24. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0023.29 *Geosafe*

Comment 10th bullet, The use of a smaller ISV system will greatly reduce the time needed to retreat a specific area in a tank if it fails to meet the treatment criteria.

Response The EIS addresses the uncertainty that would occur in the operations schedule if an area as large as a complete tank has to be retreated as a result of unsuccessful ISV. Until additional technology development has been completed, to state that the use of the smaller ISV system will greatly reduce the time needed to retreat a specific area in a tank if it fails to meet the treatment criteria would be considered premature. The time required to retreat a tank is not a function of the size of the confinement facility. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0023.30 *Geosafe*

Comment 11th bullet, The concern of mixing fluxants into deep zones of the tank can be reduced by implementing the treatment depth reduction techniques recommended in comment A 3 (See Comment number 0023.03). Geosafe has already demonstrated the mixing of fluxants at full scale with excellent results.

Response Thermal mixing is well known in conventional electric furnaces and should work well for ISV. Because thermal mixing in electric furnaces is a natural phenomena, its presence does not constitute an endorsement of the application of a particular technique or equipment. The statement in the EIS refers to further development work that may be required. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.97 *CTUIR*

Comment P 3-48: Sect. 3.4.5: In Situ Vitrification Alternative: this section does not adequately discuss how all of the vitrified ground and waste is to be verified for vitrification, and how this verification process will include leakage, migration, below the area of impact. This process has not been adequately explained for the purposes of this EIS.

Response Further technology development regarding the implementation of the ISV alternative may be required. Volume One, Section 3.4.5.7 and Volume Two, Section B.3.4.4 discuss the issues applicable to the implementability of this alternative including inspection of the final waste form to confirm that all

of the waste is stabilized and the waste form is acceptable. One possible method of verification would be drilling through the vitrified mass to ensure that vitrification was complete, but these drill holes would not necessarily confirm any potential migration that may exist below the vitrified mass. Migration in the vicinity of the vitrified mass could be verified by drilling additional boreholes near each tank farm when ISV had been completed. Please refer to a related discussion on verification in the response to Comment number 0023.12.

Comment Number 0072.98 *CTUIR*

Comment P 3-54: Sect. 3.4.5.7: Implementability: How is excess melting going to be addressed, Please describe the fractionation process of the melt? What are the anticipated cooling times, and how have these times been calculated, are they based on the fractionation process? If the times are not based on the fractionation process what exactly are they based on? What is the verification process for the vitrification, the fractionation, the cooling, the immobilization?

Response Many crucial questions must be answered before the ISV alternative can be implemented. Volume One, Section 3.4.5.7 contains discussions of the substantial research, development, and demonstration activities that would be required. Inspection of the final waste form to confirm stabilization of the waste is one area requiring more information. The implementability of this alternative is not known at this time. To account for these uncertainties, additional technology development time and costs were incorporated into the analysis of these alternatives. The information requested is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives. Implementability was one factor analyzed for the technologies included in the alternatives analysis.

Comment Number 0072.99 *CTUIR*

Comment P 3-54: The technical uncertainties associated with this process are just as great for the MUST's because the contents of the MUSTs have been inadequately described within this EIS.

Response As is explained in Volume Two, Section A.2.3, definitive characterization data do not currently exist for the inactive MUSTs. Because they received the same waste products that are contained in the tanks, the concentration of constituents is expected to be approximately the same. Volume Two Table A.2.3.1 lists the current estimated waste volumes for the MUSTs and briefly comments on the use of each tank. ISV of the small MUSTs may present less of a technical challenge because the size of the melt more closely conforms with previously demonstrated vitrification processes. Please refer to the response to Comment numbers 0012.14, 0072.169, 0029.01, and 0060.02 for a discussion related to MUST contents.

Comment Number 0072.185 *CTUIR*

Comment P B-53: Sect. B.3.4: Same comment as above. [Please refer to the response to Comment number 0072.195.]

Response Please refer to the response to Comment number 0072.195.

Comment Number 0102.01 *Eister, Warren*

Comment The Draft Environmental Impact Statement for the Hanford Site Tank Waste Remediation System - Summary (DOE/EIS-0189D) seems to suggest the choice system would be In Situ Vitrification (Figure S.6.2 along with Tables S.7.2 and S.7.3).

It is very reassuring that decisions made more than twenty years ago continue to be re-evaluated. Unfortunately those decisions have been extremely difficult to implement.

However, in spite of the continuing unresolved difficulties, this EIS Summary reports that DOE has already adopted the Phased Implementation System which is dependent on potential geologic repositories and involves extensive process and transportation activities.

Is the In Situ Vitrification technology being developed with the same level of effort as the Phased Implementation?

Would this In Situ Vitrification System be applicable to the:

- Savannah River site?
- Spent fuel from the nuclear power reactor program?
- TRU waste?
- Low-level wastes?

Are there other technologies being sought that would allow the spent fuel from the nuclear power program to remain in the vicinities of the current power plant sites?

Response The preferred alternative for tank waste identified in the Draft EIS and Final EIS is Phased Implementation not ISV. DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0072.05 regarding NEPA requirements for the analysis of alternatives and Comment numbers 0055.03 and 0005.07 for a discussion of the role of the EIS in the decision making process. Repository costs and uncertainties analysis results for each alternative have been included in Volume Two, Appendix B and Volume Five, Appendix K, respectively, in the Final EIS.

The TWRS EIS focused on tank waste remediation alternatives. Technology evaluation was limited to those technologies currently available or for which sufficient development information was available. DOE is not currently developing any remedial technologies. Potentially-applicable ISV technologies are under commercial development. Technologies development and/or evaluation would be conducted during the detailed design and demonstration phases of the preferred alternative. Issues related to ISV technology applicability at other DOE sites, for commercial nuclear power programs, or to other radioactive waste types beyond those required for the alternatives evaluation were not considered because they are beyond the scope of the EIS.

Please refer to the response to Comment number 0037.03 for more information concerning interim onsite storage of HLW and compliance issues related to the Nuclear Waste Policy Act.

L.3.4.7 Ex Situ Intermediate Separations Alternative

Comment Number 0005.45 *Swanson, John L.*

Comment Page 3-59 contains a sentence regarding the Tri-Party Agreement requiring the retrieval function to remove waste to an extent based on volume or as much as is technically possible, WHICHEVER IS LESS. I believe you mean to say remove the MOST, leaving the LEAST - but that is not what the sentence says.

Response The cited text has been revised as follows, "The Tri-Party Agreement (i.e., Milestone M-45-00) requires that the removal function remove waste to the extent that SST waste residuals meet specific volume requirements based on tank type, or that as much waste is removed as technically possible, whichever action results in the least residual waste volume" (Ecology et al. 1994).

Comment Number 0005.46 *Swanson, John L.*

Comment Page 3-67 defines an off-gas stream from a vitrifier as a "gaseous air stream containing combustion gases." This is true for a combustion-fired melter, but how about a joule-heated melter?

Response Volume One, Section 3.4.6.2 states that fuel-fixed melters have been included for analysis in the EIS. It is further stated that future evolution may result in another melter configuration. With either the joule-heated or fuel-fixed melter, a large quantity of off-gas with contaminants such as SO_x and NO_x must be treated. The total volume of gas with a fuel-fixed melter would be greater with the use of kerosene and oxygen for the fuel, but the total amounts of SO_x and NO_x would not differ greatly. The fuel-fired melters considered provide a more conservative analysis in the design and treatment of the off-gas for discharge to the environment. Please refer to the response to Comment numbers 0005.42, 0072.91, 0023.01, 0023.15, 0023.24, 0023.28, and 0072.101 for discussions of issues related to off-gassing. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0005.47 *Swanson, John L.*

Comment Page 3-67, last paragraph of 3.4.6.2 ("Driving heavy equipment--") seems to be out of place. This same paragraph appears in similar locations for other alternatives too; the same comment applies in those sections as well.

Response Because this is an issue common to many of the alternatives, a better location for a one-time entry to the section has been determined. This discussion on mitigating a potential accident has been moved to a discussion of elements common to the alternatives in Volume One, Section 3.4 and Volume Two, Appendix B. This statement of concern appears on several pages within Volume One, Section 3.0 and Volume Two, Appendix B.

Comment Number 0027.10 *Roecker, John H.*

Comment Technical Uncertainty
To state that the technical uncertainty of the intermediate and extensive separations alternatives are both moderate is erroneous and misleading to those who are not familiar with the technologies involved. Intermediate separations requires three technologies, all of which have been demonstrated, while extensive separations requires at least ten, most of which have not been demonstrated. This misleading information needs to be corrected.

Response The degree of technical uncertainty provided in the Summary assigns a high, medium, or low ranking for the entire remediation alternative. DOE and Ecology acknowledge that there is a higher level of technical uncertainty with extensive separations than with intermediate separations. However, overall, both alternatives fall into the moderate category. Additional discussion regarding technical uncertainty is provided in Volume One, Section 3.4 and Volume Two, Appendix B and the response to Comment number 0005.03.

Comment Number 0036.16 *HEAL*

Comment The EIS states that intermediate separations would reduce the waste going to the repository. It adds, "The other goal of separations would be to limit the generation of additional waste during the separations processes" (p. 3-65). What does this passage mean?

Response Limiting the generation of additional waste during the separations process means that design and implementation of the HLW/LAW separations processes would consider the volume of LAW along with the volume of HLW that would be generated. One means of accomplishing this would be to limit the introduction of sodium hydroxide during the enhanced sludge washing process, which would limit the overall amount of sodium in the resulting LAW form.

Comment Number 0057.03 *Garfield, John*

Comment With respect to primarily the cost, the EIS references the document from '94 Boomer et al. That document compares two alternatives that are nearly identical to intermediate separations, then extensive separations is called clean and enhanced sludge washing in that document. It shows a cost penalty for using clean of $7 billion dollars compared to enhanced sludge washing. Those same alternatives show a $3 billion dollar advantage in the Environmental Impact Statement Draft. That is a $10 billion dollar swing. That deserves investigation. The repository comments convey part of that. The rest relates back to my earlier remarks about the headquarters influence.

Response The cost estimates were reviewed and revised for the Final EIS. The waste loading and blending assumptions that impact the volume of HLW have been revised to reflect the recommendations of an independent technical review team. The size of the HLW canisters has been revised to reflect recent DOE-RW findings that a longer canister for Hanford HLW is technically feasible. These changes, as well as the resulting cost impacts, were revised and are included in Volume One, Section 3.4 and Volume Two, Appendix B. For more information on issues relating to HLW canisters and repository costs, please refer to the response to Comment numbers 0081.02 and 0008.01.

Comment Number 0057.05 *Garfield, John*

Comment The next comment I would like to make is that the chosen case built around the extensive sep..or excuse me the intermediate separations data of without repository cost shows it $30 billion dollars. That estimate assumes a stand-alone high-level waste treatment facility which would cost in the vicinity of $1 to $2 billion dollars and add another equivalent amount in operating costs. There is some recent data developed using a single facility but which can be - its mission can be modified both in terms of scope and capacity to accommodate both low-level treatment at a smaller scale through the 200-ton per day capacity 1 to 200-ton per day capacity for the full scale low-level treatment and then can be converted for high-level treatment. That is the only sane approach to this problem. Building three demonstration plants and two full-scale plants is a lunacy that will cost us $30 billion dollars. A simpler facility approach that I just described would cut those costs in approximately half and, in fact, the studies release from the DOE reading room suggests that cost is about $16 to $18 billion dollars. That should be the basis for the EIS intermediate separations case.

Response DOE and Ecology recognize that there are opportunities for optimizing the costs estimated for each of the alternatives addressed in the EIS. As discussed in the EIS, the alternatives were developed to bound the impacts associated with remediating the tank waste. Process and facility design optimization would not be precluded with the selection of any of the alternatives presented in the EIS. For more information on the topic, please refer to response to the Comment number 0072.05.

The Draft EIS addressed the full range of reasonable alternatives. The alternative identified is bounded by the alternatives addressed in the Draft EIS, and DOE and Ecology believe that including the

requested alternative would not provide valuable additional information to the public or decision makers.

Comment Number 0072.100 *CTUIR*

Comment P 3-56: Sect. 3.4.6: Ex Situ Intermediate Separations Alternative: The separation of the Waste streams into HLW and low activity waste seems confusing. Low activity waste is waste that is a subset of HLW? What are the legal requirements for classifying waste as LAW? Have the Affected Tribes been consulted regarding this?

Response LAW is the waste remaining after removal of as much of the radioactivity from HLW as practicable. The definition of LAW is provided in Volume One, Section 1.0. DOE and the NRC have had formal discussions on tank waste classification and LAW regulation; however, DOE would need to formally solicit an opinion from the NRC regarding the classification of LAW. Volume One, Section 6.2 provides additional information on tank waste classification and the results of the discussions between DOE and the NRC. Criteria must be formalized as to the extent to which the HLW in the tanks must be separated for the residual waste to meet requirements for incidental waste, LAW, as well as the DOE and Washington State definitions of LLW and hazardous waste requirements of the State of Washington. Design specifications for HLW and LAW treatment will require that waste forms meet applicable criteria for disposal in the potential geologic repository or as LAW for onsite disposal, respectively.

DOE plans for onsite near-surface disposal of LAW date back to the 1988 Hanford Defense Waste EIS ROD (DOE 1987). That NEPA process, as well as subsequent consideration of onsite disposal of LAW during the 1989 and 1994 Tri-Party Agreement negotiations, and the Tank Waste Task Force process (HWTF 1993), provided interested parties as well as Tribal Nations with the opportunity to comment on the planned onsite disposal of LAW. The TWRS EIS and the public involvement process for Tri-Party Agreement amendments associated with the privatization initiative provided additional opportunities for Tribal Nation input into the decision-making process related to this issue. The Tribal Nation consultation process is discussed in the response to Comment number 0072.149.

Comment Number 0072.101 *CTUIR*

Comment P 3-56: PP 3: The LAW is to be quenched into a 'cullet', this indicates that there is going to be an additional secondary waste stream generated from the reaction of molten silicates, nitrates, hydroxides, oxides, metals and water. What will be done with this waste stream. Will this waste stream be classified as High level liquid waste? The off gasses that are produced are supposedly going to be treated in some fashion, please explain how this is to be accomplished including feed rates, volume of off gas produced, filter failure rates, retrievable useable material, and indicate where this process has been proven including references.

Response The technical data that served as a basis for developing the Ex Situ Intermediate Separations alternative are referenced in the EIS (WHC 1995 n, j, i and Jacobs 1996) and are available for review as part of the TWRS EIS Administrative Record and in DOE Reading Rooms and Information Repositories.

Quench water is a secondary waste stream that would contain contaminants as a result of quenching the molten LAW glass in order to produce the cullet. This quench water would be recycled extensively either as quench water or back to the front of the process to be added to the LAW stream for vitrification. This liquid waste stream would not be expected to be classified as HLW.

The amount of secondary waste generated during operations of the Ex Situ Intermediate Separations alternative would consist primarily of off-gas and liquid effluent emissions identified in Volume Two, Table B.11.05. The off-gas and liquid effluents would be treated to remove contaminants to the maximum extent possible before being discharged. The HLW vitrification process would result in gas flows out the stack of approximately 3,500,000 metric tons (mt) over the life of the facility. The radiological and chemical concentrations to be released from the stack were calculated and used in the routine risk assessment. The liquid effluent from the HLW vitrification facility was estimated to be 1,200,000 mt (before recycle) based on material balance calculations. Volume Two, Section B.3 describes the liquid effluent processing of secondary radioactive waste streams for all alternatives. In addition to these emissions, secondary waste consisting of contaminated filters and spent ion exchange resins would be generated during treatment operations.

The generation of off-gas during the vitrification process would result from the evaporation of water, thermal destruction of chemical compounds, evolution of volatile compounds, and the entrainment of particulates in the off-gas stream. A detailed description of the off-gas system is provided in Volume Two, Section B.3. Control technologies that would be employed to reduce emissions include: quench towers, venturi scrubbers, chillers, demisters, high-efficiency particulate air (HEPA) filtration, sulfur recovery, and NO_x destruction. The off-gas emissions from the vitrification plants are included in the risk assessment. The off-gas treatment processes that would be used are the same technologies that have been successfully used in commercial and defense nuclear industry as well as the chemical processing industry.

Comment Number 0072.102 *CTUIR*

Comment P 3-56: PP 5: What is the amount of secondary waste generated from this process? Will there be material that can be recycled? Will the secondary waste stream have to be reprocessed for additional radionuclide removal?

Response Secondary waste streams will include treatment for removal of radionuclide and chemical contaminants to the maximum extent possible before discharge. Off-gas streams will include various technologies to treat chemical and radionuclide emissions during operations. Liquid effluents would be

collected and sent to the onsite Liquid Effluent Treatment Facility for treatment. Please refer to the response to Comment numbers 0072.101 and 0072.109.

Comment Number 0072.103 *CTUIR*

Comment P 3-59: top of the page: Where does the strontium end up with this process, in the liquid or the solids phase?

Response The strontium will be mainly in the HLW solid phase during the enhanced sludge washing process used for the Ex Situ Intermediate Separations alternative. A small amount, approximately 6 percent of the strontium and decay product activity, would end up in the LAW.

Comment Number 0072.104 *CTUIR*

Comment P 3-59: Sect. 3.4.6.2: What was the process for determining the average feed stream, and what are the expected ranges for this feed stock in relation to the glass content and characteristics? What will be the process for determining what to do, in the case of 'out of operating' mode? Will this process entail stocking waste from the other tanks in order to blend the feed mixture? If this is the case, has this information been costed out to show how many and how large these out of ground tanks will be?

Response The technical data that served as a basis for developing the Ex Situ Intermediate Separations alternative is referenced in the EIS (WHC 1995i, j, n and Jacobs 1996) and available for review as part of the TWRS EIS Administrative Record and in DOE Reading Rooms and Information Repositories. Additional details regarding the facility layout, including the melter feed system and associated tankage, are provided in Volume Two, Section B.3.

The average feedstream was developed by taking the average overall chemical and radiological inventory including dilution water that would be added during waste retrieval operations. The material balance calculations assumed that the tank waste would be adjusted to 5 molar soluble sodium during retrieval and transfer. It is expected that there will be some variation in the feed stream composition during the waste treatment process. Compositional limits for waste feed would be established during the detail design phase and would take into consideration the affect of variability in the waste feed on the vitrification process, the acceptability of the glass, as well as safety concerns. Blending of the waste during retrieval and the ability to sample and blend waste in the lag storage area would minimize the variance in the waste feed. The lag storage and melter feed system would provide further opportunity for waste feed conditioning. The engineering data developed include the necessary equipment and processes to blend the waste feed and no additional out of ground tanks are required.

Comment Number 0072.105 *CTUIR*

Comment P 3-61: Sect. 3.4.6.2:. PP 3: S 1: The figure 3.4.9, depicts a sluicing module at the end of the end effector. If sluicing has to be discontinued because of tank leakage, please describe this sluicing module, and why it is depicted.

Response The sluicing module referred to in the comment would minimize the amount of water introduced to the tank during retrieval as compared to articulated arm method of sluicing. The articulated arm would be deployed when there was concern about the integrity of the tank or a potential for tank leakage. Other types of engineered modules, such as mechanical end effectors, could be used for selected retrieval operations with the articulated arm. Please refer to the response to Comment number 0029.01 for additional information concerning sluicing.

Comment Number 0072.106 *CTUIR*

Comment P 3-66: PP 1: S 7: Within this sentence there is a reference that silica is sand. Silica is not sand. Sand can consist of many things, including silicon dioxide.

Response Sand is commonly defined as loose, fine particles of disintegrated rock. The sentence that is referred to in the comment is describing glass formers, some of which may be either silica or sand (depending on the desired composition of the glass).

Comment Number 0072.107 *CTUIR*

Comment P 3-66 PP 2: S 1: Quenching molten glass will not necessarily make gravel sized pieces, in addition the pieces formed will have a high percentage of fractures, and necessarily a very large surface area, please explain how these cullets are better at resisting aging, and weathering, and where are the references for this process?

Response The treatment facilities that would produce glass cullet as a waste form would have equipment in place to produce uniform-sized cullet. Glass fines would be screened and recycled back to the melter and oversized cullet would pass through a roll crusher to produce cullet of acceptable size for handling. Glass cullet would have a larger surface area-to-volume ratio as compared to monolithic pours of glass (e.g., glass logs) in canisters. This discussion is included in Volume Two, Section B.3 of the EIS. Glass cullet would have higher leach rates than monolithic pours of glass due to the higher surface area-to-volume ratio. The acceptability of HLW glass cullet produced under the Ex Situ No Separations alternative is identified in Volume One, Sections 3.4 and 6.2 and Volume Two, Appendix B. The increased leaching for cullet was taken into account when the impacts associated with the immobilized LAW were analyzed in the EIS in Volume One, Section 5.2 and Volume Four, Appendix F. Please refer to the response to Comment numbers 0035.04, 0012.11, and 0052.11 for a discussion of waste form and storage issues.

Comment Number 0072.108 *CTUIR*

Comment P 3-67: PP 2: What does partial recycle of off gas mean? Does this mean that there is going to be a substantial amount of off gas released to the environment? Has this been incorporated into the risk section? Have the impacts of this off gas been assessed as to their affects to Native Americans?

Response Each tank waste alternative that uses high-temperature processing (vitrification or calcination) would make extensive use of recycle streams to recycle back into the treatment process volatile radionuclide and chemical constituents captured in the off-gas system. These recycle streams would minimize the generation of secondary waste. It has been determined that a bleed stream would be required for each alternative to avoid a continuous buildup of certain volatile radionuclides and chemical constituents, namely technetium and mercury, in these recycle streams. Complete recycle of the more volatile constituents is not possible. The off-gas emissions estimates used for risk assessment were developed considering volatility and the ability of the off-gas treatment system to capture and recycle individual constituents.

Please refer to the response to Comment numbers 0072.207 and 0072.91 for discussions on assessment of Native American risk resulting from routine air emissions during remediation. The Tribal consultation process is discussed in Comment number 0072.149.

Comment Number 0072.109 *CTUIR*

Comment P 3-68: PP 4: Bottom of the Page: One 22 metric ton per day HLW does not seem like enough, especially since there is going to be down times for change outs, plugging, melt inconsistencies, spills, and other process related problems. Wouldn't it be more prudent to plan for additional melt capacity above and beyond the 20 mt as allowances for capacity needs? Additionally, what is the total amount of secondary waste generated with his process? How will this compare to the global vitrification process already in use in France, and the United Kingdom? What are the expected off gases, and what are the treatment process being proposed? Are these gasses being addressed in the risk portion of this document?

Response The 20 mt (22 ton) melter capacity for HLW vitrification under the Ex Situ Intermediate Separations alternative was calculated using a 60 percent overall operating efficiency along with a 13-year operating duration. The 60 percent overall operating efficiency takes into account down time due to process-related problems.

The amount of secondary waste generated during operations of the Ex Situ Intermediate Separations alternative would consist primarily of off-gas and liquid effluent emissions identified in Volume Two, Section B.11, Tables B.11.05 (radiological) and B.11.06 (nonradiological) The off-gas and liquid effluents would be treated to remove contaminants to the maximum extent possible before being discharged. The HLW vitrification process would result in gas flows out the stack of approximately 230,000 mt over the life of the facility. The radiological and chemical concentrations that would be

released from the stack were calculated and used in the routine risk assessment. The liquid effluent from the HLW vitrification facility was estimated to be 72,000 mt based on material balance calculations. Volume Two, Section B.3 describes the liquid effluent processing of secondary radioactive waste streams for all of the alternatives. In addition to these emissions, secondary waste consisting of contaminated filters and spent ion exchange resins would be generated during treatment operations.

A discussion of foreign vitrification technologies can be found in Volume Two, Section B.9. A comparison of secondary waste generation at foreign vitrification facilities was not made; however, the generation of gaseous and liquid effluent streams would be expected to be the same for similar waste types and processing rates. Regulatory requirements for gaseous and liquid discharges would control the number and type of treatment technologies employed to reduce the risks to human health and environment. These requirements would be different in foreign countries. The Hanford Waste Vitrification Plant Foreign Alternatives Feasibility Study indicated that plants operating in foreign countries would require additional process equipment for treating melter off-gas and other effluents to meet United States environmental requirements.

The generation of off-gas during the vitrification process would result from the evaporation of water, thermal destruction of chemical compounds, evolution of volatile compounds, and entrainment of particulates in the off-gas stream. A detailed description of the off-gas system is provided in Volume Two, Section B.3. Control technologies that would be employed to reduce emissions include: quench towers, venturi scrubbers, chillers, demisters, HEPA filtration, sulfur removal, and NO_x destruction. The off-gas emissions from the vitrification plants are included in the risk assessment.

Comment Number 0072.110 *CTUIR*

Comment P 3-70: Sect. 3.4.6.5: Post Remediation: this section has to be, either removed or changed to reflect the clean closure option. Additionally during closure, the tanks are not supposed to have residual equal to 1 percent but should be less than 1 percent. The MUSTs, pump pits, valve boxes, and diversion boxes, final disposition has not been firmly established within this EIS. If these ancillary equipment are to be dealt with under clean closure conditions then they need further definement in terms of their contents, their extent of contamination and their disposal.

Response Closure is not included in the scope of this EIS because there is insufficient information concerning the amount of contamination to be remediated. However, Volume One, Section 3.3 addresses how tank waste remediation and closure are interrelated because some of the decisions made regarding how to treat and dispose of tank waste may impact future decisions on closure. There are three representative types of closure addressed. These include clean closure, modified closure, and closure as a landfill. The referenced paragraphs are included in Volume One, Section 3.4 to illustrate the type of activities following remediation rather than specifying the type of closure. The value of, "... a residual equal to no more than 1 percent ...," was used to bound the impacts from the tank residuals. Closure of ancillary equipment also is not included in the scope of this EIS. Issues related to

tank farm closure are discussed in Comment number 0072.08. Please refer to the response to Comment numbers 0012.14, 0072.50, and 0101.06 for MUST characterization and issues related to closure. Because the analysis requested in the comment is not within the scope of the EIS, no modification to the document is warranted.

Comment Number 0072.111 *CTUIR*

Comment P3-72: Sect. 3.4.6.7: Implementability: bullets 3,6: If Low Activity Waste has not been thoroughly described, and permitted, how does this EIS propose to deal with the enormous amount of uncertainty involved throughout all the process stages? This is not the easiest way of dealing with the waste. Because the Nuclear Regulatory Commission has not finished with the negotiations, why in Section 3.4.6.5., does it mention that this LAW be buried under the Hanford Barrier? Burying this waste in a cullet form under the Hanford Barrier is the same as saying DOE made the waste, used their contractors to partially treat it, buried it and then walked away leaving the Affected Tribes to deal with the consequences. This is not acceptable. The ex situ intermediate separations alternative therefore is not acceptable. Changes made to this alternative, such as determining the LAW disposal criteria will necessarily need CTUIR input.

Response DOE and Ecology acknowledge the concerns regarding uncertainty expressed in the comment. To develop engineering data required to perform impact analyses for each of the alternatives, assumptions were made regarding the technologies that have been configured to create a remediation alternative, including process stages and waste form. Also, for the purposes of comparing alternatives, a single and consistent method of closure was assumed for all of the alternatives. Closure as a landfill covered by a Hanford Barrier was chosen as the representative closure method for analysis. This does not mean that closure as a landfill is proposed or necessarily would be selected in the future. Please refer to the response to Comment number 0072.08 for more information regarding closure. Although these assumptions were based on best information available, applications of a similar technology, or engineering judgement, there are uncertainties associated with each of the alternatives. Major assumptions and uncertainties are addressed in Volume One, Section 3.4. Additional uncertainty analyses were completed for the Final EIS, and are included in Volume Five, Appendix K.

DOE and Ecology acknowledge the concerns regarding LAW expressed in the comment. LAW is the waste remaining after removal of as much of the radioactivity from HLW as practicable. DOE and the NRC had formal discussions on the way tank waste is classified and how the LAW portion might be regulated in the context of the previously planned grouted LAW. 58 FR 12344, March 1993, states that disposal of residual waste from the DST waste would only be a small fraction of the reprocessing wastes originally generated at the Site; residual waste material should be classified as incidental waste, since they are wastes incidental to the process of recovering HLW; the residual activity of these incidental wastes would be below the concentration limits for Class C wastes under the criteria of 10 CFR part 61; and the disposal of the residual would not be subject to NRC licensing. Section 6.2 provides additional information on tank waste classification, and the results of the discussions between DOE and the NRC. However, criteria must be formalized as to the extent to which the HLW in the

tanks must be separated for the residual waste to meet requirements for incidental waste (LAW) as well as the DOE definition of LLW and State of Washington definition of hazardous waste. Design specifications for HLW and LAW treatment will require that waste forms meet applicable criteria for disposal in the potential geologic repository, or as LAW for onsite disposal.

LAW disposal in onsite near-surface vaults was incorporated into the Ex Situ Intermediate Separations alternative, as well as all other ex situ alternatives except Ex Situ No Separations, because that is the current planning basis for the TWRS program as represented in the Tri-Party Agreement. The planning basis assumes that LAW will be vitrified and disposed of onsite in near-surface vaults. Further, it assumes that LAW will meet NRC criteria for incidental waste based on the extent of separations of LAW from HLW during the pretreatment process.

The disposal criteria for incidental waste is determined by the NRC and is well-established criteria. For the TWRS program, the issue at hand is whether the LAW waste stream, when vitrified, will be classified as incidental waste on the waste specifications. In the requests for proposals for Phase 1 of the privatization initiative, DOE defined the waste specifications for LAW that contractors would be required to meet. The waste specification was prepared to produce a waste that would be classified as incidental waste. DOE will consult with NRC to ensure that the waste meets applicable standards for incidental waste.

DOE and Ecology acknowledge the concerns regarding burial of vitrified cullet expressed in the comment. Cullet has a high surface area-to-volume ratio which results in lower long-term performance, including susceptibility to leaching. However, assuming vitrified LAW in cullet form for all of the ex situ alternatives provides a conservative analysis of the long-term impacts resulting from onsite retrievable disposal of LAW in near-surface vaults. Risks associated with retrievable disposal of LAW in vaults have been analyzed and these are presented in Appendix D.5. In addition, a Native American Scenario has been added to the Final EIS in Volume One, Section 5.11 and Appendix D. DOE and Ecology acknowledge the recommendation regarding consultation with Tribal Nations in determining LAW disposal criteria. Please refer to the response to Comment numbers 0035.04, 0012.11, and 0052.11 for related information.

Comment Number 0072.186 *CTUIR*

Comment P B-66: Sect. B.3.5: LLW is not the same as LAW, yet it appears that these terms are being used interchangeably. Because of this short time period for the review of this particular EIS. Please check for additional similar situations and correct them as is appropriate.

Response LLW is not the same as LAW. LAW is the waste remaining after removing as much radioactivity as practicable from HLW. The definition of LAW is provided in Volume One, Section 1.0, and addressed in more detail in Section 6.2. The term LAW used in Volume Two, Appendix B on page B-66 describes the waste stream after removal of the HLW components. The term is used correctly so no change to the EIS is warranted. Please refer to the response to Comment numbers

0005.25, 0072.118, 0072.117, and 0072.100 for issues related to regulatory definitions of Hanford tank wastes.

Comment Number 0072.187 *CTUIR*

Comment P B-95: PP 2: How will the insoluble sludges be suspended in the solution of soluble waste? How much volume of additional chemicals must be added? Will this be done in tank or in a receiving tank?

Response Following retrieval, where the sludges will be mobilized and suspended, the insoluble sludge particles will remain in suspension in the aqueous solution as long as the sludge particles have sufficient velocity. This velocity can be produced by such mechanical devices as pumps and mixers. The additional volume of chemicals to be added and the location of the addition point will be determined during the testing phase for this alternative.

Comment Number 0072.188 *CTUIR*

Comment P B-95: PP3: Why is it assumed that Cs is the only soluble radionuclide to be removed?

Response The engineering data package used in developing this alternative (WHC 1995j) assumed that only well-documented technologies would be used in developing the Ex Situ Intermediate Separations alternative. Cesium recovery by ion exchange is at present the sole technology that is well-documented for the recovery of soluble radionuclides. This assumption was then carried forward into the EIS. Removal of additional soluble radionuclides was included in the Phased Implementation and Ex Situ Extensive Separations alternatives.

Comment Number 0072.189 *CTUIR*

Comment P B-107: Sect. B.3.6: Calcining tank waste will result in a form not acceptable at the permanent waste repository.

Response The calcined HLW form would not meet the standard waste form (i.e., borosilicate glass) specified in the current waste acceptance requirements for the potential geologic repository. NEPA requires that an EIS address the full range of reasonable alternatives, including alternatives that would not be in compliance with laws and regulations. Please refer to the response to Comment number 0072.80 for a discussion of the NEPA requirement to consider reasonable alternatives regardless of their ability to comply with regulations. Volume One, Sections 3.4 and 6.2 and Volume Two, Section B.3 address regulatory compliance issues related to each of the alternatives. Please refer to the response to Comment number 0012.20 for a discussion of glass types and regulatory licensing issues.

Comment Number 0089.09 *Nez Perce Tribe ERWM*

Comment Page 3-66, Paragraph 2
It states that, with ex situ vitrification, LAW will be melted and flow into a water bath to break the glass formed into cullets, later the cullets will be bonded in a matrix material before onsite disposal. The EIS does not indicate what matrix material will be used to hold the cullets together. It is a concern that the matrix may not be as resistant to degradation as the vitrified glass allowing breakdown and waste surface area to increase. Whatever the matrix material is it will than also become LAW along with the glassformers used to create the product. Why not leave the LAW as a full size molded product rather than increasing the surface area for chemical breakdown by forming cullets. Surely a suitable configuration can be found for the molded LAW, that will not require forming cullets.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Matrix material composition and final waste form would be evaluated during the detailed design phase that would follow selection of this specific remedy, if this selection occurs. Volume One, Section 3.4 addresses waste composition and the reasons for assuming a vitrified low-activity cullet form. Cullet would provide processing and material handling advantages for high-capacity processing facilities; however, cullet has a high surface area-to-volume ratio, which results in lower long-term performance. Please see the response to Comment numbers 0005.40 and 0072.89 for a discussion of how the cullet waste form provides a bounding impact analysis. The response to Comment numbers 0035.04, 0052.11, and 0012.11 contain discussions concerning waste form.

L.3.4.8 Ex Situ No Separations Alternative

Comment Number 0005.48 *Swanson, John L.*

Comment The second paragraph under "Vitrification Process" on page 3-74 appears to be garbled. On balance, it appears to be addressing LAW vitrification, but it specifically says HLW glass.

Response The second paragraph under Vitrification Process on the referenced page may appear to discuss LAW vitrification, but the section heading is Ex Situ No Separations alternative, meaning that all of the glass waste produced is HLW. The first paragraph under Vitrification Process states that the HLW facility capacity is provided by two melters operating in parallel. The paragraph identifies HLW glass because this paragraph discusses only the HLW process as the only applicable process for discussion under this alternative. The text has been revised to clarify the discussion regarding vitrification under the Ex Situ No Separations alternative in Volume One, Section 3.4.

Comment Number 0057.07 *Garfield, John*

Comment Other things like the calcination case mentioned two calciners at a processing rate of 200 tons per day. You may be able to accomplish a solidified moltent sodium process at those rates but drying the waste to a calcine form would require something on the order of 20 to 40 calciners.

The physics are not there to do it at a 100 tons per calciner. That is a technical error that should also be fixed.

Response A more detailed description of the conceptual calciner is discussed in Volume Two, Section B.3. The discussion in Volume One, Section 3.4 is a summary level discussion. The calciner design is modeled after available laboratory data. Additional details including mass and energy balances for the calcining process are available for review in the TWRS EIS Administrative Record and in DOE Reading Rooms and Information Repositories. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0072.112 *CTUIR*

Comment P 3-73: Sect.3.4.7: PP 4: Because this is a retrieval EIS not a closure EIS, this paragraph should be removed, or the language strengthened to indicate that there are several closure options.

Response Cost estimates for the removal and treatment alternatives included several Site closure assumptions (e.g., the Hanford Barrier), which are discussed in Volume One, Section 3.4.1.4, Major Assumptions and Uncertainties to provide an equal basis of comparison among alternatives. The text is considered appropriate within the context of the section and therefore no revisions to the text are required. For an extensive discussion of all issues related to closure, please refer to the response to Comment numbers 0072.08, 0019.03, 0019.04, and 0101.06.

Comment Number 0072.113 *CTUIR*

Comment P 3-74: Calcination Process: This process results in an unacceptable waste form for the permanent repository and thus this section should be removed or edited to clearly state the consequences of producing an unstable waste form that will spread to the environment.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The information requested in the comment is in the EIS. The Summary, Section S.7.1, Volume One, Section 3.4.7.7, and Volume Two, Section B.3.6.4 discuss the fact that the calcined waste form would not meet the current waste acceptance criteria for the potential geologic repository. NEPA requires that an EIS address the full range of reasonable alternatives, including alternatives that would not be in compliance with laws and regulations. For a discussion of this requirement, see the response to Comment number 0072.80. Volume One, Section 6.2 and Volume Two, Appendix B.3 also address regulatory compliance issues related to each of the alternatives. The radiological impacts of transporting the calcined HLW are analyzed in Volume Four, Section E.7.4.1.1.

Comment Number 0072.114 *CTUIR*

Comment P 3-76: PP 2: This paragraph relates to a process that produces a product that is unacceptable for the permanent waste facility, this paragraph should be removed or edited to clearly state the consequences.

Response Please refer to the response to Comment number 0072.113.

Comment Number 0072.115 *CTUIR*

Comment P 3-76: PP 3: S 2: This sentence refers to the closure process which is not within the scope of this EIS and should be removed or edited to clearly state the reasoning and the consequences and additional closure alternatives associated with this action.

Response Please refer to the response to Comment numbers 0072.112 and 0072.08.

Comment Number 0072.116 *CTUIR*

Comment P 3-77: Sect. 3.4.7.5: This section refers to the closure process and should either be removed or edited to reflect additional closure options such as the clean closure option of removing the tanks and the contaminated underlying soils as not to preclude all closure options.

Response Please refer to the response to Comment numbers 0072.112 and 0072.08.

L.3.4.9 Ex Situ Extensive Separations Alternative

Comment Number 0005.49 *Swanson, John L.*

Comment The first paragraph on page 3-80 refers to "--multiple complex chemical separations--." It appears to me that the use of the word "complex" is editorializing, and that word should be deleted. The last sentence of that paragraph says "--fewer radioactive contaminants--"; a more accurate statement would be "--lower concentrations of radioactive contaminants--"

Response It is true that the term "fewer radioactive contaminants" would mean less radioactive isotopes in the LAW and "lower concentrations of the radioactive contaminants in the LAW." The text in Volume One, Section 3.4 has been revised to reflect lower concentrations of radioactive contaminants in the LAW.

The term "complex" is intended to give the reader a feeling for the number, complexity, and level of development for the multiple separations processes used for the Ex Situ Extensive Separations alternative; therefore, the term conveys accurate and useful information.

Comment Number 0005.50 *Swanson, John L.*

Comment The second paragraph on page 3-80 includes Jacobs Engineering as a Site M&O contractor, which is incorrect.

Response The cited statement references information obtained from the Site Management and Operations contractor documents, one of which was prepared by Jacobs Engineering Group Inc. (i.e., Jacobs 1996), and does not state, nor is meant to imply, that Jacobs is the Site Management and Operations contractor. Therefore, the statement has not been revised.

Comment Number 0036.13 *HEAL*

Comment The EIS is inaccurate in addressing technical risk.
As noted above, DOE has conducted many analyses of the alternatives for treating and disposing Hanford tank wastes. Compared with many of these analyses, the EIS is relatively useless in communicating varying degrees of technical risk.

For example, following is a quote from the EIS on the technical risk involved with the intermediate separations technology: "Performance of key processes (e.g., solid liquid separation) has been assumed in the absence of substantive data" (p. 3-72). Next is a quote addressing the technical risk involved with extensive separations: "The key implementability issue associated with this alternative is that the performance of key separations processes has been assumed in the absence of substantive data" (p. 3-85).

The two above quotes say exactly the same thing: There is no qualitative difference between the technical risk involved in intermediate separations and the technical risk involved in extensive separations. Extensive separations is a complex, essentially science fiction technology that has little chance of becoming practical for use on tank waste. It has not been utilized except on a laboratory scale. Intermediate separations, on the other hand, has been used in several places and is relatively simple. The key concern is whether intermediate separations will work on the scale that it must to be useful to the tank program. The list of concerns with extensive separations is almost as long as the TWRS EIS. The approach in the EIS is tantamount to saying that building a car that can go 250 miles per hour involves the same amount of technical risk as building one that can go 2,500 miles per hour.

The position of the Northwest's stakeholders on this issue is clear: The TWRS Task Force stated:

> The high cost and uncertainty of high-tech pretreatment and R&D threatens funding for higher performance low-level waste form, vitrification, and cleanup. Use the most practicable, timely, available technology, while leaving room for future innovation. Keep a folio of technological options and make strategic investments over time to support a limited number of promising options. Give up further research on unlikely options.

The lack of honest, frank text concerning technical risk seriously misleads the public and decision makers and unfairly prejudices judgement on the separations issue.

Response In response to the issue of assessment of technical risk; the EIS discusses the ability to implement the alternatives to provide additional information to decision makers. The implementability of a remedial alternative is a function of its history of demonstrated performance and its ability to be constructed and operated. In the case of both the Ex Situ Intermediate Separations and Ex Situ Extensive Separations alternatives, there is no history of demonstrated performance on the Hanford tank wastes. Bench-scale testing is currently underway for the Ex Situ Intermediate Separations alternative. No testing is underway for the Ex Situ Extensive Separations alternative at the Hanford Site; however, a process that is similar to the Intermediate Separations alternative is being used on the tank wastes at the Savannah River Site. It would be premature to state that intermediate separations has been used in several places and is relatively simple, especially with the operation problems that have occurred at the Savannah River Site. To provide the engineering information required for the EIS, the engineering data packages for both alternatives (WHC 1995e and WHC 1995j) assumed the performance of key processes in the absence of substantive data, leading to the same essential statement in the EIS. The inclusion of both the Ex Situ Intermediate Separations and Ex Situ Extensive Separations alternatives is the result of providing a range of reasonable alternatives to the decision makers, and no change has been made to the EIS. DOE and Ecology believes that the uncertainties are expressed in an unbiased and accurate manner.

Regarding the issue of alternatives that should or should not be considered in the EIS, NEPA requires DOE and Ecology to examine a full range of alternatives in the EIS. This range of alternatives must include a No Action alternative, and may then include other reasonable alternatives to allow an analysis of a full range of alternatives. Among the four major categories of alternatives examined in the EIS was a category involving extensive retrieval of the wastes from the tanks. Following retrieval, the HLW is separated from the LAW. The degrees of separation of these two types of wastes may range from no separations, to intermediate separations, to extensive separations. For more information on how the EIS developed alternatives consistent with the recommendation of the Tank Waste Task Force, see the response to Comment numbers 0072.05 and 0038.05. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0055.09 *Martin, Todd*

Comment The EIS is somewhat inaccurate in addressing technical risk for pretreatment. If you look at the language addressing the intermediate separations essentially sludge washing which we have a pretty good idea of how to do and the extensive separations which I have often characterized as science-fiction technology, the language is almost identical. It basically says there is uncertainty here because these are first of the time processes. I agree with that but one is much more technically uncertain the extensive separations than the other and I think the EIS should reflect that.

Response Please refer to the response to Comment number 0036.13.

Comment Number 0072.117 *CTUIR*

Comment P 3-81: PP 2-5: the LAW form as described here, is not an acceptable form because it does not meet the regulatory criteria, and the process results in a waste form that is very susceptible to leaching of high activity components. This section also needs to be redone to assume a glass form as the final waste product.

Response The Ex Situ Extensive Separations alternative would meet the requirements for disposal of HLW and LLW. However, residuals left in tanks would not meet the water protection standards if additional closure is not performed. Closure is not included in the scope of this EIS; however, closure for the tanks and residuals would be addressed in a future closure plan. The EPA is considering a rule to further regulate LLW disposal facilities; and the final design of the onsite LAW disposal facility may be impacted by EPA rule 40 CFR 193. A discussion of the ability of each tank waste alternative to enable DOE to comply with Federal and State regulations is included in Volume One, Section 6.2. Specifics of the matrix material and waste form would be final design issues. Volume One, Section 3.4 addresses waste composition and the reasons for assuming a vitrified LAW cullet form.

Please refer to the response to Comment numbers 0005.40, 0072.89, and 0072.107 for discussions of the cullet waste form and how cullet provides a basis for a conservative analysis of long-term impacts. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.118 *CTUIR*

Comment P 3-83: Sect. 3.4.8.4: Operation: The LAW description needs to be edited, removing the last two bullets.

Response Specifics of the matrix material and waste form would be final design issues; however, for the purposes of analyzing the ex situ alternatives in this EIS, LAW was assumed to be produced in vitrified cullet form. The referenced text correctly describes the operations involved in producing this type of waste form. Volume One, Section 3.4 addresses waste composition and the reasons for assuming a vitrified LAW cullet form. Cullet would provide processing and material handling advantages for high-capacity processing facilities; however, cullet has a high surface area-to-volume ratio, which results in lower long-term performance. Assuming vitrified LAW in cullet form for all of the ex situ alternatives provides a conservative analysis of the long-term impacts resulting from onsite disposal of LAW. No change to Volume One, Section 3.4 is required.

For a discussion of regulatory requirements for onsite disposal of LAW please refer to the response to Comment number 0072.111.

Risks associated with retrievable disposal of LAW in vaults have been analyzed and these are presented in Volume Three, Appendix D.5. In addition, a Native American Scenario has been added to the Final EIS in Volume One, Section 5.11 and Appendix D.

Please refer to the response to Comment numbers 0005.40, 0012.11, 0072.11, 0035.04, 0052.01, 0072.89, 0072.107, and 0072.117 for related information. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0072.119 *CTUIR*

Comment P 3-84: Sect 3.4.8.5: Post Remediation: second and third paragraphs: these two paragraphs need to be removed because this EIS is a retrieval EIS and closure options are not within the scope. If closure options were within the scope of this EIS then the option would necessarily be clean closure and removal of the tanks, underlying soil contamination, ancillary equipment, and MUSTs as not to prejudice future options for closure.

Response Please refer to the response to Comment numbers 0072.08 and 0072.112.

Comment Number 0072.190 *CTUIR*

Comment P B-115: Sect. B.3.7: The definition of LAW indicates that there will be a HLW component. This is unacceptable in terms of long term risk.

Response Volume Two, Section B.3.7.1 describes the extent to which the treatment processes are used to separate HLW from the tanks waste. LAW is the waste remaining after removing as much of the radioactivity as practicable. The definition of LAW is provided in Volume One, Section 1.0, and tank waste classification (e.g., Class A, B, C) is addressed in more detail in Section 6.2. NRC Class A waste contains the least amount of radioactivity. Long-term risk has been analyzed for each of the alternatives and waste forms, and this is presented in Volume One, Section 5.11, and addressed in more detail in Volume Three, Appendix D.4.7. Because the information contained in the Draft EIS is correct, no change to the text was made.

For more information on LAW, LLW, and HLW definitions, please refer to the discussions contained in the response to Comment numbers 0072.100, 0072.111, 0072.117, and 0072.118.

Comment Number 0072.191 *CTUIR*

Comment P B-119: Fig. B.3.7.2: This figure, to be acceptable, should have LLW exchanged for LAW and interim on site storage exchanged for on site disposal.

Response Figure B.3.7.2 accurately depicts the process flow of the Ex Situ Extensive Separations alternative described in Volume Two, Appendix B, Section B.3.7. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

L.3.4.10 Ex Situ/In Situ Combination 1 Alternative

Comment Number 0005.09 *Swanson, John L.*

Comment The two combined ex situ/in situ alternatives discussed in the EIS speak of remediating a large fraction of the risk while remediating only a small fraction of the tanks. Such statements imply a knowledge of tank-by-tank inventory data that is much better than that given in the EIS. What data (or assumptions) were used for these alternatives? What accuracy do they have? Without evaluation of these factors, it is not possible to evaluate whether these combined alternatives are worth considering. Thus I feel that the current presentation of these combined alternatives is very biased in their favor.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The TWRS EIS addresses many potential criteria that could be used to develop a selection process and acknowledges that additional waste characterization and analysis would be required to implement this alternative (Volume Two, Appendix B, page B-127). Please also refer to the response to Comment number 0072.192. The data used for tank-by-tank analysis were based on SST and DST inventory data presented in summary form in Volume Two, Appendix A. DOE and Ecology believe that the existing historical data, laboratory data, and characterization reports, which provide the basis for the tank waste inventory used in the EIS, are adequate for detailed evaluation of impacts. The EIS acknowledges the uncertainties associated with the tank waste inventory, and accordingly uses a bounding approach to impacts assessment based on the available data.

The ex situ/in situ alternatives were developed to assess the impacts of combining two or more of the tank waste alternatives. Recognizing that tank waste differs greatly in the physical, chemical, and radiological characteristics, it may be appropriate to implement different alternatives for different tanks. These alternatives were developed to bound the impacts that could result from a combination of alternatives and are intended to represent a variety of potential alternative combinations that could be developed to remediate the tank waste. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted. Please refer to the response to Comment number 0005.03 for a discussion of assumptions and uncertainty ranges used in the alternatives analyses.

Comment Number 0072.120 *CTUIR*

Comment P 3-86: Ex Situ/In Situ Combination Alternative: Technical staff agree that it may be necessary to implement an alternative treatment process for Tank wastes due to their varied contents, but the alternative of in situ treatment is unacceptable. The people of the CTUIR have been made involuntarily responsible for the waste DOE produced on CTUIR ceded land, and do not and should

not, have to bear the responsibility of the enormous excess risk from in situ process. Therefore this alternative is unacceptable both in idea and in implementation.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste.

NEPA requires DOE and Ecology to examine a full range of alternatives in the EIS. The Ex Situ/In Situ Combination alternative was developed to assess the impacts that would result if a combination of two or more of the tank waste alternatives were selected for implementation. Because the tank waste differs greatly in its characteristics, it may be appropriate to implement different alternatives for different tanks. The Ex Situ/In Situ Combination alternative represents a combination of the In Situ Fill and Cap and Ex Situ Intermediate Separations alternatives, and as such can be considered as one of the reasonable alternatives for evaluation. It is intended to represent a variety of potential alternative combinations that could be developed to remediate tank waste. Because this alternative is one of the full range of alternatives developed in the EIS, the document has not been changed. For the Final EIS, a second combination alternative that was presented in the Draft EIS, has been fully described and impacts have been analyzed. This alternative is described in Volume One, Section 3.4 and impacts of the alternative are described in Volume One, Section 5.0 and associated appendices.

Comment Number 0072.192 *CTUIR*

Comment P B-126: Sect. B.3.8: This alternative is unacceptable in that there is an illegal in situ component. Additionally the characterization process has not adequately justified that they know where 90 percent of the contaminants that contribute to long term risk are located, or how to get at them for treatment.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste.

The Ex Situ/In Situ Combination alternative was developed to represent a variety of potential alternative combinations that could be developed to remediate the tank waste. Existing uncertainty associated with the tank waste inventory data must be resolved and additional tank characterization is required before final design of any alternative. Please refer to the response to Comment number 0005.09. Several activities that involve collecting and analyzing data on tank contents are ongoing, including the Tank Characterization program. Data obtained from this program would be used for refining remediation process design. Please refer to the response to Comment numbers 0012.14 and 0072.07 for discussions on characterization of tank inventory. Volume Two, Appendix A,

Section A.3 and Volume Two, Appendix B, Section B.1 address tank inventory data and ongoing waste characterization programs, and Volume Three, Appendices D and Volume Four, Appendix E address

anticipated risk and accidents. Volume Five, Appendix K addresses the uncertainties associated with human health risks associated with this and other alternatives.

L.3.4.11 Phased Implementation Alternative

Comment Number 0005.51 *Swanson, John L.*

Comment Page 3-94 says "Separations prior to LAW processing---." I believe that the word IMMOBILIZATION or VITRIFICATION should be substituted for the word PROCESSING.

Response The Phased Implementation alternative description has been revised as follows, "Separations prior to LAW immobilization would be performed to remove the cesium, strontium, technetium, TRU elements, and entrained sludge particles from the waste stream to the extent required to meet LAW product specifications."

Comment Number 0005.52 *Swanson, John L.*

Comment The first two paragraphs on page 3-99 appear to be "lifted" from a privatization write-up, in that they talk of what functions are to be performed by DOE. This EIS assumes that all the functions will be performed by DOE.

Response Volume One, Section 3.4 has been revised as follows for the Phased Implementation alternative, "The waste (mainly DST liquid waste) would be retrieved and transferred to receiver tanks for LAW treatment." The cited text in Volume One has been revised as follows, "Separated cesium and technetium radionuclides would be stored at the treatment facilities or packaged for interim onsite storage at the Canister Storage Building."

Comment Number 0005.53 *Swanson, John L.*

Comment On page 3-99 it is stated that Phase 2 sludge washing will be performed in-tank. Is that really the intent?

Response The text regarding sludge washing has been revised in Volume One, Section 3.4 to remove the reference to in-tank sludge washing.

Comment Number 0005.54 *Swanson, John L.*

Comment I do not understand how the Phased Implementation approach can have R&D costs of only $190,000,000 (page 3-100) when those costs are $820,000,000 (page 3-71) for the intermediate separations alternative, which involves fewer pretreatment steps. Can you explain this?

Response Because Phase 1 of the Phased Implementation alternative would be a demonstration process, the research and development cost for the treatment process was assumed to be part of the

Phase 1 cost. Research and development cost associated with the waste retrieval and transfer function was included at the same level as the other ex situ alternatives. Development programs currently are ongoing at the Site that are covered under the TWRS program or under other programs.

Comment Number 0032.05 *Heacock, Harold*

Comment In regard to the Department's currently planned method of implementing this program which is based upon the privatization of the work performance, we are not addressing that issue at this time. However, we have previously supported the privatization concept in other statements.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Comment numbers 0032.06, 0043.04, and 0060.01 contain information concerning privatization and associated issues related to privatization.

Comment Number 0032.06 *Heacock, Harold*

Comment Funding of the privatization program through the proposed budgeting set-aside at the expense of other Hanford Site cleanup programs and the concurrent failure to meet all Tri-Party Agreement commitments is not acceptable.

Response Changes to the TWRS program were incorporated into the Phased Implementation alternative, as required by the proposed 1996 Tri-Party Agreement amendments; therefore, Phased Implementation would not deviate from the Tri-Party Agreement or any other applicable regulation. DOE and Ecology intend to comply with all Federal, State, and local regulations and ordinances applicable to tank waste remediation. Funding for privatization is outside the scope of the TWRS EIS. The response to Comment number 0043.04 contains a discussion of privatization issues.

Comment Number 0035.06 *Martin, Todd*

Comment More specifically, I do not trust the costs just in general in the EIS. For example, the EIS assumes that for about 250 million dollars, the DOE can build a 20-ton a day low-level vitrification facility.

Everybody who has been in Hanford circles for years remembers that the Hanford waste vitrification plant, a one to three metric ton a day facility was going to cost one point three billion dollars.

What does the EIS say DOE can build essentially the same facility now for? About 232 million, about one-fifth the cost.

In totality, in the preferred alternative for phase one the EIS says that the two 20-ton a day vitrification facilities, two pretreatment facilities tied onto the side, and one HLW vitrification facility, in total five facilities, can be built for about one point four billion.

Again, I refer back to the one relatively small vitrification facility that DOE said that it would take one point three billion to build. I say no way can DOE build these facilities for that cost.

Are these costs due to privatization savings? The answer to that is no. The EIS does not deal with privatization. It assumes that these are traditional DOE facilities.

Further, if these costs are actually correct, there is not a need for privatization. The privatization set-aside account that everybody has been wrangling over the last couple of months has more than enough money in it right now to start building these facilities and get on with cleanup.

Either these numbers need to be changed, or we need to switch paths and start building vitrification facilities.

Response Please refer to the response to Comment numbers 0055,06 and 0057.06 for a discussion of the approach used to develop the cost estimate for this alternative.

The HWVP capital cost estimate is not directly comparable to the capital cost estimated for the Phase 1 HLW facility because it includes support facilities and infrastructure that are estimated as separate components for Phased Implementation.

The cost estimating methodology has been reviewed and revised cost estimates have been completed for the Phased Implementation and combination alternatives. These revised costs are shown in Volume One, Section 3.4 and in Volume Two, Appendix B.

Comment Number 0035.07 *Martin, Todd*

Comment Just in my cursory look at some of the other costs in the EIS things jump out at me. For instance, in the preferred alternative, phase one, basically DOE has to retrieve about 36 tanks to vitrify in that phase.

How much does the EIS say this will cost? Zero dollars. Not a penny. I think there are some retrieval costs there. There must be.

Response During Phase 1, readily retrievable and well-characterized DST waste would be retrieved and transferred to two DSTs used as receiver tanks for the demonstration facilities. This retrieval effort was assumed to be accomplished by using the existing tank farm work force and infrastructure, in the same manner that wastes currently are transferred. The cost associated with DST waste retrieval during Phase 1 was assumed to fall within continued operations. Continued operations costs of

$1.58 billion, including 10,000 person-years of labor, were included in the cost estimate for Phased Implementation. The Draft EIS also states that selected SST wastes could be processed during Phase 1. It was assumed that wastes retrieved under retrieval demonstrations (e.g., tank 106-C) could be transferred to the demonstration facilities. Because the cost associated with these retrieval demonstrations is included in other programs, it is not included in the estimate for Phase 1, but is accounted for in the estimate for continued operations of the tank farms. The cost involved would be small in comparison to the overall project costs.

The Phased Implementation alternative identified in the TWRS Draft EIS would produce, during Phase 1, approximately 11 percent of the total LAW volume. Waste retrieval would not be required from 36 tanks during Phase 1.

DOE and Ecology have reviewed and revised the cost estimates for the Phased Implementation alternative for the Final EIS. These revisions are shown in Volume One, Section 3.4 and Volume Two, Appendix B, and are reflected in the Summary.

Comment Number 0036.03 *HEAL*

Comment The costs in the EIS are incredible and must be redone. The EIS should not be finalized until a formal, credible data package for the preferred alternative is completed.
The EIS assumes the following for Phase 1 of the preferred alternative:

1. The cost of a 100 metric ton per day vitrification facility is half the cost of a 200 ton per day facility. There is no engineering data to support this assumption. In fact, there is data to refute it. About 15 percent of the cost of a vitrification facility is dependent upon its throughput (the rate at which it makes glass). Therefore, the cost of a 100 metric ton per day facility would be less than a 200 ton per day facility -- but not much less -- and certainly not 50 percent less.

2. The "six tenths rule" is an engineering rule used for extrapolating the cost differences between chemical facilities of different sizes. The EIS uses this to determine the costs of vitrification facilities of different sizes. This is a wholly inappropriate use of the rule. Again, it applies for facilities where about 85 percent of the facility cost is dependent upon processing equipment -- primarily chemical facilities. Vitrification facilities only have about 15 percent of their cost dependent on processing equipment. Therefore, vitrification facility costs are not particularly sensitive to sizing differences -- which means use of the "six tenths rule" results in grossly underestimated costs.

These two assumptions have resulted in grossly underestimated costs for the preferred alternative.
The EIS estimates the cost of the Phase 1 facilities as follows:

- A 20 metric ton per day LAW vitrification facility can be built for $248 million.
- A 1 ton per day HLW vitrification facility can be built for $232 million.

Comparing these numbers to much more rigorously developed cost estimates we can see exactly how far off the EIS's numbers are. The Hanford Waste Vitrification Plant, which was designed to produce between 1 and 3 tons per day of glass, was estimated to cost $1.3 billion. This is almost exactly the same facility that the EIS says DOE can build for $232 million.

The EIS claims that for Phase 1 the total capital cost will be $1.4 billion. In other words, DOE is going to build two 20 ton per day LAW vitrification facilities, a one ton a day HLW vitrification facility and two pretreatment facilities for about the same cost as the one ton per day Hanford Waste Vitrification Plant!

Response Please refer to the response to Comment numbers 0035.04, 0035.06, 0055.06, and 0057.06.

Comment Number 0036.04 *HEAL*

Comment If the costs in the EIS are indeed accurate, there is no need for privatization.
If DOE's cost estimates are accurate, there is no need to take the extra risks of privatization. All of DOE's cries that there is not enough money to build vitrification facilities are false. The money DOE is currently putting in a set aside fund for privatization is more than enough to build these vitrification facilities.

Response Phased Implementation approach reduces the technical risk associated with tank waste remediation over a full implementation alternative. Phased Implementation also provides a greater opportunity to reduce overall program costs by applying lessons learned and experience gained during Phase 1 to the design and construction of the full-scale Phase 2 treatment facilities. The cost estimates developed for the TWRS EIS were developed using common assumptions. The Phased Implementation alternative cost estimate assumed the same contracting strategy, government-owned and contractor operated, as the other alternatives. As discussed in Volume One, Section 3.3, the EIS does not address the contracting strategy that would be used to privatize tank waste remediation. Please refer to the response to Comment number 0043.04 for more information.

Comment Number 0036.05 *HEAL*

Comment A cursory review of the cost estimates identified many other problems. Following are just a few: The EIS assumes that tank farm operation costs will be the same for both the Phased Implementation and Ex Situ Intermediate Separations alternatives. This is a faulty assumption.
The Intermediate Separations alternative would begin treating waste in 2004 at a relatively high rate, resulting in tanks being emptied. This would allow DOE to dramatically reduce its tank farm operation costs. The estimate for operations for Intermediate Separations is $8.6 billion.

The operations estimate for the Phased Implementation alternative is also $8.6 billion. It should be much higher. Phased Implementation will treat waste at a much slower rate than Intermediate

Separations, requiring DOE to fund operations programs for a longer period of time and thus at a higher level.

Response A difference in the rate at which the cost declined for different rates of processing is expected. Many of the factors that would control the ongoing tank farm operations cost would be the monitoring and maintenance requirements and how these requirements were reduced for individual tanks and tank farms. The monitoring and maintenance requirements for a tank farm may not be appreciably lower until all of the tanks within that tank farm are empty. The tank retrieval sequencing and blending strategy, which have not been finalized, would identify when waste retrieval from individual tanks and tank farms would be complete.

Because of the conceptual level of development, it was assumed for the purposes of the TWRS EIS that continued tank farm operations cost for Phased Implementation would be the same as for the Ex Situ Intermediate Separations alternative. In fact, the difference between level funding and the annual reductions in operating cost associated with the Ex Situ Intermediate Separations alternative for the years 2004 through 2011 totals $141 million or approximately 1.6 percent of the total $8,600 million used in the TWRS EIS for continued tank farm operations.

DOE and Ecology have reviewed and revised the cost estimates appropriately for the Phased Implementation alternative. These revised cost estimates have been presented in the Final EIS in Volume One, Section 3.4 and Volume Two, Appendix B.

Comment Number 0036.06 *HEAL*

Comment To support the Tri-Party Agreement, DOE must retrieve waste from 36 tanks in Phase 1 of the Phased Implementation alternative. The EIS estimates that this will cost $0. Surely there is a cost associated with retrieving the high-level waste from 36 tanks.

HEAL finds the estimates in the EIS to be utterly devoid of credibility and insists that the EIS not be finalized until a credible, formal data package for the preferred alternative is completed.

Response Please refer to the response to Comment number 0035.07 which addresses a similarly worded comment.

Comment Number 0036.11 *HEAL*

Comment The EIS must require vitrification as technology for tank waste treatment.
For all alternatives, except the Phased Implementation alternative, the EIS assumes vitrification will be the immobilization technology. The EIS provides no rationale as to why this alternative does not also require vitrification. Given that it is the preferred alternative, this is even more disturbing.

Vitrification has been the technology that stakeholders have found acceptable. It balances the concerns for a safe waste form with a relatively available technology that allows DOE to "get on with it." Any changes to the assumed use of vitrification must be accompanied by a compelling argument outlining any emerging technologies that better respond to stakeholder values. HEAL has not seen such an argument, and strongly doubts that one could be made.

The TWRS privatization initiative, upon which the Phased Implementation alternative was designed, also fails to require vitrification as a technology. It appears that this EIS has been designed to "fit" the decision to not require glass as a waste form in the privatization Request for Proposals.

Response Please refer to the response to Comment number 0035.02 which addresses a similarly worded comment.

Comment Number 0036.15 *HEAL*

Comment EIS does not show any effects of privatization.
DOE has spent over a year in an unsuccessful attempt to sell its privatization plan to the public. Cost is one of the many concerns that the public has raised with DOE. DOE has consistently held that privatization would cost 30 percent less than a traditional approach. DOE has been unable to furnish the public with any information that supports the above assertion.

The EIS continues the information void concerning the benefits of privatization. The EIS refers to privatization in the description of the Phased Implementation alternative, "under Phased Implementation, either DOE or a private contractor would design, build, and operate ... (the facilities)" (p. 3-23). As was pointed out above, DOE has held that the differences between a traditional government-owned, contractor-operated approach, and the contractor-owned and operated privatization approach were "revolutionary." Yet the EIS fails to show the different impacts of this revolutionary approach. Worse, the EIS is not explicitly clear about which approach -- privatization or traditional GOCO -- is being analyzed.

The EIS does allude to how the cost estimates for Phased Implementation were reached. It was developed by, "... combining applicable components from other ex situ alternatives and applying rations as required to account for differences in facility sizes and capacities and the degree of separations in LLW and HLW" (p. 3-99). Engineering data in the TWRS program over the years has shown that facility capacity and size do not have a large impact on facility cost.

The cost savings that DOE claims are virtually guaranteed are not evident in the EIS. The Tri-Party Agreement case is estimated to be $30-41 billion and Phased Implementation $32-42 billion. Where are the savings?

Response The EIS addresses the potential environmental impacts associated with a Phased Implementation approach to tank waste remediation. It was assumed for cost estimating purposes that

the Phased Implementation alternative would use the traditional government owned-contractor operated contracting strategy. This was done to allow the reader to make an equitable comparison among the alternatives. A potential exists to reduce the cost for tank waste remediation by allowing the market place to establish, through the competitive bidding process, the cost for waste treatment. Cost savings projections that might result from privatization are not included in the EIS in an effort to maintain the competitive bidding process.

The fact that privatization is not addressed in this EIS is discussed in Volume One, Section 3.3. DOE believes that privatization will result in an overall cost savings for the project but has not published an estimate of savings that may result. The 30 percent figure identified in the comment is reasonably consistent with the cost savings resulting from other activities the federal government has privatized. Privatization is not within the scope of the EIS. Please refer to the response to Comment numbers 0036.05, 0036.04, 0055.06, and 0057.06.

Comment Number 0037.05 *Elredge, Maureen*

Comment Mostly I am concerned with further cost estimates throughout the EIS. They seem to be questionable. And I am particularly concerned that the preferred alternative is widely perceived as a privatization alternative which is supposed to save money, and yet this is not made evident in the document.

I want to urge you to use extreme caution both in assuming that the preferred alternative will be cheaper, and even more so in assuming that a privatization scheme will be a success.

When the cleanup program was being pummeled in Congress and the media last year, privatization was held up as the Holy Grail, sort of along the lines of please give us another chance. We will bring in corporate America. They will fix everything. We will be fine. Please give us our money.

We do not need Holy Grails. We need progress. We need action on the ground now. If privatization efforts fail it will be a disaster not only for Hanford but for the entire cleanup program. Thank you.

Response Please refer to the response to Comment number 0036.15, which addresses a similarly worded comment.

Comment Number 0038.06 *Reeves, Merilyn*

Comment The Board is troubled by some aspects of the preferred alternative, and where the EIS has not considered the impacts of privatization as a contractor mechanism.

Response Please refer to the response to Comment numbers 0036.15, 0036.05, 0036.04, and 0057.06 for discussions related to this issue.

Comment Number 0038.07 *Reeves, Merilyn*

Comment The concerns the Board has voiced have to do with liability in privatization, budget, regulatory, logistics, and public participation issues.

The Board has been dubious of DOE's ability to privatize, and has been disappointed in DOE's lack of responsiveness to the Board's concern.

Response Because the issues identified in the comment are not within the scope of the EIS, no modification to the document is warranted. Please refer to the response to Comment numbers 0036.04, 0036.05, and 0036.15.

Comment Number 0038.08 *Reeves, Merilyn*

Comment In regard to the specific technical approach, the Board has not been adverse to Phased Implementation. DOE has not made a case for that, privatized or not.

Response The TWRS EIS does not address privatization. The Phased Implementation alternative is based on the same common assumptions as the other alternatives to ensure comparability of the environmental impacts. However, the Phased Implementation alternative does address the technical requirements of remediating tank waste with a phased approach and impacts associated with that approach. Please refer to the response to Comment numbers 0043.04 and 0035.15, for more information.

Comment Number 0038.09 *Reeves, Merilyn*

Comment Phased Implementation can save money over the course of the program. The Board does remain dubious that Phased Implementation will save money, and will likely be more expensive. Again, our main concern has been with DOE's particular program of privatization.

Response The costs estimates developed for the TWRS EIS were developed using the same basis for all alternatives. The Phased Implementation alternative represents the traditional government-owned contractor-operated contracting strategy as described in Volume One, Section 3.3. Please refer to the response to Comment number 0036.15 for more information.

Comment Number 0038.11 *Reeves, Merilyn*

Comment The Board is concerned by the preferred alternative's effect on the Tri-Party Agreement. The Board has been and remains a staunch supporter of the Tri-Party Agreement.

The Phased Implementation approach has resulted in an unfavorable impact to the Tri-Party Agreement. The Tank Waste Task Force stated the following about the Tri-Party Agreement, quote, Tri-Party Agreement is in need of strengthening and improvement.

The Tri-Party Agreement should increase meaningful public and tribal involvement in all key Tri-Party Agreement decisions, with the public and the tribes as a partner in the goals, scope, pace, and oversight of the cleanup.

The process of the goal in the site specific advisory board and ongoing oversight of the agreement and improving pubic involvement is essential to achieving successful and satisfactory cleanup.

And our Board is trying to carry on these traditions. As we stated earlier, amendment four to the Tri-Party Agreement was judged to be very responsive to the above concerns.

Unfortunately concurrence in yet to be completed negotiations that will once again change the Tri-Party Agreement are somewhat or may be seen to be reversing the progress made in amendment four.

The Tri-Party Agreement changes that are being made in order to support the Phased Implementation alternatives are very disconcerting. The Tri-Party Agreement will go from a long list of interim and long-term enforceable milestones to only a handful of milestones, many of them not enforceable.

The changes will not increase meaningful public involvement or really involve site specific boards, the Hanford Advisory Board, in ongoing oversight of the TWRS program. And this is a step in the wrong direction.

Response The amendments referenced in the comment were based upon the privatization initiative. The Phased Implementation alternative merely bounds the technical approach of staged remediation of the tank waste and analyzes the potential impacts to support a comparison among alternatives. DOE and Ecology are cognizant of the Hanford Advisory Board's concerns regarding the remediation schedule and stakeholder and Tribal Nation participation in decision making. DOE is committed to meeting milestone commitments in the agreement and to effective and meaningful public and Tribal Nation involvement in the cleanup of the Hanford Site. Please refer to the response to Comment number 0012.19 (public involvement), 0072.149 (Tribal Nations consultation), and 0043.04 (privatization relationship to the Tri-Party Agreement).

Comment Number 0055.08 *Martin, Todd*

Comment Secondly, I think that the chart that Carolyn showed that had to do with the technical uncertainty of the various options was misleading on Phased Implementation. The rationale is that the technical uncertainty for this alternative is low because we are starting small and we are building. We will be able to employ learning. I think that is a very subjective call and I do not buy it. That option

includes pretreatment processes have never been done before. Technetium removal. That is not low on the technical uncertainty scale.

Response The phased approach allows information to be collected and analyzed concerning retrieval, separations, and vitrification technologies before constructing full-scale plants. Lessons learned from the demonstration phase would be applied to the full-scale phase, which should improve the efficiency of operations of the second phase. This may reduce construction and operating costs during the second phase. The process of building demonstration plants to verify that technologies function effectively before building full-scale plants is a standard practice used in many industries where new technologies are being used. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0057.02 *Garfield, John*

Comment With respect to the summary slide, Todd made this same comment, the high-waste complex separations and treatment processes involved uncertainties that will be reduced by implementing the phased approach. I concur with the basic finding of the EIS in terms of the alternative chosen, however, instead of emphasizing the need to demonstrate technology, the emphasis should be on spreading early capital dollars and using a single facility to accomplish the mission. That should be the emphasis more than demonstration. There is no technical justification for demonstration philosophy with this process. The functions of sludge washing, cesium removal, and vitrification are not unknown technologies and any uncertainty with them can be demonstrated either radioactively hot at a laboratory scale or at large-scale cold with simulants much more efficiently than two low-level demos and one high-level demo. That will set the program back 5 to 10 years treated under 5 percent of the waste and cost something on the order of $3 billion dollars. That is a waste.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The demonstration process provides the opportunity to reduce overall program costs while completing remediation of the tank wastes within Tri-Party Agreement requirements, especially considering the uncertainty associated with the tank waste inventory. The lessons learned and process knowledge gained during Phase 1 would be incorporated into the design and operation of the full-scale treatment facilities during Phase 2. Please refer to the response to Comment number 0055.08.

Comment Number 0068.02 *Martin, Todd*

Comment Further, another one that is very easy for anybody to understand is you look at the EIS, and you see in Phase 1 they need to retrieve and vitrify the waste from about 36 tanks. How much would that cost? How much would it cost to pump the nuclear waste out of this auditorium if it were full? According to the EIS, zero dollars. Won't cost a penny. Surely there's a cost there. But the EIS doesn't reflect it. Again, the costs need to be fixed.

Response Please refer to the response to Comment number 0035.07 which addresses a similarly worded comment.

Comment Number 0072.121 *CTUIR*

Comment P 3-92: Sect. 3.4.10: This alternative is unacceptable if the implementation consists of decommissioning any process that produces waste acceptable to the HLW permanent repository, the added push of continuing to operate the test facility will reduce the time it take to finish the job.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Decommissioning of facilities for this alternative is addressed in Volume One, Section 3.4.

Comment Number 0072.122 *CTUIR*

Comment P 3-92: Phase 1: The selection of the SST waste is an integral component and effort has to be taken that this section include language reflecting that waste from all SSTs be test reacted as to ensure complete acceptability.

Response The waste processed during Phase 1 could include selected SST waste. As explained in Volume One, Section 3.4, the retrieval and treatment of the remaining DST and SST waste will be completed in the following stages of the alternative (Phase 2) following completion of the demonstration phase (Phase 1). Before any waste is retrieved it would be characterized and analyzed to ensure compatibility. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.193 *CTUIR*

Comment P B-132: Sect. B.3.9: This alternative, while good for a conservative industry approach does not take into account the uncertainties associated with the characterization program. Unless the demonstration phase proved beyond a doubt it could handle waste forms from all the tanks..

Response Considerable uncertainty associated with the tank waste inventory data remains, and additional tank characterization is required before final design of any alternative. Please refer to the response to Comment numbers 0012.14, and 0072.07 for discussions of characterization of tank inventory and characterization in programs. Phase 1 of the Phased Implementation alternative would include technical evaluation, demonstration, and detailed design for the separations and immobilization processes for various categories of waste feed. Following the successful implementation of Phase 1, Phase 2 would be implemented to complete the tank waste remediation according to the technical approach most appropriate to the tank waste categories. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0088.05 *Porter, Lynn*

Comment One of my concerns about the preferred alternative and privatization is who decides when it's a success or not. Is this strictly going to be the DOE deciding, or will the Tri-Parties together decide on this? And there need to be enough milestones in this, spaced closely enough together that the public interest groups can track this and know whether it's succeeding or failing, whether it's on track where it should be. Because otherwise this could go on for years, and all of a sudden, as it has before, all of a sudden we find out hey it's not working and we have to start over.

Response Privatization is a contracting mechanism that is not within the scope of the EIS. DOE and Ecology have agreed on a set of criteria that will be used in making a decision on whether privatization is achieving its intended goals or failing, which would cause a change from the primary path to the alternate path. Under this agreement, should Ecology determine that compliance with the primary path is unlikely, it will inform DOE of such an opinion. DOE will respond within 30 days whether a change from the primary to the alternate path is necessary. If DOE determines that a change is not necessary, it will provide Ecology with a written rational for continuing with the primary path. Ecology will have the authority at any time to require DOE to evaluate the viability of the primary path. These activities will be among the issues routinely statused, discussed, and reviewed by the Hanford Advisory Board and its Health Safety and Waste Management Committee. Additional review, input, and comment by Tribal Nation regulator and stakeholder representatives is encouraged. Because the analysis requested in the comment is not within the scope of the EIS, no modification to the document is warranted.

L.3.4.12 Ex Situ/In Situ Combination 2 Alternative

Comment Number 0005.05 *Swanson, John L.*

Comment As an example of some of my concerns related to (3) and (4), I cite the "last minute" addition of the "Variation of the Ex Situ/In Situ Combination alternative." I do not see that this is a bounding case at all, and I see no evidence that it is based on anything more than some assumed characterization data (perhaps on computer predictions based on a set of assumptions). Thus, I feel that you got carried away by even proposing this as a separate variation; wouldn't it be better to discuss it in the context of being in the "noise level" of the very uncertain characterization data on which I am assuming the original ex situ/in situ alternative was based? (I am assuming this because you do not tell me the source of the "currently available characterization data" that you are basing this on, and I am not aware of any sound data bank that would allow this alternative to be factually based). (See Comment 0005.09).

Response The variation of the Ex Situ/In Situ Combination alternative (known as the Ex Situ/ In Situ Combination 2 alternative in the Final EIS) referenced in the comment was added to provide a range of alternatives that includes a combination of the in situ and ex situ alternatives. Without this alternative, there would have been only one alternative to represent partial retrieval, and it is important to show the public and the decision makers the relationship between environmental impacts and the extent of

retrieval. This alternative provides one more alternative on the continuum from no retrieval to minimal retrieval to partial retrieval to extensive retrieval.

The variation of the Ex Situ/In Situ Combination alternative presented in the TWRS Draft EIS was based on limited data analysis and was therefore included in a brief preface to the Draft EIS, which provided general information on the levels of impacts that would occur as a result of implementing the alternative. This alternative has been developed and analyzed to the same extent as the other alternatives in this Final EIS. The variation is known as Ex Situ/In Situ Combination 2 alternative in the Final EIS. The information is presented in Summary, Sections S.5, S.6, and S.7; in Volume One, Section 3.4, and throughout Section 5.0. More detailed information on the alternative may be found in Volume Two, Appendix B.

Comment Number 0012.08 *ODOE*

Comment The EIS includes an attachment which describes a variation of the Ex Situ/In Situ Combination alternative. This alternative was not analyzed in the EIS and should be excluded from consideration for that reason.

Response The variation of the Ex Situ/In Situ Combination alternative analyzed in the Draft EIS was identified very late in the process of preparing the Draft EIS. DOE and Ecology choose to include a brief summary of this alternative as an attachment to the EIS. This alternative has been fully developed and incorporated into the Final EIS. DOE and Ecology believe the Ex Situ/In Situ Combination 2 alternative provides another alternative between the no retrieval and extensive retrieval, and, as a result provides useful information to the public and decision makers. Please refer to the response to Comment number 0005.05 for more information.

Comment Number 0047.04 *Ahouse, Lorretta*

Comment I am very concerned that an "attachment variation of the Ex Situ/In Situ Combination alternative" was added at the last moment to the Draft EIS. As I understand, this alternative would only remove 26 percent of the total tank waste volume and would not meet the Tri-Party Agreement. This is not acceptable to me as a citizen of Washington State. Why was this alternative even added so late in the process if its does not meet the Tri-Party Agreement? Does the Department of Energy have any plans to seek an exemption from the Tri-Party Agreement? Why are we wasting taxpayers dollars to examine alternatives that are not legally acceptable? Please, just get on with the cleanup.

Response Please refer to the response to Comment numbers 0005.05 and 0012.08 which address similarity worded comments. Please refer to the response to Comment number 0072.80 for a discussion of the NEPA requirement to analyze reasonable alternatives, even when they do not comply with regulations. In the Final EIS the Summary, Section S.7 and Volume One, Section 6.2 address the ability of the alternative to comply with Federal and State regulations and the Tri-Party Agreement.

L.3.4.13 Miscellaneous

Comment Number 0005.11 *Swanson, John L.*

Comment I am quite sure that the alternatives involving in situ disposal will require more extensive/costly characterization activities than the other alternatives, but I do not see that reflected in the cost comparisons. Isn't that a bias in their favor? (I learned at the May 2 hearing that characterization is not included in this EIS, but my statement re biasing of comparisons stands. Also, shouldn't the omission of characterization from this EIS be highlighted, along with the omission of closure, so that it will be clear how limited in scope this EIS really is?)

Response Additional characterization requirements for in situ alternatives have been considered. Volume One, Section 3.4 acknowledges that additional characterization would be required for the in situ alternatives have been considered. The cost estimates completed in support of the Draft EIS included an additional $903 million for the in situ alternatives to cover additional characterization activities. These cost estimates are available for review in the TWRS EIS Administrative Record and DOE Reading Rooms and Information Repositories The relationship between closure and the alternative is presented in the Summary and Volume One, Section 3.3 and the impact in Section 5.0. For a discussion of the closure issues, please refer to response to Comment numbers 0072.08, 0101.06, and 0072.50.

Comment Number 0035.09 *Martin, Todd*

Comment Lastly, I would like to address the issue of mortgage reduction. This is something at Hanford that we have been dealing with for two years.

It has been a very high priority, and it has to do with putting money into old facilities for the purpose of closing them down in such a way that we could free that money up for real cleanup.

The tanks are the greatest mortgage reduction opportunity at Hanford we have. If we get the waste out of the tanks, we will reduce the budget by, as Dick said, about 300 million dollars. It is time to get on with it. It is time to do the job.

Response Cost associated with continued monitoring and maintenance activities at the tank farms would be reduced as the number of tanks containing waste was reduced. Remediation of Hanford tank waste is a needed investment to environmental well-being of the Hanford area and is required to protect human health and the environment.

L.3.5 CESIUM AND STRONTIUM CAPSULE ALTERNATIVES

L.3.5.1 Preferences for Capsule Alternatives

L.3.5.1.1 Specific Preferences

Comment Number 0006.01 *Skyes, Megan*

Comment As a scientist involved in biomedical research in the area of bone marrow transplantation, I am writing to express my support for the production of Cs-137 sources at the Hanford Reservation. It is my understanding that this is the only world producer of large Cs-137 sources other than the Russian laboratories at Mayak. In view of the high prices of Cs-137 sources that results from the existing monopoly, it will be nearly impossible to purchase sources in the future, as funding for biomedical research is becoming more and more limited. Therefore, the production of Cs-137 sources (at a lower cost) would be a major benefit to the biomedical research community. There are numerous other investigators, not only in the field of bone marrow transplantation, but in immunology who are dependent upon the availability of these irradiators in order to carry out their research. I hope that it will be possible for the Department of Energy to deal with the existing Cs-137 at Hanford in a cost-effective manner and in so doing to serve a vital need for the medical research community.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on the cesium and strontium capsules. For the Final EIS, DOE has identified the No Action alternative as the preferred alternative and has modified the Summary Volume One, Section 1.3 accordingly.

The TWRS EIS addresses alternatives for management and disposal of encapsulated cesium and strontium. The encapsulated cesium and strontium are included in the EIS primarily because they were originally extracted from the stored high-level tank waste to reduce the thermal heat generation in the tanks and would be considered HLW for purposes of disposal. DOE is actively seeking commercial interest in the beneficial applications for the encapsulated cesium and strontium, and DOE remains committed to pursuing any viable commercial or other beneficial uses; at this time, the preferred alternative is No Action. These uses would not be without substantial cost for reprocessing and repackaging since the current encapsulation was designed principally for storage purposes. If viable commercial or beneficial uses are not implemented, the capsules would be designated as waste at some point in the future and would be disposed of using methods consistent with one of the alternatives identified in the EIS or a new NEPA analysis would be completed. Under no action, the capsules will be stored and maintained under current operations at the WESF, which includes a comprehensive monitoring program. This program is described in Volume One, Section 3.2.

Comment Number 0008.03 *Evett, Donald E.*

Comment Secondly, S.5.2 Cesium and Strontium Capsule Alternatives: I personally would prefer to select alternative (4) physically mixing the capsule contents with the high-level tank waste, which would then be vitrified and disposed of at a potential geologic repository.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on the cesium waste and strontium capsules.

Comment Number 0029.02 *Bartholomew, Dale C.*

Comment I believe that cesium capsules should be left in a condition for possible future commercial irradiation. At the public hearing on May 2, 1996, we were advised that only one capsule leaked, but no one at the hearing was able to identify the mode of failure. If the mode of failure was a bad weld, I believe that it is premature to dispose of all capsules, because there still may still be some interest in commercial irradiation. It would be imprudent to waste all of the previous time, effort, and cost that went into the separation and concentration of the cesium-137 and strontium-90 isotopes.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on the cesium and strontium capsules. For the Final EIS, DOE has identified the No Action alternative as the preferred alternative and has modified the Summary and Volume One, Section 1.3 accordingly. Please refer to the response to Comment number 0006.01.

Comment Number 0032.07 *Heacock, Harold*

Comment A secondary issue addressed in the Draft EIS is the disposal of the cesium and strontium capsules currently stored in the WESF facility at the B Plant.

We believe that any action to dispose of the capsules should be deferred at this time, so long as an adequate degree of environmental protection is maintained in their storage.

These capsules represent a resource that may have significant future use in irradiation programs. Pending the determination of their potential future utilization, we believe this potential asset should be retained.

This position is consistent with the Draft EIS since the high-level waste ex situ vitrification plant operation is at least 10 years away.

Ultimate disposal of these capsules with the other high-level waste is the preferred solution to the disposal of the capsules.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on the cesium and strontium capsules. Please refer to the response to Comment number 0006.01.

Comment Number 0040.05 *Rogers, Gordon J.*

Comment The cesium and strontium capsules should be transferred into air-cooled storage in the facility now being built for the Spent Nuclear Fuel project. In the meantime serious efforts should be made to see if there is a market for commercial use as radiation sources. Permanent disposal plans can wait.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on the cesium and strontium capsules. Please refer to the response to Comment number 0006.01.

Comment Number 0043.05 *Hanford Communities*

Comment The Hanford Communities would also like to comment on the plans for disposition of the cesium and strontium capsules currently stored in the B Plant. We believe that any action to dispose of the capsules should be deferred at this time. These capsules represent a resource that may have significant value. Rather than pay to dispose of these materials, the Department should actively explore opportunities for commercial use and sale.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on the cesium and strontium capsules. Please refer to the response to Comment number 0006.01.

L.3.5.1.2 General Preferences

Comment Number 0012.13 *ODOE*

Comment The second issue addressed by the EIS is what to do with the cesium and strontium capsules stored at Hanford. The cesium capsules contain cesium-135 and cesium-137. These two isotopes present different hazards. Cesium is very soluble in water. Cesium-135 has a long half-life. If it is disposed at Hanford, it presents an unacceptably large risk to public safety and health and the environment. Oregon supports disposal of the cesium and strontium from capsules in a suitable form to the national high-level nuclear waste repository. The waste form selected should ensure that cesium-135 will not endanger public health and safety or the environment.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on the cesium and strontium capsules. Please refer to the response to Comment number 0006.01.

Comment Number 0060.05 *Davenport, Leslie C.*

Comment I do not feel that a final choice can be made between the proposed alternatives yet. The No Action alternative of continued storage in WESF is acceptable during the next 10 years while DOE

selects an alternate storage method for the capsules or determines if there is a use for them. I do not like the Onsite Disposal alternative because I feel that the capsules, if discarded, belong in the proposed geologic repository. Similarly, it makes little difference other than cost if the capsules are Overpacked and Shipped, or Vitrified with Tank Waste if a HLW vitrification facility is operational at Hanford.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on the cesium and strontium capsules. Please refer to the response to Comment number 0006.01.

Comment Number 0089.02 *Nez Perce Tribe ERWM*

Comment ERWM endorses the Overpack and Ship alternative for the strontium and cesium capsules.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on the cesium and strontium capsules. Please refer to the response to Comment number 0006.01.

L.3.5.2 No Action Alternative (Capsules)
No comments were submitted for this topic.

L.3.5.3 Onsite Disposal Alternative
No comments were submitted for this topic.

L.3.5.4 Overpack and Ship Alternative
No comments were submitted for this topic.

L.3.5.5 Vitrify with Tank Waste Alternative
No comments were submitted for this topic.

L.3.6 BORROW SITE SUMMARY
Comment Number 0019.03 *WDFW*

Comment WDFW is concerned by stating specific (potential) borrow sites in this document future decisions will be steered by the mentioning of such locations now. Statements are made in this document without the word "potential" even mentioned. Example, section B.6.1, paragraph discussing first and second layers, last sentence, which states "The proposed topsoil would be obtained from the McGee Ranch quarry site of the Hanford Site." This document appears to be trying to steer future decisions prior to exploring alternatives for borrow sites.

Throughout the document, the author states "future NEPA documentation will specifically address in detail impacts and mitigation of post-remediation tank closure where, for example most impacts of borrow site activities would occur" (page 5-258). The summary states "The impacts of closure cannot

be meaningfully evaluated at this time. U.S. Department of Energy (USDOE) will conduct an appropriate NEPA review, such as an EIS, to support tank closure in the future." Since a meaningful analysis of impacts to potential borrow sites for post-remediation activities is not being undertaken by this EIS, WDFW requests all references to potential post-remediation borrow sites be deleted from the document (i.e., figures, tables, and text).

Response The TWRS EIS frequently states that the final selection for the borrow sites must be evaluated in the document for waste site and tank farm closure. The Summary states that, "The impacts of closure cannot be meaningfully evaluated at this time. DOE will conduct an appropriate NEPA review, such as an EIS, to support tank closure in the future." This question was also contained within the Notice of Intent to prepare the TWRS EIS.

Volume One, Section 3.6, states that, "The final selection of borrow sites for earthen material has not been made; however, the locations indicated represent potential borrow sites that would support each of the alternatives in both volume and location. Future borrow site decisions will be made in the ROD for the Hanford Remedial Action EIS."

Volume One, Section 4.5, states that, "The potential Vernita Quarry and McGee Ranch borrow sites have potential for both historic and prehistoric materials. Surveys have identified prehistoric or historic sites at both Vernita and McGee Ranch. The McGee Ranch area has been determined to be eligible for nomination to the National Register of Historic Places as the McGee Ranch/Cold Creek District. No prehistoric sites are known at the potential Pit 30 borrow site, although one structure from the homestead era is located at Pit 30." These statements are reiterated in Section 5.5 where it is stated that, "Archaeological surveys of the three potential borrow sites have identified a variety of prehistoric or historic artifacts and sites at the Vernita Quarry and McGee Ranch. The likelihood of disturbing additional archaeological sites in these areas is considered high." In addition, the archaeological importance of historic and prehistoric sites is reiterated in Volume One, Sections 5.5.1, 5.5.2, and 5.5.3.

Volume One, Section 5.17 identifies the potential Vernita Quarry and McGee Ranch borrow sites as undeveloped areas on the Hanford Site Development Plan's Future Land-Use Map. Further, using the potential Vernita Quarry site would involve expanding an existing quarry, while using the potential McGee Ranch borrow site would essentially be a newly developed site (though a small, old borrow area does exist). It is further stated that, "Planning for possible borrow sites for the TWRS program is still in its early stages and the CLUP and Hanford Remedial Action EIS address future land uses for the Site as a whole." Section 5.5.3 explains that any disturbance of the land surface, such as would occur in borrow site activity, is not compatible with the relationship between the Native Americans and the land.

Volume One, Section 5.20.1 states that, "Although much of the area proposed for the remedial activities is in areas currently disturbed, activities in some areas [primarily the Vernita and McGee Ranch borrow sites] have the potential to impact historic, prehistoric, or cultural sites. These areas

have not been fully surveyed because they are potential borrow sites subject to change during final design. The final selection of borrow sites would be made through the Site Comprehensive Land Use Plan."

The discussion of alternatives uses these borrow sites as example locations for the materials that may be required for closure. Certainly, gravel and sand sources are required for construction of the facilities required for the various alternatives. In WHC-SD-WM-EV-103 and WHC-SD-WM-EV-104, Tables 6-12 and 9-12, respectively, state the assumption that an onsite gravel plant would provide crushed aggregate for concrete construction at a location 5 kilometers (km) (3 miles [mi]) from the construction site, the potential borrow site known as Pit 30.

Considering the earlier discussion, which states that the decisions for the borrow sites will be made elsewhere, that the prehistoric, historic, and cultural significance must be thoroughly evaluated, and the undeveloped status given to portions of the area land relationship with the Native Americans, DOE and Ecology do not believe that including these potential borrow sites alternatives for borrow sites. Using these named potential borrow sites provides only a basis to more completely discuss the potential impact of each of the alternatives covered in the TWRS Final EIS in terms of potential for traffic accidents with distance traveled, construction and operation emissions to the environment, a comparison between the alternatives, and an interrelated closure discussion for each of the various alternatives.

Comment Number 0019.07 *WDFW*

Comment Page 3-116, Tables 3.6.1, 3.6.2, and 3.6.3 If I were to open this EIS to this page, I would conclude from the titles of thee tables that a decision has been made on borrow site locations when in fact this document does not perform adequate NEPA analysis, i.e., a range of alternatives, for sources of different material types needed. WDFW requests all references to borrow site locations be deleted from the document since the impacts to borrow sites will require NEPA review.

Response Please refer to the response to Comment numbers 0019.03, 0072.08, and 0101.06. The EIS has been reviewed and revised as appropriate to clarify the assumed borrow sites as "potential" sites.

Comment Number 0072.123 *CTUIR*

Comment P 3-116: Tables 3.6.2. and 3.6.3.: These tables present figures that are for closure options. Because this EIS is a RETRIEVAL EIS, the tables are inappropriate and should be removed, or all of the closure options be equally presented.

Response The tables identified in the comment represent borrow materials required for the assumed closure scenario presented in the EIS. For more information on the closure assumption, please refer to the response to Comment numbers 0072.08 and 0019.03. As identified in the Draft EIS in Volume One, Section 3.3 closure is not within the scope of this EIS because there is insufficient information

concerning the amount of contamination to be remediated. The amount and type of waste that remains in the tanks after remediation also may affect closure decisions. Closure as a landfill was included in all of the alternatives except the No Action and Long-Term Management alternatives so the alternatives could be meaningfully compared. This does not mean that closure as a landfill has been proposed or would be selected for final tank closure. Because the information contained in the Draft EIS is correct, no change to the text was made.

L.3.7 COMPARISON OF ACTIVITIES ASSOCIATED WITH ALTERNATIVES

Comment Number 0005.15 *Swanson, John L.*

Comment I find it strange that system costs is the only metric included in the summary description of each alternative in Section 3.0 ("Description and Comparison of Alternatives"). People are certainly interested in the costs, but the major concern on the part of the public appears to me to be in the perceived risk to their health and well-being. Couldn't/shouldn't summary data of some sort in that area be included in this section along with the cost data? If this is not done, I feel that you should change the title of this section to "Description and COST Comparison of Alternatives."

Response Volume One, Section 3.0 provides a description and comparison of the alternatives based on the characteristics of the alternatives themselves. These characteristics include cost. However, the section also provides a comparison of the processes inherent to each alternative; construction, operations, and post-remediation features of each alternative; the schedule, sequence of activities, and costs of each alternative; the amount of waste to be retrieved from the tanks, treated, and disposed of onsite verses offsite for each alternative. The potential environmental impacts associated with each of the alternatives are presented in Volume One, Section 5.0. In Volume One, Section 5.14, a summary table is provided that lists each alternative and all of the associated impacts as presented in Section 5.0. Additionally, a summary of those impacts was presented in the TWRS EIS Summary, Section S.7, which was prepared to accompany the EIS or to be read separately by individuals who did not want to read the entire EIS. The level of data and summarization of the data, as well as the presentation of the data and summary information provided the public and decision makers with the appropriate level of information in a format that was accessible considering the complexity of the proposed action and associated impacts. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0005.55 *Swanson, John L.*

Comment Why is the number of HLW shipments required for the Extensive Separations alternative ~50 percent as large as that for the Intermediate Separations alternative (page 5-146), when the ratio of the number of canisters is only ~10 percent as large?

Response The average rail trips per year calculated and reported in Volume One, Section 5.10, Trail Traffic Volumes, for the number of canisters generated as result of the Ex Situ Extensive Separations alternative has been modified in the Final EIS.

L.3.8 ALTERNATIVE CONSIDERED BUT DISMISSED

No comments were submitted for this topic.

L.3.9 MISCELLANEOUS

Comment Number 0005.59 *Swanson, John L.*

Comment Page vii of Volume Two contains incorrect definitions/descriptions of B Plant and T Plant.

Response According to two references, Hanford Tank Clean Up: A Guide to Understanding the Technical Issues (Gephart-Lundgren 1996), The Hanford Site: An Anthology of Early Histories (Gerber 1993), and T Plant (DOE 1994l), T Plant and B Plant were both constructed as plutonium removal facilities. Both facilities used the bismuth phosphate separation process. In later years, B Plant was used to remove cesium and strontium from acid waste pumped from the Plutonium-Uranium Extraction (PUREX) Plant. T Plant is currently used as a decontamination and repair facility. According to DOE 1994l, these plants, along with Z and U plants, for example, were given alphanumeric names due to 1940's wartime secrecy. These descriptions are provided in the Volume One Glossary. B Plant and T Plant were deleted from the Acronyms and Abbreviations list in Volume Two, Appendix B.

Comment Number 0005.60 *Swanson, John L.*

Comment On page B-9, an incorrect date is given for the start of the PUREX plant.

Response According to two references, Hanford Tank Clean up: A Guide to Understanding the Technical Issues (PNL 1996) and The Hanford Site: An Anthology of Early Histories (WHC 1992), the correct date for the PUREX Plant hot start up was January 1956. All applicable, incorrect references have been revised.

Comment Number 0022.04 *Sims, Lynn*

Comment There is no argument that Cold War Clean Up is extremely expensive. But inadequate clean up will be more expensive. Choosing less expensive options now will probably result in contaminated soils and water, serious loss of quality of life and health and perhaps loss of land use, trade, and commerce.. Our costs now are a result of military production. Perhaps military clean up should be built in up front in the military budget since that is the department which seems to receive more funds than requested while DOE monitoring and clean up funds are slashed.

Finally, it must always be of paramount importance to remember that bomb production was implemented to protect this nation and that to skimp on efforts to clean up puts our homeland at serous risk forever.

Response Comment noted.

Comment Number 0025.01 *Heart of America*

Comment *A public interest group distributed a questionnaire at the Spokane and Seattle, Washington public meetings. Listed below are the questions and a tally of the totals from the 33 individuals who submitted surveys. The agency responses follow after the summary of the questionnaire. Below each question in bold is the ranking system contained in the questionnaire (using a scale of 1 to 10). In parenthesis following the rank are the number of individuals who circled the number on this questionnaire.*

Please tell us the degree to which you agree or disagree with the following proposals for Hanford's high-level nuclear wastes on a scale from one to ten with #1 being Strongly Disagree; #5 No Opinion; and #10 being Strongly Agree.

1. The current Tri-Party Agreement calls for retrieving 99 percent of the wastes from all of Hanford's high-level nuclear waste tanks by the year 2028 and turning it into some form of glass (vitrification). To what degree do you agree/disagree with the Tri-Party Agreement?

Rank: **1** (3) **2** (1) **3** (1) **4** **5** **6** (1) **7** (1) **8** (8) **9** (3) **10** (14) . N/A (2)

2. Leaving 75 percent of the high-level nuclear waste in the tanks forever, and filling them with cement or gravel after removing the most radioactive 25 percent would cost less than retrieving and vitrifying 99 percent of the waste. This is the Ex Situ/In Situ Combination alternative.

   a. The cost savings claimed by USDOE for this option justify leaving most of the high-level nuclear waste in the tanks:

Rank: **1** (23) **2** (1) **3** (3) **4** (1) **5** **6** **7** (1) **8** (2) **9** (1) **10** (2)

   b. USDOE has fully considered in the EIS the evidence that waste from tank leaks is moving towards groundwater and the risks this may pose to the Columbia River and future exposed populations from this alternative:

Rank: **1** (18) **2** (1) **3** **4** **5** (2) **6** **7** (4) **8** (2) **9** (2) **10** (1) N/A (4)

   c. Any alternative that leaves high-level nuclear waste in the tanks and in the soil beneath the tanks poses an unacceptable risk to the Columbia River and future generations.

Rank: **1** (1) **2** **3** (1) **4** **5** **6** **7** **8** (2) **9** (3) **10** (27)

   d. For the same reasons that the public voted in 1986 against Hanford being an underground high-level nuclear waste dump, leaving high-level nuclear waste in tanks or threatening groundwater is NOT acceptable:

Rank: **1** (2) **2** **3** (1) **4** **5** **6** **7** **8** (4) **9** (2) **10** (25)

3. USDOE's Tank Waste Task Force (public interest groups, local governments, Tribes,...) urged USDOE to base decisions assuming that the wastes, after being vitrified, will stay at Hanford for a very long time, and not to assume USDOE will move the waste to its proposed Yucca Mountain repository. Do you agree/disagree with the advice:

Rank: **1** (6) **2** (1) **3** (2) **4** **5** (5) **6** **7** **8** (1) **9** (7) **10** (11) N/A (1)

4. a. USDOE should use conservative assumptions that tank leaks move down to groundwater in less than 40 years, instead of claiming that leaks will stay close to the tanks and not reach groundwater for over 100 years:

Rank: **1** (1) **2** (1) **3** (1) **4** (1) **5** (1) **6** (1) **7** **8** (3) **9** (2) **10** (23)

b. Because this EIS assumes tank leaks do not move quickly to groundwater, the EIS wrongly creates a bias in favor of delaying retrieval of all wastes from leaking single-shell tanks:

Rank: 1 (3) **2** (1) **3** **4** **5** (2) **6** **7** (3) **8** (3) **9** **10** (22)

5. a. Should the EIS drop (not include) the "repository fee" in its presentation of costs and as a basis for decision making?

Rank: Yes (22) No (12)

b. Does the inclusion of the repository costs appear to have biased the consideration of alternatives, including how one would weigh each alternative's risk versus costs?

Rank: Yes (26) No (4) N/A (3)

c. If the cost of the No Separations alternative (make all the waste into glass logs) were in the same price range as other alternatives when the hypothetical repository fee was not added onto it, would you urge that it be considered as a reasonable alternative to building multiple vitrification and separations plants:

Rank: Yes (19) No (10) N/A (5)

Response

Comment item number 1: Please refer to the response to Comment numbers 0047.03 and 0009.01.

Comment item number 2a: Please refer to the response to Comment number 0072.05.

Comment item number 2b: Please refer to the response to Comment number 0012.15.

Comment item number 2c: Please refer to the response to Comment number 0072.08.

Comment item number 2d: Please refer to the response to Comment numbers 0072.08, 0072.100, and 0072.111.

Comment item number 3:	Please refer to the response to Comment numbers 0081.02.
Comment item number 4a:	Please refer to the response to Comment numbers 0012.15 and 0030.02.
Comment item number 4b:	Please refer to the response to Comment numbers 0012.15 and 0030.02.
Comment item number 5a:	Please refer to the response to Comment numbers 0081.02 and 0004.01.
Comment item number 5b:	Please refer to the response to Comment numbers 0081.02 and 0004.01.
Comment item number 5c:	DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment numbers 0081.01 and 0004.01.

Comment Number 0027.03 *Roecker, John H.*

Comment Systems Engineering
In 1993 DOE proudly and loudly stated that it was going to use systems engineering to establish the requirements for both TWRS and also the Hanford Site. To my knowledge that has not been done in either case, yet here we are reviewing the EIS for implementing a very specific TWRS action. Looks to me as if the systems engineering commitment lasted about as long as the January 1994 Tri-Party Agreement. Two fundamental systems engineering actions are required to correct this situation. First, a top down requirements allocation from the site level to the program level is needed. Secondly, the TWRS Functions and Requirements Document, along with an integrated alternatives systems analysis, must be finalized and issued. I would request that issuance of the Final TWRS EIS be deferred until such systems engineering and analysis has been completed. Without such one cannot be sure that the right work is being performed or that the best alternative has been selected.

Response Since 1993, two systems engineering documents, TWRS Functions and Requirements (DOE/RL-92-60) and TWRS Systems Engineering Management Plan (DOE/RL-93-106) have been prepared. DOE conducted an independent Systems Requirements Review (SRR), submitted in November 1994, to validate the TWRS Functional Requirements Baseline. The SRR evaluated selected representative TWRS activities and identified the need for improvement in the implementation of systems engineering, quality of supporting documentation, and timeliness of testing assumed solutions and competitive alternatives. In response to the SRR, the TWRS System Requirements Review Action Plan (DOE/RL-95-74) was prepared, which addressed the findings presented in the SRR and presented

the methodology for revising the Functional Requirements Baseline and developing the infrastructure required to support the functional requirements. Because the EIS and the TWRS Functions and Requirements have been developed concurrently, the conclusions of the TWRS Functional Requirements are anticipated to be consistent with the recommended alternative presented in the Final EIS. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives. Please refer to the response to Comment number 0101.07 for further discussion of systems engineering.

Comment Number 0027.04 *Roecker, John H.*

Comment Technical Balance
I wish I was more interested in the projected cost of housing in the Tri-Cities in the year 2040 because there sure is plenty of computer printout data on that and other similar items, but I am just not. Instead, I would like to see more of the technical data that supports such items as operating efficiency, number of canisters, process design, alternative costs, etc. I would like to request that the reams of computer printout data and modeling contained in the appendices be restrained a little and more of the basic technical data that really establishes how an alternative is going to perform be put into the EIS.

Response The technical data that support the areas of interest indicated (i.e., operating efficiency, number of canisters, process design, and alternative costs) are contained in the TWRS Administrative Record and are available for review. The data to support the performance capability of the recommended alternative will be contained in the detailed design document for that alternative, which will be prepared following the Final EIS. The evaluation criteria used in the EIS are defined by NEPA and are confined to impacts to the environment only. As such, the requested evaluation of alternative performance data is beyond the scope of this EIS, but will be contained in future documents.

Comment Number 0027.06 *Roecker, John H.*

Comment Use of Non-Optimized Alternatives
The alternatives described in the EIS represent first cut approaches and do not represent optimized alternatives that have been tuned utilizing good engineering principles. More recent optimized process design flowsheet and facility design data is available and should be used in the Final EIS. This optimized design will significantly reduce the estimated cost.

Response The purpose of the EIS is to examine bounding alternatives, including a No Action alternative. It is anticipated that the optimized process design flowsheet will be used during the detailed design of the waste retrieval, transfer, treatment, and storage facilities conducted during the demonstration phase of the preferred alternative. The TWRS baseline flowsheet is continually updated and optimized. In order to support the EIS schedule, the baseline data used for development of the Draft EIS was frozen in May 1995. NEPA requires the alternatives be compared on an equitable basis. The Draft EIS presents conceptual alternatives that were developed using common bases that allow equitable comparison. Please refer to the response to Comment number 0072.05.

Comment Number 0027.08 *Roecker, John H.*

Comment Cost Estimates
In this day of tight budgets the cost estimate for an alternative is a very critical item. It is impossible to understand the basis for any of the cost estimates with the information contained within the EIS itself. It is necessary to look up several reference documents. This is not the easiest task if you do not live in the Tri-Cities. It would be helpful if the backup information for the life cycle cost estimates could be included in an appendix. There are several of the existing appendices that could be greatly reduced to make room for this information. As an example, the over 50 pages devoted to socioeconomic impact could be reduced to approximately 10 pages. The endless tables representing computer modeling printout could be put in a reference document.

Response As stated in Volume One, Section 1.0, the EIS fulfills the requirement for an analysis of potential environmental impacts in the decision-making process. NEPA and The Washington State Environmental Policy Act (SEPA) provide decision makers with an analysis of environmental impacts (both positive and negative) of proposed actions for consideration during decision making. This EIS presents the impacts of the proposed action and its reasonable alternatives for review and comment by the public and interested parties. Because of the magnitude of the cost required to implement any of the alternatives, it was determined that cost estimates would be included in the EIS. The development and presentation of alternative cost estimates is not the primary purpose or major focus of an EIS. The development of bounding alternatives for the EIS would indicate the need to develop additional cost data for the decision-making process.

The technical data used to develop the alternatives presented in the EIS are contained in the TWRS EIS Administrative Record and DOE Reading Rooms and Information Repositories. The Administrative Record contains additional cost estimate detail. As indicated in the front of Volume One, EIS technical reports, background data, materials incorporated by reference, and other related documents are available at Seattle, Spokane, and Richland, Washington; Portland, Oregon; and Washington, D.C.

The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0027.09 *Roecker, John H.*

Comment My understanding of the capital cost estimates for the down sized facilities in the combination and Phased Implementation alternatives is that the sixth-tenths power rule was used. That is an absolute error. The sixth-tenth power rule does not work for these types of facilities. These facilities have a significant portion of their capital cost attributable to basic facility systems which are essentially independent of facility size. The sixth-tenth power rule works for facilities in which processing equipment makes up most of the capital cost. That is not the case with these waste processing facilities. That is something that must be fixed in the Final EIS. Conceptual cost estimates

for the size facilities included in the EIS have been made. Why not use the available existing data which has backup rather than include erroneous data?

Response The cost estimating methodology has been reviewed for the Final EIS and revised cost estimates were completed for the Phased Implementation and combination alternatives. These revised costs are shown in Volume One, Section 3.4 and Volume Two, Appendix B. Please refer to the response to Comment numbers 0055.06, 0057.06, and 0035.06.

Comment Number 0030.01 *Krieg, Ronald K.*

Comment I am also disappointed in the limited scope that the inclusion of subsurface barrier technology in this Draft EIS was only as a potentially viable component to remediation alternatives, and am dissatisfied in Appendix B's level of analysis and conclusions of subsurface barrier technology. My other areas of concern involve the focus being on future impacts and conditions of alternatives alone with no regard to current or past practices. If the DOE is to develop a systematic approach to actually solving some problems in a truly cost effective manner with the least environmental impact, all aspects and pertinent details of all alternatives should be included in this EIS.

Response Subsurface barrier technology is discussed in Volume Two, Appendix B. Subsurface barriers are a potentially viable technology available to the decision makers. The EIS incorporates by reference (Treat et al. 1995) a detailed engineering feasibility study on subsurface barriers. Subsurface barriers were added as a potential mitigation measure in Volume One, Section 5.20 in the Final EIS. Please refer to the response to Comment number 0001.01.

All of the alternatives' future potential impacts are based upon an analysis of the potential impact of the alternatives themselves, without consideration of past or current practices, as appropriate.
The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0030.04 *Krieg, Ronald K.*

Comment The Hanford Federal Facility Agreement and Consent Order set a goal for the SSTs that no more than 1 percent of the tank inventory would remain as a residual following waste retrieval activities (3-31, Vol. 1). Many times it is stated that this retrieval criteria of 99 percent may not be achieved (3-101, Vol. 1). Residuals left in tanks would not meet the water protection requirements if additional closure action is not taken (6-30, Vol. 1), with these residuals having low solubility because substantial quantities of liquid was used in the attempt to dissolve or suspend wastes during retrieval (3-31, Vol. 1). Furthermore, performance of key alternative processes have been assumed in absence of substantive data. Cost estimates may have a high degree of uncertainty because some of the processes are unproven (3-100, Vol. 1).

The Tri-Party Agreement calls for total waste removal from Hanford's single- and double-shell tanks for processing and storage offsite, unless technically unfeasible. Throughout the EIS the word "uncertainties" is used regarding costs, COC inventories and volumes, technology performance, actual risks, and SST leakage quantities. It would be a shame to see uncertainty translate to unfeasibility. The time has come to eliminate uncertainty through a systematic, cost and risk effective remedial approach with the least long-term impacts to our future populace's health and environment.

Response As required by the CEQ, the TWRS Draft EIS identifies and analyzes the range of reasonable alternatives for the proposed action, which also includes a No Action alternative. All data that support the cost and impact analysis of each alternative are presented in an objective format for comparison by the decision makers and by the public during the comment period. However, the EIS is limited to the TWRS and evaluation of reasonable tank waste remedies. Under the Tri-Party Agreement, DOE and Ecology are bound to complete specific milestones related to tank waste remediation, and given the uncertainties listed in the comment, the Agencies have selected the Phased Implementation as the preferred alternative.

Identification and presentation of the many existing uncertainties was the method chosen by DOE and Ecology to complete the evaluations and publish the EIS. To consider and resolve all uncertainties before publication of the EIS would result in inordinate delay and failure to comply with the Tri-Party Agreement. Please refer to the response to Comment numbers 0005.03, 0072.05, and 0072.80 for discussions regarding regulatory requirements for bounding alternative analyses.

Comment Number 0030.05 *Krieg, Ronald K.*

Comment A recent report prepared by the National Research Council regarding containment-in-place technologies acknowledges subsurface barriers as an imperative use during remediation efforts and as a feasible interim solution to hazardous substance migration at Hanford and other Department of Energy sites. The committee's comparison of costs found retrieving and processing wastes costs $15 billion more (17.5 vs. $2.4 billion) than the alternative of in situ stabilization and isolation. I do not believe the Feasibility Study of Tank Leakage Mitigation Using Subsurface Barriers (WHC-SD-WM-ES-300) fully analyzed subsurface barrier technology and recommend what the National Research Council has; that containment-in-place technology be re-evaluated on its technical, fiscal, environmental, and public health merits as a possible short- or long-term alternative for radioactive waste management and inclusion as such in this EIS.

Another problematic issue is in Appendix B's level of analysis and conclusions of subsurface barrier technology, which failed to include information from the Feasibility Study of Tank Leakage Mitigation Using Subsurface Barriers regarding subsurface barriers' cost effectiveness when supporting clean closure activities. Although closure decision are not a part of this EIS, they are stated to be interrelated with the decisions made concerning remediation of tank wastes.

The conclusion I am referring to is stated: "The most cost effective individual action is adding a close-coupled subsurface barrier to support clean-closure. This result is lowering both risk and HI and the overall cost of the alternative. This apparent anomaly arises from the substantial reduction in contaminated soil and recovered contaminants requiring treatment when a subsurface barrier is used. The resulting cost savings more than offset the cost of installing the barrier (WHC-SD-WM-ES-300 Rev. 0, pg. 8-3). Information such as this must not be overlooked, forgotten, or excluded from this EIS.

A reduction in the financial risk involved with contaminant migration and the technical uncertainties of the ex situ technologies is possible and available now. The potential cost savings to TWRS could be in the $5-7 billion range if a 10-year delay in remediation costs could be attained through effective deployment of subsurface barrier technology. This principle would carry over to many other situations throughout the DOE complex. Mitigated through the use of effective subsurface barriers under the tanks a delay in start up could save money in two ways: 1) identical real budgets have lesser present value as they are postponed farther into the future, and 2) technology productivity improvements occur as time passes, further reducing real costs. This approach would allow the DOE to improve the design, construction, and operations of initial and full scale remedial operations to the SSTs.

Barriers for confinement-in-place of buried waste have been effectively used in many environmental remediation activities. Subsurface barriers provide a cost effective option for resolving the 200 Areas' management and remediation problems either as a short or long-term approach. With their continued development, cost efficient subsurface barrier technology providing the highest containment performance standards must be retained and given serious consideration on its technical fiscal, environmental, and public health merits for inclusion in this Draft EIS.

Response The subject report by the National Research Council, titled The Potential Role of Containment-in-Place an Integrated Approach to the Hanford Reservation Site Environmental Remediation, recommended that containment-in-place technology be considered and evaluated on its technical, fiscal, environmental, and public health merits as a possible short- or long-term alternative for radioactive waste management. Such analysis should be conducted on a site-specific basis.

For analysis in the EIS, alternatives that bound the full range of reasonable alternatives were developed. In order to bound the impacts associated with in situ disposal of the tank waste or tank leakage during waste retrieval activities, subsurface barriers were not assumed to be used. This does not preclude the use of subsurface barriers during remediation activities but provides an upper bound on the expected environmental impacts. Subsurface barriers would be beneficial for retrieval of wastes from known or suspected leaking tanks. This technology would be evaluated for tank-specific application. Subsurface barriers were added as a potential mitigation measure in Volume One, Section 5.20 in the Final EIS. Please refer to the response to Comment numbers 0001.01 and 0030.01.

Comment Number 0046.03 *DiGirolamo, Linda Raye*

Comment We ought to convert the WHOLE NUCLEAR INDUSTRY by forming a commission name NEW AGE ENERGY - touched upon by Mr. Browning - This NAE would begin research and development at Hanford while the DOE cleans up its awful mess...beginning immediately!

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste.

Comment Number 0054.01 *Belsey, Richard*

Comment Grout did not work because we had so many processes going on. At Savannah River, they are today using grout because they were able with relatively simple separations to clean out 99.99 percent of the high activity fraction. But Hanford kept on, the Hanford's performance assessment kept on bouncing back over, over, strung out over time saying give us more information, your I-129 releases from the grout are still rising at 10,000 years. You at least have to model it out to know where it is going to turn the corner. I raise this question because we have re-opened all of those issues almost like re-opening a wound and looking at an infection again and saying why are we doing this and I would council that in fact you all list other stabilization forms (grout and ceramics) in this Draft EIS. How did we come to glass. There has been both a rich scientific literature about stabilizing radionuclides in glass going back 20 or 30 years and whereas with other substances there is spotty science and particularly with ceramics and grout there are highly variable reactivity. You go down to Savannah River it is almost like a witches brew. They stir it up and they have to use this particular kind of stone or else the whole thing does not gel and same thing with ceramic. So from my perspective, science wise we have to be careful about changing the stabilized waste form and we also now have about a 20-year, nearly a 20-year experience, not our own, but with other people using glass particularly for the high-level wastes. So I think that we should clearly not make any change in the waste form because of the inherent delay that will come about and the one thing we can not afford to do is to delay. The delays have cost nearly a billion dollars now and every year we delay costs that much more with by and large no real value so we got to get on with it. So state clearly that you are not going to consider anything except glass and glass from whoever gets to do the job of cleaning this up. I will leave that for now. Thank you very much.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. NEPA requires that a full range of alternatives be examined in the EIS. This range of alternatives must include a No Action alternative, and may include other reasonable alternatives to allow analysis of a full range of alternatives. Some alternatives do not produce a glass waste form. Consequently, the EIS cannot omit glass from analysis as the waste form for a given alternative. It should be emphasized that for the ex situ alternatives, glass was the primary waste form to be produced. Similarly, the EIS also discusses alternate immobilization technologies to allow their

analysis. These technologies were not included in the alternatives developed for impact analysis, but may serve as potential components of a remediation alternative. The discussion of alternate technologies, including grout, will be found in Volume Two, Section B.9.0. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted. Please refer to the response to Comment numbers 0005.40, 0005.18, 0072.179, and 0009.08 for a discussion of issues related to grout.

Comment Number 0058.01 *Swanson, John L.*

Comment I have heard tonight different people give their biases. They blame somebody else for subjective judgement while they are drawing their own. In recent years have used a saying many times that I will repeat here. It applies to these costs analyses and comparisons of alternatives and that is the assumptions drive the conclusions.

Response When assumptions were made in the EIS, every effort was taken to ensure that these assumptions were applied equitably among the alternatives to ensure comparability. Please refer to the response to Comment number 0005.03.

Comment Number 0059.02 *James Jordan Associates*

Comment A brief white paper entitled, A Comparison of BNL's Small Modular HLW Treatment System with a Large Central Melter System is attached in support of JJA's request to include the BNL concept in the EIS analysis. Finally, an economic analysis of the estimated costs of producing high-level radioactive glass using the Small Module Inductively Loaded Energy concept invented by BNL is attached to this request. JJA has formally requested that the BNL concept be developed for possible use at Hanford and other DOE sites.

Response Alternatives were developed that bound the full range of reasonable alternatives and reflect the results of the public scoping process for the EIS and discussed in Volume One, Section 1.2. Representative alternatives that incorporate the range of cost, human and ecological health risk, and technologies have been developed for analysis in the EIS. The alternatives in the EIS have been developed to bound the applicable alternative technologies, including the one proposed by the commentor. Because the EIS contains bounding alternatives that will be presented to the decision makers, no change has been made to the EIS. Please refer to the response to Comment numbers 0072.05 and 0072.79.

Comment Number 0062.02 *Longmeyer, Richard*

Comment My second comment is with regard to the privatization. I have some concerns with regard to safety issues, as well as issues such as water quality issues. Both groundwater, and the Columbia River. The question is will the private contractors treat groundwater and the Columbia River with the same care that the government has been mandated to treat it, under the Tri-Party Agreement? Will

they hold to the same safety guidelines, or perhaps better guidelines, that would be something that I would be interested to know.

Response Privatization is not within the scope of the EIS, as discussed in Volume One, Section 3.3 on page 3-13 of the Draft EIS, because it is a contracting mechanism. Under this concept, DOE would competitively bid a portion of the remediation work instead of having the Site Management and Operations contractor perform the work. Equivalent requirements for retrieval, treatment, and disposal of the waste, as well as quality and performance verification, would apply regardless of how DOE contracts to perform the remediation. Please refer to the response to Comment numbers 0009.19. 0060.02, and 0076.03.

Comment Number 0072.15 *CTUIR*

Comment It is difficult to follow the constituents through the various processes and into the environment. A mass balance showing distribution of the constituents for the tanks into various waste forms, effluents, and the environment would be helpful.

Response The detailed technical data developed to assess the environmental impacts of the alternatives addressed in the EIS are contained in referenced technical documents and calculations. The technical data are available for public review as a part of the TWRS EIS Administrative Record and in DOE Reading Rooms and Information Repositories. A mass balance for each of the waste treatment alternatives was completed in order to estimate the off-gas and liquid effluents. These off-gas and effluents streams then were used as sources in the risk assessment analysis. The human and ecological health effects from these off-gas and effluent streams are addressed in Volume One, Section 5.11. The TWRS EIS is a lengthy document and the inclusion of the detailed conceptual engineering information into the EIS would greatly lengthen the document. DOE and Ecology must balance the need to present relevant supporting data against the need to have a manageable and understandable document. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.196 *CTUIR*

Comment P B-166: Sect. B.7.1: It is noted that the evaluation for potential sites does not indicate that the affected Tribes were not notified or consulted with. If they were, please produce references, if they were not, please contact technical representatives of the affected Tribes.

Response The Draft EIS identifies in Volume Two, Section B.7 that the final site selection for the facilities associated with the ex situ alternatives has not been made. The potential site locations indicated in the EIS were taken from Hanford Site studies that examined potential site locations for the treatment facilities required for tank waste remediation and are included as examples for calculation of environmental impacts. The identification of these sites, within the 200 Area Waste Operations areas, is consistent with the Hanford Site Development Plan and the recommendations of the Hanford Tank

Waste Task Force. As indicated in Volume One, Section 5.20, before to any ground disturbance activities, consultations would be conducted with the DOE Richland Operations Office Historic Preservation Officer, the Hanford Cultural Resource Laboratory, Washington State Historic Preservation Officer, and concerned Native American Tribal groups and governments. Consultation with Tribal Nations groups and governments would be performed early in the planning process to determine areas or topics of importance to these groups such as religious areas and potential resources of medicinal plants. Please refer to the response to Comment number 0072.149 for a discussion of the Tribal Nation consultation process for the TWRS EIS. Please refer to the response to Comment numbers 0019.03, 0072.235, 0072.50, and 0101.06 for related borrow site and closure information.

Comment Number 0072.236 *CTUIR*

Comment P E-202: Sect. E.10.2: Although not clearly stated, this appears to be the preferred alternative. Please confirm. Additionally, it appears that the only alternative for MUSTs involves filling them with grout (sand, gravel and cement). As we have stated on several prior occasions, the selection of an alternative that results in irretrievable waste forms may be unacceptable.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. There has been no attempt in the accident analyses or at the location referenced in the comment to identify any alternative as the preferred alternative. The preferred alternative is identified in the Summary, Section S.7 and Volume One, Section 3.4. For the ex situ alternatives, the MUST waste would be retrieved and only the residual left in the tanks would be grouted. Grouting of the MUST was included in the analysis to facilitate a balanced comparison of the alternatives. Closure of the MUSTS, like closure of the tank farms, will be the subject of future NEPA analysis. For each of the alternatives presented in Volume One, Section 3.4 and Volume Two, Appendix B, remedial actions for MUST waste are described. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0083.01 *Pollet, Gerald*

Comment Hanford's Dangerous Nuclear Waste Tanks
They can explode! They do leak! Leaked waste will poison the Columbia River! So why does the U.S. Department of Energy want to consider leaving 75 percent of the waste in the tanks forever? Is this your idea of clean-up?

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The EIS includes an analysis of potential accidents, including explosions, in Volume One, Section 5.12 and Volume Four, Appendix E. Past tank leaks are discussed in Volume One, Section 5.4.2. A discussion of the potential cumulative impacts of past tank leaks and the TWRS alternatives is provided in Volume One, Section 5.13 and Volume Four, Appendix F. The regulations

(40 CFR 1500 to 1508) that implement NEPA requirements that an EIS address the full range of reasonable alternatives. For the TWRS EIS, the full range of reasonable alternatives was determined to range from leaving all of the waste in the tanks to retrieving as much of the waste as practicable (assumed to be 99 percent) and alternatives that fall between these two extremes. The DOE and Ecology preferred alternative is to retrieve 99 percent of the waste to the extent technically practicable. Please refer to the response to Comment numbers 0072.05 and 0009.01.

Comment Number 0085.03 *Klein, Robin*

Comment In the mean time we're calling for funding to develop real solutions. Not just for Hanford tank wastes, but to address soundly the global problem of disposing of dangerous radioactive materials worldwide. At the same time we're being asked to comment on TWRS. I'm going on a slight tangent here on purpose. We're also being asked to comment on the PEIS for disposition of weapons usable fissile materials nation wide. There we are faced with the ominous alternative, possibility of processing the worlds stores and reactors, with the likelihood that this could occur at Hanford. I hope that in parallel, with comments on what to do with the tank wastes, we don't lose sight of the pressure mounting to fire up reactors once again along the Columbia River. This is a non-solution to a problem, for which there is no good solution. Maybe if just a fraction of the dollars that were spent on developing those horrific weapons were spent on coming up with a permanent real solution, funding those great minds at the labs in Los Alamos Sandia, we'd probably stand a chance, and I believe we would. After all, that stuff's going to be around a while one way or another. But don't revive a failing nuclear industry at the price of health and safety of our futures.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. Congressional funding issues are not included in the scope of this EIS. However, Volume One, Section 5.13 (Cumulative Impacts) addresses actions at other DOE sites and programmatic actions that could impact the Hanford Site, actions adjacent to the Hanford Site, and planned or reasonably foreseeable DOE actions at the Hanford Site.

L.4.0 AFFECTED ENVIRONMENT

L.4.1 GEOLOGY

Comment Number 0072.124 *CTUIR*

Comment P 4-3: Sect. 4.1 Geology: This section is missing a table depicting the Ringold formation.

Response The Ringold Formation is shown in Figures 4.1.3 and 4.1.4 and described in Section 4.1.3. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.125 *CTUIR*

Comment P 4-4: Fig. 4.1.1: Depressions are typically mapped by a closed end line with comb-like tooth projections pointing towards the depression, not as shown in this figure.

Response The closed line comb-tooth symbol is considered standard nomenclature for depicting a depression. The nomenclature used in the figure was adopted from a report on the geology of the Hanford Site (Lindsey 1992) and communicates the feature accurately. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0072.126 *CTUIR*

Comment P 4-7: PP 1: S 3: What direction are the fluvial sediments deposited, where is the figure depicting the direction of these sediments?

Response The direction of deposition of the fluvial sediments is not germane to the analysis of impacts and was therefore not included in the discussion. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.127 *CTUIR*

Comment P 4-9: PP4: S 5: What contamination exceeds which levels?

Response Radiological control areas are those areas where contaminants exceed natural background levels. Generally, the contaminants that exceed background levels are discussed in the sentences that proceed the referenced text in Volume One, Section 4.1 and in Appendix I. More detailed discussions are available in the source documents for this information, which are referenced in the EIS and available for public review in the DOE Reading Rooms and Information Repositories.

Comment Number 0072.128 *CTUIR*

Comment P 4-10: Sect. 4.1.5: Where are the references for these potential borrow sites?

Response The information concerning the potential borrow sites was obtained from the Site Evaluation Report for Candidate Basalt Quarry Sites, Bechtel Hanford Incorporated, February 1995. This reference was added to Volume One, Section 4.1.5.

Comment Number 0072.129 *CTUIR*

Comment P 4-10: Sect. 4.1.6: Please explain the stress regime for the fold belts indicated here in relation to the Cascadia subduction zone.

Response The stress regime of the Yakima Fold Belt is discussed in Volume Five, Section I.1.6.2. Because the geotechnical data presented in Volume Five, Appendix I is sufficient to support the EIS analysis of the seismicity, no further discussion is warranted.

Comment Number 0072.130 *CTUIR*

Comment P 4-10: Sect 4.1.6: PP2: Where is the diagram indicating the epicenters of these quake swarms? Please indicate a possible cause. Figures showing historical and recent seismicity of the Columbia Plateau are provided in Volume Five, Appendix I.

Response Earthquake swarms can occur at any location and their cause is not understood. They are not associated with known faults. Figures showing historical and recent seismicity of the Columbia Plateau are provided in Volume Five, Section I.1.6.

Comment Number 0089.20 *Nez Perce Tribe ERWM*

Comment Page 4-10, Paragraph 4
Not all earthquake sources are mentioned in this EIS, and Probabilistic Seismic Hazard Analysis DOE Hanford Site, Washington, WHC-SD-W236A-TI-002, Revision 0, by Geomatrix Consultants should be referenced. Large earthquakes occurring on the Cascadia Subduction Zone pose a threat to the tanks and should have been considered in this EIS. Also, there is more than one earthquake swarm area located within the boundaries of the Hanford Site.

Response As stated in Volume Four, Section E.1.4, seismic scenarios were being studied by DOE and Ecology when the Draft EIS was published. The scenarios have been incorporated into the Final EIS in Volume Four, Appendix E. The hazard curves referenced in WHC-SD-W236A-TI-002, Rev. 1, were incorporated into the analysis. Please also refer to the response to Comment number 0072.130.

L.4.2 WATER RESOURCES

Comment Number 0072.131 *CTUIR*

Comment P 4-11: Sect. 4.2: Which contaminants that are not within the scope of this EIS.

Response The contaminants in the vadose zone, groundwater, and surface water due to past releases are not within the scope of this EIS. The EIS does present data regarding these contaminants in Volume One, Section 4.2. This information has been modified in the Final EIS to include data regarding vadose zone contamination that was unavailable when the Draft EIS was published. These new data are also addressed in Volume Six, Appendix K. Cumulative impacts are discussed in Volume One, Section 5.13 and Volume Four, Appendix F.4.5. Please also refer to the response to Comment numbers 0072.08, 0012.01, and 0012.15 for issues related to vadose zone contamination and closure.

Comment Number 0072.132 *CTUIR*

Comment 4-12: Sect. 4.2.2: It is indicated that the confined aquifers are not likely to be impacted, please justify this statement.

Response Interconnection between the unconfined and lower confined aquifer is possible across the Central Plateau. However, except for the area near the erosional windows that occurs in the basalt several kilometers north of the 200 East Area and B Pond vicinity in the 200 East Area, there is no indication of aquifer interconnection. Groundwater mounding from discharges from B Pond have resulted in a substantial downward hydraulic gradient in this area. Groundwater mounding associated with B Pond are anticipated to greatly diminish by the time there are any releases from the TWRS facilities. The assertion that the confined aquifer is likely not impacted by TWRS alternatives is based on the TWRS facilities being separated from the confined aquifers by the vadose zone, unconfined aquifer, and confining layer(s) that are generally present in the lower portion of the unconfined aquifer, in addition to the reduction of downward hydraulic gradient in the vicinity of B Pond as discharges to the pond are reduced and eliminated. Please refer to the response to Comment number 0045.04 for a discussion of the text related to this issue that has been added to the Final EIS.

Comment Number 0072.133 *CTUIR*

Comment P 4-12: Sect. 4.2.2: Bullet 3: an overbank deposit is not necessarily laterally continuous; please indicate how these overbank deposits act as confining layers.

Response Overbank deposits are not necessarily laterally continuous; however, their presence, in conjunction with other relatively low-permeability sediments, combine to form a confining layer at the base of the unconfined aquifer, except as noted in the vicinity of an erosional window several kilometers north of the 200 East Area. Please refer to the response to Comment numbers 0072.132 and 0045.04.

Comment Number 0072.134 *CTUIR*

Comment P 4-14: PP 1: Please indicate how the groundwater flux influences the local groundwater north of the 200 West area.

Response The potential influences to the local groundwater north of the 200 West area due to waste water from the Effluent Treatment Facility will cease before tank waste releases addressed in this EIS reach groundwater for any of the alternatives. Please refer to the response to Comment number 0012.16. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.135 *CTUIR*

Comment P 4-15: Sect 4.2.2.4› In this section it's indicated that the NW corner of the 200 West area that groundwater flows northward. Please indicate how the treated waste water from the affluent treatment facility impacts the ground water movement in this area.

Response Please refer to the response to Comment number 0072.134, which addresses the same issue, and the response to Comment number 0012.16 for a related discussion of groundwater flow modeling.

Comment Number 0072.136 *CTUIR*

Comment P 4-18: PP2: Please indicate more clearly how the downward hydraulic gradients affect the local groundwater movement.

Response The potential effects of downward hydraulic gradients in the unconfined aquifer in the vicinity of B Pond will cease or be greatly reduced before tank waste releases occur for any of the alternatives. Consequently, these potential impacts are not germane to the analysis of impacts and are not included in the discussion. Please refer to the response to Comment numbers 0072.13, 0072.138, 0072.259, 0045.04, and 0089.23 for related discussions regarding B Pond.

Comment Number 0072.137 *CTUIR*

Comment P 4-18: Sect. 4.2.3: PP 3: Can you supply a figure indicating the relative levels that are consistently detected that are of Hanford origin?

Response Provided in this section are the current water quality and supply information. Relative levels of contaminants in the affected environment between Hanford and non-Hanford sources are not germane to the analysis of impacts and are therefore not included in the discussion. The two must be assessed together to provide a meaningful analysis. Any concentrations of radionuclides above background levels are assumed to come from the Hanford Site.

Comment Number 0072.138 *CTUIR*

Comment P 4-18: PP 4: Although the B pond is not used for human consumption today, it is still open to access from animals in the environment. Do the samples exceed chronic aquatic levels?

Response There is no indication that the TWRS alternatives would affect or be affected by B Pond. Thus, chronic aquatic (contaminant) levels in B Pond are not within the scope of this EIS.

Comment Number 0072.139 *CTUIR*

Comment P 4-21, 4-22, 4-23: The distributions of tritium, iodine-129, and nitrate are drawn with lines indicating a high level of certainty. Is there a figure indicating the depth of these distributions?

Response Typical monitoring well construction on the Site requires that the monitoring wells be screened from about 10 feet above the water table to 20 feet below the water table. The distributions of tritium, iodine-129, and nitrate are based on data from these wells and are assumed to represent concentration levels in the upper 20 feet of the unconfined aquifer. There are no known references that contain figures indicating the depth or vertical distribution of contaminants.

L.4.2.1 Surface Water

No comments were submitted or this topic.

L.4.2.2 Groundwater

Comment Number 0045.01 *DiGiromlamo, Linda Raye*

Comment Page 4-12. Section 4.2.2, third bullet: Vertical gradients in some parts of the 200 Areas are downward from the unconfined aquifer to the confined aquifer. Therefore, assuming the mud and overbank materials are not completed impermeable, some movement of water from the unconfined to the confined aquifers is probable. Also, there have been some indications of "contaminants" in wells tapping the confined aquifer. This should be discussed in the Final EIS.

Response Please refer to the response to Comment number 0045.04.

Comment Number 0045.04 *USDOI*

Comment Page 4-15. Section 4.2.2.3, last paragraph, fourth sentence: The Draft EIS states that erosional windows "allow some interconnection" between the unconfined and confined aquifer. It would be more accurate to state in the Final EIS that some interconnection is possible everywhere and that the erosional windows enhance the degree of connection.

Response The following statements were added to the text of the EIS in Volume One, Section 4.2 and Volume Five, Appendix I. "Interconnection between the unconfined and lower confined aquifer is possible across the Central Plateau; however, except for the area near the erosional windows that occur in the basalt several kilometers north of the 200 East Area and B Pond vicinity in the 200 East Area, there is no indication of aquifer interconnection. In the vicinity of B Pond, groundwater mounding from discharges from B Pond have resulted in a downward hydraulic gradient. Several kilometers north of the 200 East Area, there is an absence of confining layer(s) associated with an erosional window which has results in enhanced interconnection of the aquifers in this area." Please also refer to the response to Comment numbers 0072.132 and 0072.133.

Comment Number 0053.03 *Carpenter, Tom*

Comment More recently, we hear that cesium could possibly be heading toward the ground water that is in the vadose zone underneath the tanks. This is an interesting finding because five years ago, John Brodeur, who is a geophysicist out there, was trying to get the attention of the Hanford officials saying you need to do better in monitoring the vadose zone and the soil underneath the tanks and eventually he lost his job but managed to be put back into Hanford under the auspices of another contractor, Rust Geotech, which ended up doing the type of state-of-the-art modeling that, in fact, showed in December of 1995 that there could be a problem with cesium 125 feet down in the vadose zone, which is a lot further than led to be believe the cesium would ever travel. It is a very significant environmental finding and yet the public was not told about the cesium possibilities until mid February and then only reluctantly and I wonder why that is.

Response In the Draft EIS in Volume One, Section 4.2 and Appendix I, vadose zone contamination beneath the tank farms was described, and in Volume One, Section 3.3 the emerging data on the extent of migration in the vadose zone were discussed. Appendix K includes a discussion of potential transport mechanisms that may result in the contaminant migration. Please refer to the response to Comment numbers 0030.02, 0012.15 and 0009.01 for discussion regarding the emerging data and how that data are addressed in the Final EIS.

Comment Number 0072.258 *CTUIR*

Comment P I-23: Sect. I.2.2.2.2: Indicating that perched water may occur in the West Area, is an indicator of the large amount of uncertainty involved with predicting subsurface structures. This section should also include the language that calcite layers may also occur under the East Area as well.

Response DOE and Ecology acknowledge the uncertainty involved with predicting subsurface structures. Caliche layers, which are often associated with perched water in the vadose zone, could occur in other areas including the 200 East Area. Based on limited information from boreholes in both the 200 East and 200 West Areas, it is likely that caliche layer(s) would be encountered in the 200 West Area and much less likely that they would be encountered in the 200 East Area. Volume Five, Appendix I has been modified to indicate perched water is possible in the 200 East Area, but not as likely as the occurrence in the 200 West Area. A discussion regarding the emerging data on vadose zone contamination is provided in Volume Five, Appendix K.

Comment Number 0072.259 *CTUIR*

Comment P I -23: Sect. I.2.2.2.3: Areas where substantial amounts of liquid may affect vadose zone saturation characteristics, such as near the B Pond should be part of the uncertainty analysis. This does not seem to be the case. Please indicate why this fact was seemingly overlooked.

Response The liquids from B Pond were not overlooked in the EIS. This issue goes beyond those expressed in the comment and includes other potential effects on the saturated zone. The 1979 groundwater levels on which the impact analysis is based represents a point in time where the B Pond groundwater mound was at a high level, higher than would be expected for the future given the decrease in waste-water discharges to the pond and its ultimate closure. This results in a conservative vadose zone impact assessment (i.e., faster contaminant transport in the vadose zone) because the vadose zone saturations are high and vadose zone thickness is less than would be expected without the mound. Another major concern relating to B Pond is the effect of the groundwater mound on groundwater gradient direction and magnitude. As pointed out in the Draft EIS, Volume Four, Section F.4.3.5, Site predevelopment water levels, as represented by a hindcast (estimates of water levels and flow directions that existed before the Hanford Site was constructed) and predicted future water levels for the year 2040, compare favorably with the groundwater levels from the year 1979 on which the impact analyses are based. Volume Four, Appendix K of the Final EIS contains predictions of the future groundwater flow directions after all of the groundwater mounds caused by past practice activities are gone. This analysis validates the flow direction calculated for the EIS impacts. Discussions of uncertainties have been expanded in the Final EIS and are now presented in Volume Five, Appendix K. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0072.261 *CTUIR*

Comment P I-34: Sect. I.2.3.2: Existing groundwater contamination should also be part of the EIS evaluation, since the tank leaching will add to what is already there, and both of these contribute to risk.

Response Existing groundwater contamination is discussed in Volume Five, Appendix I and Volume One, Section 4.2. Potential cumulative impacts are discussed in Volume One, Section 5.13 and Volume Four, Section F.4.5. Existing groundwater and soil contamination is not within the scope of this EIS, but will be addressed in a future NEPA analysis on tank closure. Please refer to the response to Comment numbers 0012.15, 0030.02, and 0072.08 for more information related to this issue.

L.4.2.3 Water Quality and Supply
Comment Number 0072.260 *CTUIR*

Comment P I-23: Sect. I.2.2.2.4: Contaminants are listed, but concentrations and total mass are not listed. Why was this information included at all if existing contamination is not used in the EIS? Even though TWRS does not claim ownership of the contaminated soil, it should be part of the analysis since all of the tank leaching will be pushing this contamination into the groundwater.

Response Records on the inventory of past practice waste disposal are sparse. The list of contaminants in Volume Five, Table I.2.2.1 was provided to give an indication of waste disposal. Volume Four, Section F.4.5 and Volume One, Section 5.13 address potential cumulative impacts

associated with past practice waste disposal and past leaks from the tanks. Included in this section is information on the quantity of the high-risk contaminants carbon-14, iodine-129, technetium-99, and uranium. The contaminants in the vadose zone from past tank leaks are not within the scope of this EIS, and will be addressed in future NEPA analysis for tank closure. The remediation plan will address vadose zone and groundwater contamination within the context of tank farm closure alternatives. Emerging information indicates that some contaminants such as cesium, potentially from past tank leaks, are 100 feet or more below the tanks. The potential mechanisms for this transport are discussed in the EIS in Volume Five, Appendix K.

For most of the TWRS remediation alternatives, the liquid fluxes (the driving force that could push existing contaminants deeper), either from infiltrating precipitation or combined with releases from the tanks, would be at or far less than current liquid fluxes due to infiltration and the fluxes associated with past leaks. It is only for ex situ alternatives, during the waste retrieval sluicing period, that the liquid flux would increase. During the retrieval period, the liquid flux would increase from 1.4E-5 m/day to a total of 2.1E-5 m/day. Following retrieval, there is a 14-year cap construction period where the infiltration would be approximately 1.4E-5 m/day. The cap is calculated to reduce total infiltration to 1.4E-6 m/day for a nominal 1,000-year period. Please refer to the response to Comment numbers 0012.15, and 0030.02 for additional information concerning existing contamination in the vadose zone and 0005.17 and 0072.08 for a discussion of the reasons for not including closure in the EIS.

L.4.3 METEOROLOGY AND AIR QUALITY

Comment Number 0072.140 *CTUIR*

Comment P4-26: PP 2: Because the Hanford Site is classified as a major source of hazardous air pollutants, what portion of these pollutants is expected to be produced by TWRS activities?

Response The cumulative impacts of ongoing and reasonably foreseeable new Hanford activities, including TWRS, are presented in Volume One, Section 5.13. Ongoing Hanford operations would include the current impact of tank farm emissions, and the TWRS alternative would include new or increased tank farm emissions postulated to result from implementation of the alternative. Please refer to the response to Comment number 0072.243. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.262 *CTUIR*

Comment P I-41: Sect. I.3.2.2: The statement is made that DOE has applied for a Sitewide Air Operating Permit for the Hanford Site; we expect to see the Vitrification Plants, EMSL, LIGO, and all other sources included.

Response The Hanford Sitewide Air Operating Permit will include all Hanford facilities within DOE oversight that have a stack or vent point, unless determined to be insignificant emission units, as

defined in WAC 173-401. Volume One, Section 6.0 indicates that air emission permits are among the permits DOE will need to have modified or initiated depending on the alternative selected in the ROD.

L.4.4 BIOLOGICAL AND ECOLOGICAL RESOURCES

Comment Number 0012.18 *ODOE*

Comment Figure I.7.2.1 on page I-90 of Volume Five is flawed. It claims areas outside the 200 Areas for waste operations. The Future Site Uses Working Group recommended use of the 200 Areas as needed for waste operations and only such additional areas between the 200 Areas as was required. The working group included a buffer around this area for protection of the public. The figure also fails to identify the mature shrub-steppe habitat as sensitive areas south of the 200 Areas. This habitat is identified by the State of Washington as needing special protection.

Figure I.7.2.2 on page I-92 of Volume Five claims a large section of the center of the Site for waste operations. This proposed area contains the bulk of the mature shrub-steppe habitat remaining on the Site. The area indicated is far larger than indicated by the working group. There is no approved future land use map of the Hanford Site. This figure and references to it need to be removed from the document.

Response Volume Five, Figure I.7.2.1 shows existing Hanford Site land uses and is adapted from the Hanford Site Development Plan issued by DOE in 1993. The figure is not intended to show biological information such as sensitive habitats. Vegetation types in the TWRS areas are shown in Volume Five, Figure I.4.2.1.

Volume Five, Figure I.7.2.2 is also adapted from DOE's 1993 Hanford Site Development Plan. The area shown for waste operations in the figure represent DOE's 1993 vision of future Site land uses based on existing and future Hanford Site missions. As stated in the comment, and noted in Volume Five, Figure I.7.2.1 and in Section I.7.2, there currently is no official approved land use map for the Site. The Hanford Site CLUP, currently in preparation, will provide an official DOE vision of future Site land uses. The Hanford Site Development Plan material is included in the EIS to provide an indication of the DOE vision of future land uses in the absence of an official land use plan. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0019.05 *WDFW*

Comment Significant adverse affects to wildlife will occur if the McGee Ranch is impacted from projects such as the Environmental Restoration Disposal Facility and TWRS. These projects are citing the McGee Ranch as a borrow site for silt loam soil. Cumulative demands for this silt loam soil exceed the resource. The existing Priority Habitat and value as a wildlife corridor will be lost. WDFW has requested USDOE to protect and preserve this parcel of land as a wildlife corridor between the two largest contiguous tracts of shrub-steppe in the State of Washington (letter dated April 5, 1996 from

Martin Baker, Assistant Director, Washington Department of Fish and Wildlife to John Wagoner, Manager, U.S. Department of Energy-Richland Operations, see enclosure).

Response The potential borrow sites identified in the EIS would not be selected to support borrow needs of the EIS alternatives based on the analysis in this EIS. These sites were identified to inform the decision maker of potential impacts associated with each of the alternatives should the representative closure option presented in the EIS be implemented. However, just as the EIS will not support selection of borrow sites, it will not support decisions associated with closure. The Draft EIS states in Volume One, Section 5.4 that use of the McGee Ranch borrow site would adversely affect an important wildlife corridor. The EIS was modified to note the Washington Department of Wildlife April 5, 1996 request to DOE to preserve this land as a wildlife corridor. Please refer to the response to Comment numbers 0072.08, 0101.05, and 0019.03 for discussion related to closure and borrow sites.

Comment Number 0019.08 *WDFW*

Comment Page 4-28, second paragraph. The Nature Conservancy has discovered 20 new species on the Hanford Site. Two plants and eighteen insects. Please revise your statement and elsewhere (e.g., I.4.1, I.4.3.4, etc.).

Response The EIS was updated in Volume One, Section 4.4 and Volume Five, Appendix I to note the Nature Conservancy's discovery of 20 new species on the Hanford Site.

Comment Number 0019.09 *WDFW*

Comment Page 4-28, section 4.4.2, second paragraph. The National Biological Service has listed native shrub and grassland steppe in Washington and Oregon as an endangered ecosystem (referenced earlier in this document). Please include this statement within the description of vegetation of the site, and elsewhere in the document (e.g., summary I.4.0, I.4.2., etc.).

Response The EIS was modified in Volume One, Section 4.4 and Volume Five, Appendix I to include the statement that the National Biological Service has listed native shrub and grassland steppe as an endangered ecosystem in Washington and Oregon.

Comment Number 0019.10 *WDFW*

Comment Page 4-52, 4.7.1.2. Washington Department of Fish and Wildlife administers the Wahluke Wildlife Recreation Area. Please correct statement.

Response The EIS was modified in Volume One, Section 4.7 and Volume Five, Appendix I to indicate that the WDWF administers the Wahluke Wildlife Recreation Area.

Comment Number 0019.11 *WDFW*

Comment Page 4-54, Section 4.7.3, first bullet. WDFW is not aware of any State natural resource agency which has submitted a proposal for the Arid Land Ecology Reserve. Please delete the words "Washington State."

Response The words "Washington State" were deleted from the referenced text in Volume One, Section 4.7.

Comment Number 0019.21 *WDFW*

Comment Page R-11, Fitzner 1992. The letter written by L. Fitzner appears on Washington Department of Wildlife letterhead. Please correct the name of the agency.

Response The EIS was modified to identify the referenced document.

Comment Number 0019.22 *WDFW*

Comment Page I-1, section I.1.0, first paragraph, last sentence. Duranceau's report does not adequately evaluate potential borrow sites for soil or gravel nor does it adequately evaluate the impacts to wildlife at basalt sites. Thus, adequate NEPA documentation has not occurred.

Response The Duranceau report (Duranceau 1995) was not intended to represent NEPA documentation for TWRS borrow site use decisions. The report was prepared as part of the process of evaluating potential borrow sites for eventual TWRS program use. The TWRS EIS also does not provide NEPA documentation with respect to borrow site use because decisions regarding closure activities, during which most TWRS borrow site impacts would occur, cannot yet be made. Closure is not included in the scope of the TWRS EIS. Additional NEPA evaluations of the environmental impacts associated with closure and borrow site issues, such as potential habitat destruction, cultural resources, site-wide planning, and cumulative impacts, will be evaluated in future NEPA documents. The selection of borrow sites will be made after extensive evaluation of prehistoric, historic, and cultural significance. Please refer to the response to Comment numbers 0072.08, 0019.03, 0101.05, and 0072.263 for discussions related to closure and borrow sites. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0019.23 *WDFW*

Comment Page I-44, section I.4.2, second paragraph, fourth sentence. WDFW disagrees with this statement. Cheatgrass provides less than fifty percent cover when woody and native herbaceous species are combined.

Response The EIS was modified in Volume Five, Appendix I to delete the statement that cheatgrass provides more than 50 percent of the vegetative cover in the Central Plateau vicinity.

Comment Number 0072.141 *CTUIR*

Comment P 4-27: Sect. 4.4.1: Biodiversity is also the buffer which keeps the ecosystems from upheaval.

Response Volume One, Section 4.4.1 has been modified to indicate that biodiversity provides a moderating effect on wide fluctuations in environmental conditions. Different plant and animal species respond differently to changes in environmental conditions. Ecosystems with higher levels of biodiversity are likely to experience less overall disruption as a result of events such as climatic changes, floods, or fires.

Comment Number 0072.142 *CTUIR*

Comment P 4-28: PP3: The recently discovered nine new plant/insect species on the Hanford Site is actually an indication of the amount of unrecorded biodiversity.

Response The EIS acknowledges in Volume One, Section 4.4 and in Volume Five, Appendix I that the discovery of new plant and insect species on the Hanford Site indicates the biodiversity of the Site. The ecological resources of the Hanford Site have been studied extensively. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted. Please refer to the response to Comment number 0072.143.

Comment Number 0072.143 *CTUIR*

Comment P 4-30: PP 1: What was the amount of error associated with the biological surveys in relation to survey coverage, mis-identification, and were any of the nine newly recorded species found in these areas?

Response The Nature Conservancy study was a multi-year effort that focused only on the North Slope, the Fitzner Eberhardt Arid Lands Ecology Reserve, and along the Columbia River. Although the study was intensive, the possibility remains that additional species could be discovered in the same areas in the future.

The Nature Conservancy did not study any of the potential TWRS areas. None of the new species were found in potential TWRS areas. Pacific Northwest National Laboratory (PNL) and the WDFW are beginning studies that might identify additional previously unknown species in areas of the Site not studied by the Nature Conservancy. PNL biological specialists indicate that, while new species conceivably could be found anywhere, the potential Vernita Quarry borrow site is the most likely location for new species of the various potential TWRS sites. This is because Vernita Quarry is part of

the Umtanum Ridge area where new species have been recorded in the past. The McGee Ranch area is less likely to contain newly discovered species than Vernita because McGee Ranch is partly disturbed by past agricultural use. The Central Plateau, where all other potential TWRS sites are located, is the least likely area for new species (Brandt 1996).

Comment Number 0072.144 *CTUIR*

Comment P 4-30: PP 4: Elk have also been sighted on islands and along the Columbia river.

Response The EIS has been modified in Volume One, Section 4.4 and Volume Five, Appendix I to indicate that elk reportedly also have been sighted on the islands and along the Columbia River. The presence of elk along the Columbia River and on the islands would not affect the analysis of TWRS alternatives' impacts because potential TWRS sites are 11 km (7 mi) or more from the river.

Comment Number 0072.145 *CTUIR*

Comment P 4-30: PP 5: S 2: The subjective use of the word 'near' is confusing, how far away is 'near'?

Response In this context, "near" is considered to be habitats occurring within 1 km (0.6 mi) of any TWRS site.

Comment Number 0072.146 *CTUIR*

Comment P 4-31: S 4.4.4: Sensitive habitats also occur in the undisturbed shrub steppe.

Response The term "sensitive habitats" in Volume One, Section 4.4 refers only to wetlands and riparian habitats. There is no intention to imply that undisturbed shrub-steppe does not include habitat areas that can be considered "sensitive" to disturbance.

Comment Number 0072.147 *CTUIR*

Comment P 4-31: S 4.4.5: If the Pipers Daisy, a Washington State sensitive species has been found at the potential Pit-30 Borrow Site, What plans are there for mitigation and for increased surveys regarding this, also, this plant and potentially many other sensitive species were not mentioned in the Eco-Risk section.

Response Future NEPA documentation for TWRS closure activities, the phase of the TWRS program during which most borrow site activities would occur, would require additional site-specific biological surveys. While specific mitigation measures have not yet been determined for impacts associated with decisions that will be supported by the TWRS EIS, these measures will be addressed in the Mitigation Action Plan to be prepared after the TWRS Final EIS is completed. In general, as discussed in Volume

One, Section 5.20 of the EIS, the principle of siting, configuring, and laying out facilities to avoid sensitive natural resources as much as possible would be a key element of a mitigation strategy. Additional potential mitigation measures that could be applied by DOE also are identified in Section 5.20. For additional information on closure and borrow site issues, please refer to the response to Comment numbers 0019.03, 0072.08, and 0101.05.

The analysis of chemical and radiological impacts presented in Volume One, Section 5.4 and Volume Three, Appendix D to biological and ecological resources considered a generic plant, as well as a number of wildlife species. Possible impacts considered to specific "sensitive" plant species were no greater than the low impacts expected on the generic plant analyzed.

Comment Number 0072.148 *CTUIR*

Comment P 4-32: PP 4: Please site where the reference is for the activities for the Native Americans written about here. Were the three affected tribes consulted regarding their activities, if so, please provide the references.

Response Hunn (Hunn 1990) was a primary reference for the material concerning Native American activities. Other references include Aiken (Aiken 1993), Devoto (Devoto 1953), and Irving (Irving 1976). Additional references are provided in Volume Five, Appendix I, Section I.4.6. Consultation with the affected Tribes occurred before publication of the Draft EIS. Additional consultation with these Tribes occurred subsequent to publication of the Draft EIS. The description of the affected environment (Volume One, Section 4.0 and Volume Five, Appendix I) and the environmental justice impact analysis (Volume One, Section 5.19) has been modified to reflect additional information (i.e., Native American natural and cultural resources, values, and perspectives) obtained through the consultation process. Please refer to the response to Comment numbers 0072.252, 0072.149, and 0012.19 for additional information on related topics.

Comment Number 0072.149 *CTUIR*

Comment P 4-32: PP5: Big game including elk and antelope were abundant on the Columbia Plateau, Bird species were an additional source of food. If the authors had followed the E.J. 12898 and consulted with the affected tribes instead of referencing HUNN, 1990, they would have been provided with appropriate information.

Response The EIS has been modified in Volume One, Section 4.5 and Volume Five, Appendix I to include additional information provided by affected Tribal Nations regarding big game on the Hanford Site. Affected Tribal Nations were consulted throughout the NEPA process as required by NEPA and the environmental justice Executive Order. This consultation process began in January 1994 with the publication of the Notice of Intent (FR 4250). In the Notice, DOE requested that "all interested parties submit written comments or suggestions concerning the scope of the issues to be addressed, alternatives to be analyzed, and environmental impacts to be addressed in the TWRS EIS." During the 45-day

comment period from January 28, 1994 through March 15, 1994, comments were received from the public, agencies, and Tribal Nations. These comments were considered when preparing the Draft EIS. DOE's response to the comments and plan for preparation of the EIS in a manner responsive to the comments are documented in the Implementation Plan for the TWRS EIS (DOE 1995b).

During the preparation of the Draft EIS, DOE and Ecology initiated several meetings with representatives of Tribal Nations to inform them of progress on the preparation of the EIS and to solicit input regarding issues being addressed in the EIS. Meetings were held with representatives of one or more of the affected Tribal Nations in July, August, and September 1994; May, June, November, and December 1995; and May and June 1996. On four of these occasions, requests were made to the affected Tribal Nations to meet individually with DOE and Ecology representatives of the TWRS EIS project. Several of the meetings were follow-up meetings with individual Tribal Nation representatives to exchange technical information or to clarify requests for inclusion of data or analysis in the EIS.

In December 1995, DOE and Ecology issued formal consultation letters to all local, and Federal agencies and Tribal Nations with an interest in the Hanford Site. These consultation letters stated that "DOE requests formal consultation ... so that the Tribe can identify and comment on specific issues and concerns that it feels should be addressed in the TWRS EIS" (Draft EIS Volume Five, Appendix J).

On April 5, 1996, in advance of the April 12, 1996 start of the public comment period, DOE issued the TWRS Draft EIS to the affected Tribal Nations as part of the consultation process. DOE requested that the Tribal Nations review and comment on the Draft EIS and committed to consider those comments while preparing the Final EIS. Further, DOE and Ecology held one or more meetings with each of the affected Tribal Nations during and following the 45-day comment period on the Draft EIS to facilitate Tribal Nation review and comment on the Draft EIS and to exchange technical information.

Throughout the NEPA process, DOE and Ecology have been proactive in consulting with the affected Tribal Nations regarding the content of the TWRS EIS. Many substantive portions of the Draft EIS were the result of consultation with affected Tribes from scoping to the publication of the Draft EIS; a similar number of changes in the Final EIS reflect consultation following issuance of the Draft EIS for comment. Consultation is a valuable part of the NEPA process. As with any intergovernmental relationship, DOE and Ecology understand that the consultation process requires improvement and will continue to work with the affected Tribal Nations to that end. A proactive consultation process results in the meaningful exchange of technical information between both parties and a shared understanding of the challenges, issues, and concerns that the agencies and Tribal Nations face as they work to improve the environment of the Hanford Site. Please refer to the response to Comment numbers 0072.53 and 0072.252 for more information on this topic.

Comment Number 0072.150 *CTUIR*

Comment P 4-32: PP6: Once again, citing from HUNN, 1990 and Fortner 1994, is unacceptable for describing Native Activities on the Hanford Site. Please consult with the affected tribes regarding these issues.

Response The EIS has been modified in Volume One, Section 4.5 and Volume Five, Appendix I to include information provided by affected Tribal Nations concerning Native American activities on the Hanford Site. This information was secured following consultation with the affected Tribal Nations. Please refer to the response to Comment numbers 0072.53, 0072.149 and 0072.252 for more information on this topic.

Comment Number 0072.263 *CTUIR*

Comment P I-44: Sect. I.4.2: The potential borrow sites are not described as being very important ecologically; the descriptions are understated to such a degree that one would suspect that this is intentional. They are each located in important undisturbed or recovering shrub-steppe or corridor areas. The acknowledged Site value "Do no more harm during future actions" would clearly be violated if any of these locations is used.

Response Volume Five, Appendix I and Volume One, Section 4.0 of the EIS describe the affected environment that could potentially be impacted by TWRS alternatives. These sections also indicate that the potential borrow sites are in shrub-steppe areas, McGee Ranch is an important wildlife corridor, and shrub-steppe is classified as a priority habitat by Washington State because of the importance of this community-type to sensitive wildlife species. Volume One, Section 5.4 contains the analysis of the impacts of TWRS alternatives on the Hanford Site's shrub-steppe habitat and on McGee Ranch as a wildlife corridor. Volume One, Section 5.20 indicates measures that could be taken by DOE to mitigate these impacts. The information contained in the TWRS EIS will not support a decision on closure alternatives selected. Closure, and its associated borrow sites, will be evaluated in future NEPA documents. Please refer to the response to Comment numbers 0019.03, 0101.05, and 0072.08 for more information on closure and borrow sites.

Comment Number 0072.264 *CTUIR*

Comment P I-48: PP 1: There is no mention of mitigation of these treasured resources.

Response Volume Five, Appendix I and Volume One, Section 4.0 of the EIS describe existing conditions in the environment that potentially could be affected by the TWRS alternatives. Impacts to biological and ecological resources are discussed in Volume One, Section 5.4 of the EIS, and potential mitigation measures for these impacts are discussed in Volume One, Section 5.20.

Potential mitigation measures include siting and configuring TWRS facilities to minimize the amount of currently undisturbed land that would be affected by TWRS and revegetation with locally-derived native plant species. For areas of biological importance (i.e., shrub-steppe habitat) that cannot be avoided, compensatory mitigation could be implemented, which would focus on planting new sagebrush to replace mature plants that were unavoidably impacted. Specific mitigation sites, planting strategies (e.g., number, location, and plant density) and performance standards would be defined in the TWRS EIS Mitigation Action Plan that will be developed in coordination with various government agencies (e.g., WDFW and U.S. Fish and Wildlife Service) and with input from the Hanford Site Natural Resources Trustees Council. These mitigation measures may be most effective as part of the Sitewide Biological Resources Mitigation Plan that is planned for the Hanford Site. Please refer to the response to Comment numbers 0019.06 for more information on this topic.

Comment Number 0072.265 *CTUIR*

Comment P I-49: Sect. I.4.3.1: Insert 'Elk' after mule deer.

Response Volume Five, Section I.4.3.1 and Volume One, Section 4.4, have been modified to indicate that elk reportedly have been sighted elsewhere on the Hanford Site, although they occur primarily on the Fitzner Eberhardt Arid Lands Ecology Reserve.

Comment Number 0072.266 *CTUIR*

Comment P I-54: Sect. I4.6: PP 5: Ethnobiological resources (based on one published reference, one unavailable report, and one set of unpublished field notes, without *any* consultation with the affected tribes) also seem considerably understated. These references are *not* in the reading room, and should have been forwarded to the affected Tribes for consideration. Please provide us with a copy of the Fortner reference..

Response The requested materials were provided to the CTUIR on receipt of the request. Reports regarding cultural and natural resource surveys relative to Tribal Nation resources are not provided to the general public. However, Tribal Nation officials are provided access to these reports.

L.4.5 CULTURAL RESOURCES

Comment Number 0072.37 *CTUIR*

Comment . Cultural resources were not described with any real understanding of Native American heritage, rights or concerns. The sparse description does not reflect the intended breadth of DOE and federal policy with respect to traditional cultural properties, and does not demonstrate an understanding of DOE responsibilities for natural and cultural trusteeship.

Response DOE and Ecology acknowledge the concern that the Draft EIS may not adequately reflect Native American views concerning their heritage, cultural and natural resources, values, and

perspectives. Additional consultation has occurred with the affected Tribal Nations. The EIS has been modified in Volume One, Sections 4.4, 4.5, 4.8, and 4.9; Volume Five, Appendix I; and Volume One, Sections 5.4, 5.5, 5.8, 5.9, and 5.19 to provide additional material that more fully reflects Tribal concerns and perspectives. Please also refer to the response to Comment numbers, 0072.149, 0072.53, and 0072.252.

Comment Number 0072.38 *CTUIR*

Comment The basis for identifying natural resources of cultural importance was a single set of unpublished notes that were not forwarded to the CTUIR technical staff. No consultation whatsoever with CTUIR staff occurred during the preparation of this EIS.

Response The unpublished material referred to in the comment concerning natural resources of cultural importance has been provided to the CTUIR. Cultural surveys are not published to protect any cultural resources that may be present. Consultation with the affected Tribes that occurred during preparation of the Draft EIS is identified in Volume One, Section 7.0. Additional consultation with the affected Tribes occurred during preparation of the Final EIS. The Affected Environment section of the EIS (Volume One, Section 4.0 and Volume Five, Appendix I) and the Environmental Consequences (Volume One, Section 5.0) have been modified to reflect additional material obtained during the consultation process. Please also refer to the response to Comment numbers 0072.37, 0072.53, 0072.149, and 0072.252 for information related to consultation with the Tribal Nations within the EIS process.

Comment Number 0072.39 *CTUIR*

Comment The Environmental Justice Executive Order is ignored completely in this section.

Response Volume One, Section 4.5 describes the affected environments' cultural resources, which include prehistoric, historic, and ethnographic sites. Potential impacts on the affected environment are described in Volume One, Section 5.5. The assessment of whether the impacts identified represent an environmental justice impact (e.g., adverse and disproportionate impact to minority, Native American, or low-income populations) is presented in Volume One, Section 5.19, which complies with the environmental justice Executive Order 12898. For additional information on Tribal Nations consultations regarding TWRS EIS, please refer to the response to Comment numbers 0072.37, 0072.53, 0072.252, and 0072.149.

Comment Number 0072.40 *CTUIR*

Comment Sacred sites are clearly within the TWRS impact zone, as are cultural resources and natural resources of cultural importance. If any consultation at all had occurred, this error could have been avoided.

Response In Volume One, Sections 5.5 and 5.19 the EIS has been modified in response to this and other comments to indicate that specific cultural and natural resources of cultural importance to Tribal Nations would potentially be impacted by TWRS alternatives. Volume One, Section 5.8 (visual impacts) and Section 5.9 (noise impacts) have been modified to address concerns expressed by Tribal Nations that construction and operation of facilities in the 200 Areas under some TWRS alternatives would adversely impact Gable Mountain. Please refer to the response to Comment numbers 0072.154, 0072.252, and 0072.53 for information regarding changes to the EIS based on consultation with Tribal Nations. These modifications were made in response to Tribal Nation comments submitted on the Draft EIS, an important step in the consultation process. Please refer to the response to Comment number 0072.149 for information regarding Tribal Nation consultations. Extensive consultation was performed with the Tribal Nations during the preparation of the EIS. Please refer to the response to Comment numbers 0072.37, 0072.53, 0072.154, 0072.225, and 0072.252 for information regarding changes to the EIS based on consultations with the Tribal Nations.

Comment Number 0072.151 *CTUIR*

Comment P 4-34: PP1: Although the White Bluffs road has been fragmented by past contemporary activities it remains just as important to the affected tribes as any other cultural site within the Pasco Basin.

Response The EIS was modified in Volume One, Sections 4.5 and 5.5 and Volume Five, Appendix I to note that the White Bluffs Road is considered an important cultural site by the affected Tribes even though it has been fragmented by recent activities.

Comment Number 0072.152 *CTUIR*

Comment P 4-34: PP5: Please indicate how much Plutonium, and other hazardous materials were deposited to the environment from this "monument." A careful presentation of the historical facts would be appropriate here.

Response This section describes historical resources only. Information on environmental releases and impacts from the 105-B Reactor are outside the scope of the TWRS EIS and are not discussed in this EIS. No TWRS activities are proposed at or near the 105-B Reactor, nor would any activities at the reactor site have any impacts on the TWRS alternatives analyzed as part of this EIS.

Comment Number 0072.153 *CTUIR*

Comment P 4-35: Sect. 4.5.3: The first paragraph of this section must be deleted in its entirety. The information contained within this paragraph is not necessary as a component of the EIS. The sole justification for this paragraph appears to be to inject DOE's unsubstantiated legal opinions into the record for this document. This is not a legitimate reason to include a statement in an EIS. In addition, the CTUIR considers the core DOE opinion contained in this paragraph to be fallacious. In the

CTUIR's opinion, federal law indicates that the U.S. Department of Energy's Hanford Nuclear Reservation is, indeed, "open and unclaimed land" upon which, under the terms of the CTUIR's and the Yakama Indian Nation's treaties of 1855, these Tribes have the right to hunt, gather plants and pasture livestock, should they so choose. Moreover, by appearing to make a distinction between the terms "right" and "privilege" as they appear in these Tribes' treaties, this paragraph promotes a legal position that has been rejected by the Washington Supreme Court and others.

It is inappropriate for this EIS to contain a paragraph that: 1) contributes nothing to the analysis and decisions being made in the EIS, 2) on its face is nothing more than a statement of legal opinion by a party that would have a great deal to gain from the adoption of that opinion, 3) is based upon debatable, misleading and/or inaccurate legal statements, and 4) which statements and opinions, if uncritically accepted, would severely injure the interests of sovereign tribal governments which the Department of Energy, as an agency of the federal government, has a fiduciary trust duty to protect. Paragraph one of Section 4.5.3. must be deleted in its entirety. Please contact CTUIR/SSRP staff directly concerning your response to this comment before completing the text of the final EIS.

Response The cited paragraph has been deleted from Volume One, Section 4.5, and a similar paragraph has been deleted from Volume Five, Appendix I, based on consultation with affected Tribal Nations.

Comment Number 0072.154 *CTUIR*

Comment P 4-35: Sect. 4.5.3: Although no *specific* religious Native American sites have been identified in the TWRS area of influence, it must be recognized that construction activities occurring during the cold war did not have cultural monitors. Also Gable Mountain is within the emergency reaction zones of the TWRS activities and this is a culturally significant religious site.

Response Many construction activities that occurred on the Hanford Site during the Cold War era did not have cultural monitors. Volume One, Section 5.8 indicates that activities conducted during implementation of all alternatives evaluated in this EIS would be visible from elevated locations (i.e., Gable Mountain, Gable Butte, and Rattlesnake Mountain). These locations are acknowledged as culturally important sites to Native Americans. Volume One, Section 5.19 has been modified based on additional consultation with the affected Tribes to indicate potential environmental justice impacts based on Tribal Nation cultural and natural resources values. Please refer to the response to Comment number 0072.37.

The direction from Recommendation for the Preparation of Environmental Assessments and Environmental Impact Statements, Office of NEPA Oversight, U.S. Department of Energy, Washington D.C., May 1993 (DOE 1993d) is to calculate the potential risk from accidents (e.g., the number of latent cancer fatalities [LCFs] from exposure to radiological constituents). The risk is not to be measured against risk acceptance guidelines, but against potential risks calculated in the other proposed alternatives.

Nations. Volume One, Sections 5.5 and 5.19 also have been modified to indicate potential environmental impacts based on Tribal Nations' cultural and natural resource values. Please also refer to the response to Comment numbers 0072.37, 0072.40, and 0072.140.

Comment Number 0072.269 *CTUIR*

Comment P I-62: Sect. I.5.3: The following sentence: "DOE has maintained the position that, for safety and security reasons, Hanford Site land uses are not compatible with exercising the privileges of hunting and gathering and pasturing and thus these lands are not considered open and unclaimed" does not reflect reality. It merely reflects the opinion of a few well-known DOE persons who consistently take such a minimalist approach to compliance as to be non-credible. Other DOE programs do, in fact, assume that Native American can and will exercise their treaty-reserved rights on Site, and are taking active measures to ensure that this can be done safely. The sentence quoted above must be omitted.

Response Please refer to the response to Comment number 0072.153 for information regarding the response to the treaty issue in the comment. For the purposes of analysis, the EIS assumes that institutional control would be maintained for 100 years. At the end of institutional control and for purposes of providing a baseline comparison for evaluating the alternatives contained in this document, the EIS assumes a variety of alternative land uses would be potential for the Hanford Site. This analysis, presented in Volume One, Section 5.11 and Volume Three, Appendix D, includes potential impacts associated with the land uses, such as Native American residential subsistence uses, residential farming, industrial worker uses, recreational shoreline users, and intruders. Please refer to the response to Comment numbers 0040.02 and 0101.01 for issues related to the 100-year administrative control period and to the response to Comment numbers 0072.154, 0072.37, 0072.225, and 0072.198 for issues related to remediation and post-remediation Site conditions and health risks.

Comment Number 0072.270 *CTUIR*

Comment P I-62: Sect. I.5.3: PP 4: While there may be no specifically identified sacred sites within 200E or 200W, there are most definitely sacred sites and traditional cultural properties within the TWRS impact area (i.e., downgradient in the groundwater and the River, and down-plume for airborne releases). There are many culturally important biota within this larger impact zone.

Response The EIS has been modified in Volume One, Section 4.5 and Volume Five, Appendix I to note that there are sacred sites, traditional cultural properties, and culturally important biota located in areas that potentially could be impacted by TWRS EIS alternatives. Potential impacts to these sites, when feasible, have been addressed in the Final EIS. For example, in Volume One, sections on noise (Section 5.9) and visual (Section 5.8) impacts associated with construction and operation of TWRS facilities in the 200 Areas, which could impact Gable Mountain, have been modified. Please refer to the response to Comment numbers 0072.37, 0072.154, and 0072.225 for more information.

Comment Number 0089.17 *Nez Perce Tribe ERWM*

Comment Nez Perce treaty rights and interest in the region are not mentioned at all in this section. Please correct this oversight in the Final EIS.

Response Volume One, Sections 4.4 and 4.5 and Appendix I, Section I.5 of the EIS have been modified to note that the Nez Perce Tribe has retained rights on the Columbia River under a treaty between the Tribe and the U.S. Government.

Comment Number 0089.21 *Nez Perce Tribe ERWM*

Comment Page 4-35, Paragraph 3
The Nez Perce Tribe's presence is there and retained rights to the Columbia River should be mentioned.

Response Please refer to the response to Comment number 0089.17, which addresses this issue.

Comment Number 0089.22 *Nez Perce Tribe ERWM*

Comment Page 4-35, Paragraph 4
Same as previous comment. (Comment number 0089.21)

Response Please refer to the response to Comment number 0089.17, which addresses this issue.

L.4.6 SOCIOECONOMICS

Comment Number 0072.155 *CTUIR*

Comment P 4-38: Table 4.6.2: The category White + the category Minority Group should add up to 100 percent. The statement that the category, group, consists of all races other than White + Whites of Hispanic origin is very confusing, please explain.

Response The categories "White," "African American," "Native American," "Asian and Pacific Islanders," and "Other" in Volume One, Section 4.6, Table 4.6.2 add up to 100 percent of the total population. The additional data in the table on "Hispanic Origin" and "Minority Group" have been deleted to avoid presenting confusing information.

Comment Number 0072.156 *CTUIR*

Comment P 4-38: Sect. 4.6.1.2: Drawing an artificial line to separate potentially impacted people from potentially non-impacted people is misleading in the case of the three affected Tribes. Please list them as three separate affected populations within this section. It is apparent that within this section

that executive order 12898 has not been fulfilled, simply listing statistics of demographics and presenting them as fulfilling.

Federal actions to address environmental justice in minority populations and low income populations is incorrect and misleading. Consultation with the affected Tribes would have resulted in the net benefit of demographic information that would have been appropriate for this section.

Response An important distinction exists between the area of potential impacts, which is depicted in the EIS as an 80-km (50-mi) radius surrounding the Hanford Site, and the populations residing within this area and the affected Tribes (i.e., CTUIR, Yakama, and Nez Perce). Both are important aspects of the environmental justice initiative and were addressed as such in the Draft EIS. Where impacts were to populations based on location of residence, the EIS addressed those impacts in terms of the geographic location of the minority, Native American, or low-income population as expressed in Volume One, Section 4.6. Where a potential impact would diminish potential treaty rights and privileges of Tribal Nations or cultural resources, regardless of whether or not the population of that nation resided in the area of potential impacts, the EIS addressed these situations in terms of impacts to the Tribal Nations. An example of this is expressed in Volume One, Section 5.19, regarding potential continued restrictions on access to portions of the 200 Areas.

In Volume One, Section 4.6, the Draft EIS presented the demographics of the potentially affected area. The Draft EIS also indicated that Tribal Nations with interest in the Hanford Site were located outside of the area of potential impacts. The Final EIS has been modified to clarify the delineation between potentially impacted populations residing within the area of potential impacts and the Tribal Nation populations. Further, the Final EIS has been modified in other sections to respond to comments and consultation with the affected Tribes regarding potential impacts to the CTUIR, Yakama, and Nez Perce. Please refer to the response to Comment numbers 0072.252, 072.271 and 0072.37. For example, the following sections were revised:

- A Native American scenario in Volume One, Section 5.11 and Volume Three, Appendix D (please refer to the response to Comment number 0072.153).
- Environmental justice analysis in Volume One, Section 5.19 to more fully present Tribal perspectives on potential impacts (please refer to the response to Comment number 0072.40).
- Volume One, Section 4.5 to communicate the perspective of Tribal Nations regarding cultural and natural resource values (please refer to the response to Comment number 0072.37).

Comment Number 0072.157 *CTUIR*

Comment P 4-43: Sect. 4.6.1.3: Where is the household income and educational attainment for Yakima County within this paragraph? Where also is the information for Oregon's Morrow and Umatilla counties?

Response As stated in Volume One, in the introductions to both, Sections 4.6 and 5.6 (Existing Socioeconomic Environment and Socioeconomic Impacts), detailed socioeconomic information and impact analysis are provided only for Benton and Franklin counties because impacts outside these two counties would be insufficient to require detailed analysis. Demographic data on the 80-km (50-mi) radius around the Hanford Site, including Yakima and Morrow counties, are included to provide the basis for the environmental justice analysis in Volume One, Section 5.19. Please refer to the response to Comment numbers 0072.53, 072.252 and 0072.271.

Comment Number 0072.271 *CTUIR*

Comment P I-62: Sect. I.6.0: Each of these sections mentions the Environmental Justice Executive Order (EO 12898), and claims to satisfy it by estimating the number of Native Americans living within the 3 counties closest to Hanford. This demonstrates a complete misunderstanding of the Order, which clearly states that the evaluation must cover human health and the environment of minority populations, differential patterns of consumption, economic and social impacts, and an evaluation of whether there is a disproportionate burden placed on these populations. Counting the number of Native Americans (and Hispanics) who live within 50 miles of Hanford does *not* satisfy this Order. Other information, such as educational attainment, public safety, schools, and so on, is interesting, but does not seem to be used for anything, and is not related to the rest of the EIS. Information that would be more directly relevant to local tribes would be the number of Native Americans actually employed at Hanford relative to local populations within 50 miles, and the trends in their employment over the years.

Response Volume One, Section 5.19, was specific to environmental justice issues. Mitigation measures associated with environmental justice are located in Volume One, Section 5.20. The demographic information in this section provides the basis for the environmental justice analysis provided in Volume One, Section 5.19. Volume Five, Appendix I does not purport to contain the environmental justice analysis. The appendix is intended to describe the potentially affected human and natural environment. The impacts of the alternatives on that environment are presented in Volume One, Section 5.0.

For the description of the affected environment, the EIS presents demographic data relative to Native American populations within an 80-km (50-mi) radius of the Hanford Site, which consist of the area of potential environmental impacts from TWRS EIS alternatives. This area includes all or portions of 10 counties by census tract (eight in Washington and two in Oregon). The EIS also describes the labor force within Benton and Franklin counties, an area that comprises the region of economic impact of the Hanford Site and hence the TWRS EIS alternatives. This description includes a breakout of the labor force by category by race and sex. Finally, the data presented provide a breakout of the Hanford Site contractor workforce representation by gender and race. The data presented indicate that the Native American population in the two-county area was approximately 0.8 percent, the Native American percent of the two-county labor force was approximately 0.8 percent, and the Native American percentage of the Hanford Site labor force was approximately 1 percent.

The data presented in Volume One, Section 4.6 and Volume Five, Appendix I were prepared to support the environmental justice analysis. Executive Order 12898 requires Federal agencies to identify minority and low-income populations that may be impacted by the proposed action. The above referenced data were provided to support that requirement.

Other information presented in the socioeconomic section, such as public schools, public safety, and infrastructure, is provided to support the NEPA-required assessment of each EIS alternative's potential impact on public services. This analysis is presented in Volume One, Section 5.6.

The second NEPA requirement is to determine the potential impact of the EIS alternatives on the affected environment. The analysis of potential impact to the affected environment is presented in Volume One, Section 5.0. Socioeconomic impacts are presented in Section 5.6. Several modifications to the impact analysis have been made in response to consultation from Tribal Nations. For example, in Volume One, noise impacts (Section 5.9) and visual impacts (Section 5.8) address potential impacts to sacred sites that are within sight or sound of the proposed TWRS activities. The long-term human health impacts have been expanded to include a Native American Subsistence user in Volume One, Section 5.11 and Volume Three, Appendix D. Please also refer to the response to Comment number 0072.37 for a discussion of additional changes to the Final EIS in response to this issue.

Based on the analysis of potential impacts to the human and natural environment, the environmental justice initiative requires the agency to determine if any of the impacts would pose a disproportionate and adverse impact on minority and low-income populations. This analysis is presented in Volume One, Section 5.19. For each area of potential impact (e.g., land use, human health, air quality, water quality, etc.), impacts presented in Section 5.0 were reviewed to determine if there were any potential disproportionate and adverse impacts to the surrounding populations. If an adverse impact was identified, a determination was made whether minority or low-income populations would be disproportionately affected. In the Draft EIS, two potential impacts were identified that would present a concern based on the requirements of the environmental justice initiative. The analysis of the impacts for the Final EIS has been reviewed based on comments and consultation with Tribal Nations. The result of this review has been a modification to the text of Volume One, Section 5.19 to indicate that under all of the alternatives except No Action and Long-Term Management, certain adverse impacts to scared sites would occur.

The final requirement of the environmental justice initiative is to mitigate any disproportionate and adverse impacts. In the EIS, mitigation measures that address the environmental justice impacts are addressed in Volume One, Section 5.20. Based on the decision documented in the ROD, DOE will prepare a Mitigation Action Plan, which will document mitigation measures to be implemented. Please refer to the response to Comment numbers 0072.53, 0072.225, 0072.157, and 0072.252 for discussions related to this topic.

Comment Number 0072.272 *CTUIR*

Comment P I-66: PP 1: The first step in identifying Native American communities is to contact the Affected Tribes. Those Tribes are: The CTUIR, YAKAMA, and NEZ PERCE.

Response Consultations with the affected Tribes have been conducted and the identification of Native American communities has been modified in Volume Five, Appendix I and in Volume One, Section 4.6, to specifically identify the CTUIR, Yakama, and Nez Perce Tribes. Please refer to the response to Comment numbers 0072.53, 0072.271, 0072.149, and 0072.157 for discussions of changes to the EIS based on Tribal Nation consultations.

L.4.7 LAND USE

Comment Number 0072.158 *CTUIR*

Comment P 4-48: Sect. 4.7.1: The invitation to the CTUIR for participation in the Comprehensive Land Use Plan was not on a Government to Government basis. This misunderstanding is in the process of being rectified. Additionally, where are the values brought forward from the Hanford from the Hanford Site Future Uses working Group?

Response The values of the Hanford Future Site Uses Working Group (HFSUWG) were one input to the 1993 Hanford Site Development Plan. The relationship between the values of the HFSUWG and the Site Development Plan is addressed in the EIS in Volume One, Section 4.7 and Volume Five, Appendix I.

Participation of the CTUIR in the CLUP is outside of the scope of the TWRS EIS. DOE and Ecology acknowledge the important role all affected Tribes have had in the NEPA process for the TWRS EIS. Consultation with the affected Tribes has resulted in many improvements to the EIS and has strengthened the decision-making process associated with the proposed action. Please refer to the response to Comment numbers 0072.37, 0072.149, and 0072.251 for more information. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.159 *CTUIR*

Comment P-4-51: PP 4: The Hanford Site Development Plan is not the "Official Land Use Plan." Please provide an explanation for what a 'passive agricultural use' is. Most agricultural uses involve the ripping or tearing of the land and injection of chemicals and the control of insects and water. This is not passive in any sense of the word. In addition, the FITZNER EBERHARDT Arid Lands Ecology Reserve and the proposed National Wildlife Refuge and Wild and Scenic River north of/and along the Columbia River consists of large tracts of the remaining undisturbed habitat of this type in America. The loss of these lands and their uncounted biodiversity should be considered priceless.

Response Volume One, page 4-49 of the Draft EIS states that the Hanford Site Development Plan, "is not a comprehensive formal land-use plan." The paragraph in Volume One, page 4-51 referenced in this comment has been modified to discuss the relationship between the TWRS EIS and the 1996 CLUP. None of the TWRS alternatives would adversely affect either the Fitzner Eberhardt Arid Lands Ecology Reserve or the proposed Wildlife Refuge/Wild and Scenic River area along and north of the Columbia River. DOE and Ecology remain committed to preserving the environmental quality of all protected lands and areas designated for protection. The word "passive" has been deleted from the phrase "passive agricultural uses." Please refer to the response to Comment number 0012.18 for a related discussion on this topic.

Comment Number 0072.273 *CTUIR*

Comment P I-88: Sect. I.7.0: The Future Site Uses Working Group Report is conspicuously absent from the document citation list. The Hanford Site Development Plan should not be used as a reference since it has not been endorsed by the tribes or the Natural Resource Trustee Council, and is contrary to identified Site values and Energy Secretary O'Leary's commitment to manage Hanford as a national natural resource.

Response The HFSUWG Report is cited in the TWRS EIS in Volume One, Section 4.7 and in Volume Five, Appendix I. This report is cited and included in the EIS reference lists for Volumes 1 and 5 as HFSUWG 1992. The recommendations contained in the HFSUWG Report were an input to the development by DOE of the Hanford Site Development Plan. Neither the Hanford Site Development Plan nor the HFSUWG Report represent an official land use plan for the Hanford Site. The CLUP, currently in preparation, will provide an official vision of future Site land uses. Please refer to the response to Comment numbers 0012.18 and 0072.159. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.274 *CTUIR*

Comment P I-88: Sect. I.7.2.1: This section should be omitted altogether, since it is inaccurate and not current.

Response One of the areas of analysis CEQ recommends for an EIS is examination of potential conflicts between the proposed action and local, State, Federal, and Tribal Nation current land uses and future land use plans (40 CFR 1502.16). Please refer to the response to Comment numbers 0012.18, 0072.159, and 0072.273. If the TWRS EIS alternative selected in the ROD were to include land uses that would be incompatible with land use policies adopted in the CLUP, additional NEPA analysis may be required.

Comment Number 0072.275 *CTUIR*

Comment P I-90: Fig. I.7.2.1: This figure woefully understates the ecologically and culturally significant areas on Site. Simply indicating areas as undeveloped does not do justice to a national treasure.

Response This figure presents existing land uses, as presented in the DOE 1993 Hanford Site Development Plan to support Volume One, Section 1.7.2, Existing Land-Use Types and Land-Use Plans. The ecological and cultural resources of the Hanford Site are discussed in Volume One, Sections 4.4 and 4.5 and Volume Five, Sections I.4 and I.5. A figure presenting the vegetation communities of the Site is provided in Volume One, Section 4.4 and Volume Five, Section I.4. No graphics have been included for cultural resources to preserve the confidentiality of specific cultural resources sites.

The cultural resources and biological resources impact analysis included the most recent available information from surveys conducted for this EIS and from other available previous research. The EIS then evaluated the impact of the various TWRS alternatives on the cultural and biological resources of specific locations used for each TWRS alternative.

Comment Number 0072.276 *CTUIR*

Comment P I-92: Fig. I.7.2.2: This figure similarly overstates the areas designated for waste management and R&D development. This map (from the Development Plan, which is not current) did not consider the various Threatened and Endangered species located on Site, and has no relation to current thinking. Additionally the non-surveyed areas which comprise 90 percent of the site are inadequately portrayed.

Response Volume Five, Figure I.7.2.2 presents information from the 1993 DOE Hanford Site Development Plan. This plan will be superseded by the information contained in the CLUP for the Hanford Site, which was released for public comment in August 1996 (DOE 1996c). The CLUP will be an official land use plan and will contain DOE's land use planning decisions. The CLUP and the related DOE land use decisions are expected to reflect the most current available information on plant and animal species of concern (threatened and endangered, as well as candidates for inclusion in both categories). The CLUP also will present DOE's land use decisions concerning areas of the Site that remain unsurveyed in terms of biological resources.

Following identification of the Final TWRS remedy and approval of the ROD, DOE will evaluate the land use impacts of the selected remedy for consistency with the final CLUP. The potential land use impacts considered with the alternatives evaluated in the EIS were coordinated with the expected requirements of the CLUP. Because these two documents have been prepared concurrently, it is unlikely that any inconsistencies will have major impacts (i.e., to the extent that the selected alternative

would be withdrawn). Please refer to the response to Comment numbers 0012.18, 0072.159, and 0072.273 for more information on this topic.

Comment Number 0072.277 *CTUIR*

Comment P I-94: Sect. I.7.2.3: It is correct that Hanford is located on ceded lands. However, the statement that "Tribal Nations have often expressed their desire to exercise the rights and privileges at the Hanford Site that were reserved in the 1855 treaties" is, to put it mildly, an understatement. To limit the description of tribal land uses to this meager paragraph demonstrates how little input the tribes have actually had into the EIS. The tribes have worked long and hard to educate DOE about tribal rights, responsibilities, interests and concerns, and to educate DOE about federal responsibilities as a trustee of natural resources on behalf of the tribes. This section should be rewritten to show a little more understanding of tribal rights and concerns and DOE's trusteeship responsibilities. Please contact the CTUIR technical staff regarding this section.

Response The EIS has been modified following additional consultation with the CTUIR, Yakama, and Nez Perce Tribes. Additional text describing Tribal perspectives on Native American land uses and natural and cultural resources values is located in Volume One, Section 4.5 and Volume Five, Section I.5.4. Tribal land use descriptions also were discussed in Volume Five, Section I.5.3 in the Draft EIS. Both the Draft and Final EIS reference added discussion of Tribal land uses in this section. Please refer to response to Comment numbers 0072.37, 0072.153, 0072.154, 0072.268, 0072.225, and 0072.198, which discuss modifications to the EIS based on Tribal Nation consultation.

Comment Number 0072.278 *CTUIR*

Comment P I-96: Sect. I.7.3: Where within this section have the Natural Resource Trustee Council been mentioned? Please provide an explanation discussing the NRTC absence.

Response Consultation with the Natural Resources Trustee Council was addressed in Volume One, Section 7.0 of the Draft EIS. The EIS has been revised in Volume One, Section 4.7 and Volume Five, Appendix I to discuss the composition, roles, and responsibilities of the Hanford Site Natural Resources Trustee Council. The Hanford Site Natural Resources Trustees Council is composed of Federal agencies (DOE and the Department of the Interior), States (Washington and Oregon) and the affected Tribes (the Yakama Indian Nation, the CTUIR, and the Nez Perce Tribe). The primary purpose of the Council is to facilitate the coordination and cooperation of the Trustees in restoring and minimizing impacts to natural resources injured as a result of cleanup of releases associated with activities at the Hanford Site. DOE will coordinate with the Council in developing the Mitigation Action Plan for impacts to natural resources identified in the TWRS EIS. Please refer to the response to Comment number 0072.264 for a related discussion on mitigation.

Comment Number 0072.279 *CTUIR*

Comment P I-98: Sect. I.7.3.5: This section slants the EIS in favor of development; it is mentioned that the local counties (actually a few county commissioners, not the entire counties) opposed designating the Hanford Reach as a Wild & Scenic River. There is no mention of the many groups and individuals (and indeed the vast majority of residents in those three counties) who support the Wild & Scenic designation. Again, the wording of the EIS implies some specific goal of developing as much of the Site as possible in order to avoid the cleanup goals agreed to in the Tri-Party Agreement.

Response DOE and Ecology acknowledge the concern expressed in the comment that local support exists for designating the Hanford Reach as a Wild and Scenic River. The agencies also are aware that local support exists for legislation. The EIS has been revised in Volume One, Section 4.7 to clarify that a number of county commissioners for Benton, Franklin, and Grant Counties are on record as opposing the designation of the Hanford Reach as a Wild and Scenic River, but that other residents and organizations of the Tri-Cities area support the wild and Scenic River designation.

The EIS assumes that DOE will retain administrative control for 100 years following approval of the TWRS ROD. During this administrative control period, the 200 Areas will be waste management and disposal areas with restricted access and use consistent with requirements described in the Tri-Party Agreement, the CLUP currently being drafted, and the HFSUWG recommendations. After the 100-year administrative control period, the EIS assumes no administrative control as the bounding condition for land use impacts by the Native American, residential farmer, shoreline, and industrial user. The EIS evaluates the land use impact of each alternative for these four types of users after the 100-year period has expired and there are no land use restrictions. DOE and Ecology consider the four users identified to represent reasonable potential future uses following administrative control, and do not consider these land impacts uses and users to represent a bias toward development, but rather baseline impact analysis prepared to support public and decision maker consideration of potential impacts to future generations from the alternatives analyzed in the EIS.

L.4.8 VISUAL RESOURCES

Comment Number 0072.160 *CTUIR*

Comment P 4-57: Sect 4.8.2: Because the TWRS area can be seen from Gable Mountain, this will impact the religious practices of the affected Tribes.

Response Volume One, Section 5.8, Visual Resources Impacts, acknowledges that TWRS areas would be visible from elevated locations such as Gable Mountain, Gable Butte, and Rattlesnake Mountain. However, the TWRS facilities generally would be similar in type and location to existing Site facilities and thus TWRS would represent a continuation of past visual impacts rather than new and additional visual impacts. Volume One, Section 5.8 has been modified to make explicit that these elevated locations (i.e., Gable Mountain, Gable Butte, Rattlesnake Mountain) are used by Native Americans in their religious practices. Based on additional consultation with the affected Tribal Nations (e.g., the

show aesthetic sensitivity, especially with respect to tribal spiritual concerns and aesthetic buffer zones around sacred sites.

CTUIR), Volume One, Sections 5.5 and 5.19 of the EIS (Cultural Resource and Environmental Justice, respectively) have been modified to more fully place in context potential impacts to Tribal cultural values and lifestyle. Volume One, Section 5.20, Mitigation Measures, describes measures that could be taken by DOE to minimize the visual impacts of TWRS facilities (e.g., recontouring newly disturbed land areas to conform with the existing terrain and constructing TWRS facilities using colors that conform with the surrounding environment). Please also refer to the response to Comment numbers 0072.37, 0072.40, and 0072.140 for discussion related to this subject.

L.4.9 NOISE

Comment Number 0072.161 *CTUIR*

Comment P 4-59: Sect. 4.9: Noise conditions from the TWRS activities may impact the religious practices of the affected Tribes, Please indicate how this subject has been addressed under Executive Order 12898.

Response The EIS has been modified in Volume One, Sections 5.9 and 5.19 (i.e., Noise and Environmental Justice, respectively), to state that noise emissions from TWRS activities might adversely affect activities conducted at Native American religious sites. Noise emissions would be greatest during construction. As noted in Volume One, Section 5.9, at distances greater than 600 m (2,000 ft) from TWRS construction sites, noise levels would approach existing background levels. Thus, it is considered likely that minimal noise impacts would occur at religious sites (e.g., Gable Mountain), which are approximately 3 km (2 mi) from potential TWRS areas. Please refer to the response to Comment numbers 0072.40, 0072.270 and 0072.271.

Comment Number 0072.280 *CTUIR*

Comment P I-103: Sect. I.9.0: These sections may satisfy the minimal requirements, but do not really show aesthetic sensitivity, especially with respect to tribal spiritual concerns and aesthetic buffer zones around sacred sites.

Response The EIS has been modified in Volume One, Sections 5.9 and 5.19 (Noise and Environmental Justice, respectively) to indicate the Native American concerns about potential impacts of noise emissions from TWRS alternatives' activities on Native American cultural and aesthetic values.

Volume One, Section 5.19 has been modified to reflect information obtained in additional consultation with the affected Tribes (i.e., the Yakama Indian Nation, Nez Perce, and CTUIR) that more fully places in context potential impacts to Tribal culture and lifestyle. Please also refer to the response to Comment numbers 0072.37, 0072.40, 0072.140, and 0072.268.

L.4.10 TRANSPORTATION

No comments were submitted for this topic.

L.4.11 RADIOLOGICAL ENVIRONMENT: OVERVIEW AND POTENTIAL RADIATION DOSES FROM 1994 HANFORD SITE OPERATIONS

Comment Number 0072.162 *CTUIR*

Comment P 4-63: PP1: The statement that chronic doses are usually less harmful, is misleading. New information regarding this, such as the NCRP rpt. No 121 must be reviewed for consistency.

Response The statement that chronic doses are usually less harmful than acute doses was not meant to imply that chronic doses result in no harm. On the contrary, this paragraph acknowledges that any dose of radiation can be harmful. The intent of the statement was to point out the general truth that doses received over a short time period, for example one day, are generally more damaging than that same dose received over a longer period, for example one year. Wording was added to the text in Volume One, Section 4.11.2 to clarify this point and indicate that even low doses of radiation can have harmful effects.

Comment Number 0072.163 *CTUIR*

Comment P 4-64: Estimating health effects for Radiation protection purposes must include significant sub-population affects such as those for children, pregnant and lactating women, women of childbearing age, developing adults, and older people with underlying health problems.

Response The DOE guidance in Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements (DOE 1993d) is to use the 1990 Recommendations of the International Commission on Radiological Protection (ICRP) (ICRP 1991). The dose-to-risk conversion factors referenced are 4.0E-04 LCF/person-rem for onsite population and 5.0E-05 LCF/person-rem for offsite population. The difference in the onsite and offsite conversion factors is attributable to the presence of offsite sub-population effects such as children and young adults. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.281 *CTUIR*

Comment P I-108: Sect. I.11.0: This section is simply a short summary of the 1994 Environmental Report, and, since it bears no relation to the current risks (as described in the Draft HRA-EIS), does not really describe the background risks to which risks from the various alternatives would be added.

Response The TWRS EIS provides baseline data from referencable sources of data regarding the existing environment at the Hanford Site. At the time of publishing the TWRS Draft EIS, the Hanford Remedial Action (HRA) Draft EIS had not been issued for publication and could not be used as a reference document for the risks described in this section of the EIS. To the extent practical at the time of publishing the TWRS Draft EIS, risks associated with past practice sites, which is the subject of the HRA EIS, were addressed in the cumulative impact section of the TWRS Draft EIS (Volume One,

Section 5.13). The cumulative impact section of the TWRS EIS has been modified to incorporate additional data from the HRA Draft EIS.

L.4.12 MISCELLANEOUS

Comment Number 0061.01 *USDOC*

Comment The subject statement has been reviewed within the areas of the National Geodetic Survey's (NGS) responsibility and expertise and in terms of the impact of the proposed actions on NGS activities and projects.

All available geodetic control information about horizontal and vertical geodetic control monuments in the subject area is contained on the NGS home page at the following Internet World Wide Web address: http://www.ngs.noaa.gov. After entering the NGS home page, please access the topic "NGS Products and Services" and then access the menu items "NGS Products." This menu item will allow you to directly access geodetic control monument information from the NGS database for the subject area project. This information should be reviewed for identifying the location and designation of any geodetic control monuments that may be affected by the proposed project.

Response DOE and Ecology acknowledge the comment and home page instructions. Every effort will be made to verify geodetic control monument locations within the TWRS EIS study area and to provide the necessary notifications and replacement if any were disturbed by construction activities.

L.5.0 ENVIRONMENTAL CONSEQUENCES

L.5.1 GEOLOGY

No comments were submitted for this section.

L.5.2 WATER RESOURCES

Comment Number 0089.23 *Nez Perce Tribe ERWM*

Comment Page 5-15, Paragraph 2
The use of 1979 sitewide groundwater level measurements may not be a conservative approach to risk assessment as the groundwater mound at B pond forms a hydraulic barrier which delays and deflects tank wastes in the groundwater from traveling directly towards the Columbia River.

Response Please refer to the response to Comment numbers 0012.16 and 0072.259.

Comment Number 0091.01 *Dyson, Jessica*

Comment This new data showing contamination dangerously close to our groundwater would not even been told to us at this point if it was left up to the Department of Energy. This is vital information for the public to have and it does have significant impacts on the public. Almost all of our agriculture in Washington comes from eastern Washington and most of the land surrounding the Columbia River is

irrigated with the rivers water. Any radiation in the groundwater will make it to the river and possibly to our dinner tables. It is your responsibility to account for all the risks to the public and be as conservative in your assumptions as possible to protect our communities.

Response DOE and Ecology are equally concerned about protecting the groundwater resources. The Draft EIS, in Volume One, Section 4.2 and Volume Five, Appendix I, documented that contaminants were present in the vadose zone beneath the tank farms and that one source of the contamination was past tank leaks. In Volume One, Section 3.3 the Draft EIS stated that new data were emerging that indicated contamination at lower levels than previously estimated. The new and emerging data are, in many cases, preliminary in that they indicate the presence of contamination beneath the tanks but do not provide any explanation on how they were transported. Potential contaminant transport mechanisms including chemically enhanced mobility of contaminants, preferential pathways (natural and man-made), and the effect of large liquid loss (as compared to the predicted losses for the TWRS remediation) were evaluated as part of the uncertainty analysis in Volume Five, Appendix K. This emerging information as well as future information that are being collected will be addressed by NEPA analysis for tank closure to ensure that the groundwater and Columbia River are adequately protected. The alternatives presented represent a full range of potential actions. The EIS incorporates "bounding" assumptions designed to result in conservative calculations of impacts. DOE and Ecology remain committed to selecting an alternative that will protect the valuable resources, which include the Columbia River, the groundwater beneath the tank farms and food sources produced in Eastern Washington. The preferred alternative would be protective of the groundwater and limit future contaminants from TWRS sources to well below drinking water standards in the Columbia River. An evaluation of potential Columbia River impact due to release of all tank waste is provided in Volume One, Section 5.2 and indicates that even for a large release, drinking water standards would not be exceeded. The preferred alternatives would release only about 1/100th of the waste and the rate of release would be slowed due to the infiltration-limiting cap over the tanks. Please refer to the response to Comment number 0030.02.

L.5.2.1 Groundwater

Comment Number 0005.19 *Swanson, John L.*

Comment I am troubled by "loose wordings" in many places; one example is in the area of the time required for leached contaminants to reach the groundwater. For example, the last sentence on S-27 says "The contaminants would reach the groundwater---", while the third sentence on 5176 says "Contaminated water would reach the groundwater---", the writers tend to use phrases like this interchangeably, but they do NOT have the same meaning because not all of the contaminants move through the soil at the same rate (deletion of the word "the" at the start of the first example would make them mean the same). This may sound like a picky matter, but I do not believe that is; for example, it is said that THE contaminants are x, y, and z and then it is later said that THE contaminants reach the groundwater after so many years, it can be concluded that x, y, and z all reach the groundwater at the same time. I believe that sentences should be accurate, so that readers do not draw incorrect conclusions because of poor sentences. This "time to groundwater" matter is addressed over and over

again in the EIS, sometimes in sentences giving the correct meaning but more often not. I recommend that a technically correct sentence format be developed and consistently used for this issue (if it sounds repetitive, so be it-it is better to be accurate than to sound good).

Response Where applicable, the text of the EIS has been modified by replacing "the contaminants" or "contaminated water" with the phrase "the fastest moving contaminants."

Comment Number 0008.05 *Evett, Donald E.*

Comment S.6.2 Groundwater Pathways by Alternative: I consider the In Situ Vitrification as the best possible method. Your report signifies greater benefits, i.e.,:

1. The rate of leaching of contaminants would be very slow.
2. Contaminants reaching the groundwater would be small.
3. Greater the level of separations performed and the greater the effectiveness of the immobilization process.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The estimated long-term impacts of this alternative are lower than those estimated for other alternatives. These estimates are based in an assumption that the ISV technology can be developed to perform effectively. As discussed in Volume One, Section 3.4, there is much uncertainty concerning the development of this alternatives. This technology may be undergoing further testing to determine its effectiveness on large-scale applications. Modifications to this process have been suggested to improve potential effectiveness and to reduce the uncertainties on its application. Discussions related to ISV technologies are addressed in the response to Comment numbers 0023.01 to 0023.30 and in the response to comments located in Volume Six, Section L.3.4.6.

Comment Number 0012.15 *ODOE*

Comment Waste Properties
Report BHI-00061 on the T tank farm shows plutonium and americium deep under the tank farm. This was not predicted by USDOE's modeling. During operations, USDOE discharged large quantities of organic complexing agents to the tanks, including EDTA, HEDTA, tributyl phosphate and glycolic acid. These complexing agents have apparently bound-up a significant portion of the plutonium and americium and allowed it to move through the soil far faster than expected. The risk analysis should include these effects.

Response DOE and Ecology are aware of the contaminants under tank T-106 and the recently emerging information concerning contamination under other tank farms from past leaks. Past leaks and other closure issues are not within the scope of this EIS and will be addressed directly in future NEPA analyses for tank closure. See Volume One, Section 3.3.1 and the response to Comment numbers 0005.17 and 0072.08. Please refer to the response to Comment numbers 0040.06 and

0101.05 for a discussion of cumulative impacts. However, it is appropriate to provide in this EIS a qualitative discussion of past tank leaks and the potential transport mechanisms responsible for the contaminant migration.

Included in the uncertainty analysis provided in Volume Five, Appendix K are 1) descriptions of these data as they related to contaminant migration from past tank leaks; 2) a discussion of the various transport mechanisms that separately or in combination could have been responsible for the observed contaminant distribution beneath the tanks; and 3) how these mechanisms could impact each of the alternatives.

Report BHI-00061 contains borehole sample data collected as a part of a 1993 investigation of contaminant migration from a leak from tank 241-T-106. The data from the 1993 investigation consist of 43 split-spoon samples from borehole 299-W10-196. These samples were taken for physical, chemical, and radiochemical analysis in addition to spectral gamma geophysical logging of the borehole on eight occasions.

The 1993 investigation resulted in data on the vertical distribution of several radionuclides and chemicals. Most notably are the following results.

- Plutonium concentrations increase dramatically at the depth of the bottom of the tank (33 feet), reach a peak at 43 feet, decrease to less than 1 pCi/g at 92 feet, spike at 95 feet, and then decreases to background at greater depths.
- Cesium-137 had a significant concentration within the fill around the tanks to a depth of 13 feet, above the presumed depth of the tank leak. The concentration decreased until a depth of 30 feet, then began to increase to a maximum at 43 feet, followed by a decrease to below background until two spikes were detected at 78 and 101 feet.
- The spikes at approximately 100 feet are observed for both mobile (e.g. technetium-99) and attenuated (e.g. cesium-137) contaminants and are believed to be concentrated by a caliche layer that occurs at this depth. This may be due to a hydraulic conductivity contrast, adsorptive capacity from the increased clay content, and/or substitution of radionuclides in the calcium carbonate.

The findings from the 1993 investigation of the tank T-106 leak along with potential contaminant transport mechanisms are discussed in Volume Five, Appendix K. The data from this investigation are expected to be the basis for additional NEPA analyses for closure which will directly address potential mechanisms affecting the fate and transport of leaks from the waste tanks.

There are many possible contaminant transport mechanisms that may be responsible for the contaminants observed at depth. These mechanisms may include: chemically enhanced mobility of otherwise relatively immobile contaminants, large fluid loss from tank(s) or other sources to provide driving force, naturally occurring vertical features such as clastic dikes that may be more transmissive than the layered sediments, and inadequately sealed drywells. These potential transport mechanisms were discussed in Volume Five, Appendix K as part of the uncertainty analysis and so that mitigating

measures could be developed. Each of these mechanisms is briefly discussed in the following paragraphs.

There are two general types of chemically enhanced contaminant mobility that are of concern to DOE and Ecology: 1) the chelation of some contaminants such as cobalt by complexing agents such as EDTA resulting in smaller K_d values and faster transport through the vadose zone; and 2) competition for cation exchange sites by elements such as sodium, which could result in a smaller K_d and faster movement through the vadose zone for contaminants such as cesium, whose transport is believed to be retarded largely by cation exchange.

The magnitude of fluid loss, while not a transport mechanism, can greatly affect the rate and distance a contaminant moves. The source terms (i.e., liquid loss per unit time and contaminant concentration) for the TWRS are quite different (smaller) than would be expected for many of the past tank leaks. This difference is in part, why the earliest predicted contaminant arrival at the groundwater for the TWRS alternatives is approximately 130 years (No Action alternative); whereas contaminants previously leaked from the tank may be arriving at the groundwater within a 50-year period.

Vertical zones of high transmissibility, whether from man-made features such as inadequately constructed drywells or natural features such a clastic dikes filled with clean sand, would result in faster contaminant transport. The drywells were constructed using a cable tool drill and the annular space between the casing and borehole was not sealed. Clastic dikes are geologic features that occur in the area. They are often vertical or near vertical and can also be found horizontally. The hydraulic nature of these features on the Site are not well known but they could be preferential pathways for contaminants to migrate vertically.

Comment Number 0012.16 *ODOE*

Comment Risk Models

The risk modeling in the EIS is sufficient to support the proposed action. We do not believe it is sufficient to support any decision which would leave waste in Hanford tanks.

The risk analysis included in the EIS uses simple linear models and simple waste source term parameters as surrogates for reality. The soil structure and hydrogeology are complex. Despite extensive drilling, boring and testing, no accurate or adequate model exists of the geohydrology of the Hanford Site. This is evident by comparison of the risk maps presented in this EIS with the draft Hanford Remedial Action EIS. These two EISs use data gathered several years apart to predict the flow paths and travel times for movement of radioactive materials through the soil and groundwater. A minor difference in input data results in large differences in movement of the wastes and larger differences in when and where the wastes are expected to reach the Columbia River.

The soil at Hanford has layers with widely varying properties. Some layers allow easy movement of water. Others slow water movement. Some layers show different horizontal and vertical rates of water movement. Simple linear models cannot adequately model the behavior of such complex systems.

We believe the modeling is also flawed by arbitrary changes in the values used for the physical properties of the soils. Page F-58 of Volume Four contains two example: 1) "Kincaid et al. (1993) specified a value of 0.498 for Θ_s in the Ringold Formation in the vicinity of the 200 East Area. This value was considered unrealistically high; therefore Θ_s and the related S_{wr} and Θ_r values were changed to the values reported for the Ringold Formation in the 200 West Area."; and 2) "The value reported for Θ_r in Wood et al. (Wood et al. 1995) was 0.0. It was assumed that the reported value was below detection and was reported as zero. Therefore, a small number (0.001) was assumed in its place to maintain the relationship between Θ_s and S_{wr} stated previously."

Page F-59 details other "simplifying assumptions." We have no assurance these simplifying assumptions are reasonable. They may or may not result in conservative evaluation of the risks. Combined with the other arbitrary changes and simplifications, the result may be great differences in the real risks compared to modeling results from the modeling.

Response Soil structure and hydrogeology of the Site are complex. Most important is the conceptual model of water movement through the vadose zone, into the underlying aquifer, and ultimately discharging to the Columbia River. The conceptual model for this EIS is based on observations that include geologic structure, the pattern of geologic materials deposited in the vadose zone and underlying aquifer, existing contaminant migration, and the bounding effects of features such as the Columbia River, the Yakima River, and Horse Heaven Hills. This results in an expectation that most of the contaminants from the tank sources will move in a west to east/southeast direction with a small amount flowing northerly through the gap between Gable Butte and Gable Mountain. These results are generally obtained using the 1979 water level data set, on which all of the groundwater assessments are subsequently based. The 1979 water level data represent a period of relatively steady conditions. Volume Four, Appendix F compares the EIS model results with results calculated assuming the decay of all 200 Area groundwater mounds, and the two sets of results parallel each other very closely.

The water level data set used by the HRA EIS is based on data from 1992. While this is more recent data, it is also for a period of large change with regard to wastewater disposed to the soil column. It also represents a period in time where, briefly, most contaminants from the 200 Areas flowed north through the gap between Gable Butte and Gable Mountain. Please refer to the response to Comment numbers 0030.02, 0091.01, 0069.07, and 0069.03 for additional discussions of issues related to risk.

Comment Number 0030.02 *Krieg, Ronald K.*

Comment My first area of concern is the focus of being on current impacts and conditions alone. This EIS states: "Previously leaking contaminants are not in the scope of this EIS (5-48, Vol. 1)." Past contamination should be. Rust Geotech's recent tests have sampled cesium-137 as deep as the well

sampled, 125 feet below the surface (Seattle PI). During the 1970's, as much as 1 million gallons of water was sprayed into single-shell tank 105-C in order to facilitate cooling. It is unlikely that 800,000 gallons of this contaminated cooling water has escaped into the surrounding soil and groundwater (WHC-EP-0182-34). Dissimilar estimates of total SST leakage from various studies range from 600,000 to 1,000,000 gallons. In the Hanford 200 Area 67 tanks are known or assumed to be leaking, and on average, one additional tank begins to leak each year. Approximately 30 tanks have not been interim stabilized with eight of the SSTs that are assumed leakers yet to be stabilized. Following interim stabilization, an SST can contain as much as 189,000 L (50,000 gal) of interstitial liquid (Vol.1, pg. 3-41). This process only minimizes potential releases, it does not provide relief to long-term impacts or relieve the possibility of continued leakage as this EIS awaits review and a Record of Decision is made.

Response Previously leaking contaminants from the tanks are not within the scope of this EIS. However, these contaminants are given some consideration in the EIS, and they will be addressed in future NEPA analysis. Please refer to the response to Comment numbers 0005.14 and 0072.08. The Draft EIS acknowledged the emerging information associated with contaminants beneath the tanks. The time between the Draft EIS and the Final EIS has afforded evaluation of some of these emerging data. These evaluations are presented in the Final EIS in Volume Four, Appendix F and Volume Five, Appendix K. Contaminants beneath the tanks are being considered in this EIS, though they are not considered as directly as in future NEPA analyses for closure. Past-practice leaks from the tanks are addressed as one component of the cumulative impacts presented in Volume One, Section 5.13. The Hanford Barrier would be used in the second phase of the preferred alternative. The Hanford Barrier will be designed so that its areal extent would mitigate the potential of infiltrating precipitation mobilizing contaminants below the tanks in the vadose zone (please refer to the response to Comment number 0089.08). It is important to understand the potential contaminant mechanisms in the vadose zone that could have resulted in contaminants moving near the groundwater table so that mitigating measures can be considered. A discussion of the potential transport mechanisms that associated with the occurrence of tank-related contaminants over 100 feet below some of the tanks is provided in Volume Five, Appendix K. The comment mentions hundreds of thousands of gallons of water leaking from some of the tanks, which is an important point. Such large volumes of water entering the vadose zone over a short period of time are dissimilar to the types of source terms associated with any of the TWRS alternatives, and may be one of the mechanisms which caused the contaminant migration in the vadose zone. See the responses to Comment numbers 0012.01, 0012.15, and 0091.01 for additional related information.

Comment Number 0030.03 *Krieg, Ronald K.*

Comment Retrieval operations cited in this EIS involve hydraulic or robotic sluicing. A conservative figure of 4,000 gallons of leakage per tank is assumed in this EIS. It is stated in the Feasibility study leaks could range to 40,000 gals in tank 241-C-106 for traditional sluicing. This same study averaged estimated leaks at approximately 10,000 gals for traditional sluicing with the average for robotic sluicing at 4,000 gals. Regardless of conflicting numbers or arguments of source credibility and test

results, retrieval options being considered will add additional contamination through leakage, thus further compounding contaminant saturated soil and the threat to groundwater.

Response The amount of leakage resulting from tank waste retrieval will vary. Certain tanks are of recent construction and have had few problems while in use. These tanks can be expected to leak very little, if any, during retrieval. Other tanks were constructed decades ago and then received rather severe use. Rather than attempting to assess potential for leakage on a tank-by-tank basis, the EIS assumed that on average, each SST would leak 4,000 gallons during retrieval. The inventory from these leaks was assumed to be the average tank inventory, which is conservative since much of the leaks would likely be sluicing liquids with lower levels of contamination. This provides an upper bound on the potential impacts, a nominal case using the inventory of the slucing liquids for a portion of the release is included in the Final EIS. Retrieval losses would add contamination to the groundwater. In the alternatives where tank waste is retrieved, the losses during retrieval are part of the starting source term for the groundwater modeling. Volume Four, Section F.2.2.3.5 of the EIS discusses contaminant losses during retrieval. When additional data become available to assess retrieval losses on a tank-by-tank basis, these potential losses may be recalculated. Until such data are available, an average loss during retrieval must be estimated.

Comment Number 0036.14 *HEAL (Exhibit)*

Comment The in situ alternatives have a faulty assumption.
For the No Action, Long-Term Management, and In Situ Fill and Cap alternatives, the EIS assumes that no leaks will happen during the administrative control period. This is a dubious assumption. Given the state of the tanks, it is safe to assume that there will be escalating tank leaks during such an extended administrative control period.

Response Accurately predicting the number or severity of tank leaks that will occur in the future is difficult. One factor that will increase the number of leaking tanks is the age of the tanks. As the tanks get older, the probability of a leak increases. The number of leaking tanks may decrease as well as pumpable liquid is removed from SSTs under the interim stabilization and salt-well pumping program. Using administrative controls, such as free liquid removal from the pore space and other voids in the tank solids and the sealing of tank entrances to prevent fresh liquid from accidentally entering the tanks will minimize the number of potential leaks. Because future leaks cannot be accurately predicted, the assumption was made that all the tanks of a given type would leak at some predetermined time in the future. This assumption may not represent an accurate prediction of the future, and the impacts of the 100-year administrative control compared to the 10,000-year risk may not be substantially different, but this assumption allows an even-handed comparison of the long-term environmental impacts of the proposed alternatives. For further discussion of continued tank farm operations and tank waste storage, see Volume One, Sections 3.2.1.4 and 3.2.1.5, respectively. Please refer to the response to Comment number 0072.85 for a discussion of potential leaks during the 100-year administrative control period.

Comment Number 0040.06 *Rogers, Gordon J.*

Comment Monitoring of vadose zone below the HLW tanks and of the groundwater plumes should be continued to assess the rates at which contaminants reach the groundwater and the Columbia River. There will be ample time to detect any real threat to the users of river water; and to take action if a real threat is shown to exist.

Response The present program of vadose zone and groundwater monitoring should be continued. The monitoring program will continue into the future to provide an assessment of contaminant transport during cleanup operations. Because existing contamination from previous activities at the Hanford Site is not within the scope of the EIS, references to the current program of vadose zone and groundwater monitoring are found in other documentation. However, the TWRS EIS does address the cumulative impacts of vadose zone contaminants from past-practice tank leaks, the EIS alternatives and other current and reasonably foreseeable actions at Hanford. Cumulative impacts are presented in Volume One, Section 5.13. Please refer to the response to Comment numbers 0072.08, 0030.02, 0091.01, and 0012.15.

Comment Number 0045.02 *USDOE*

Comment Page 4-13, Section 4.2.2.2, second paragraph, second sentence: As assumed recharge rate of 0.1 sediment/year (cm/yr) is used for the 200 West Area. However, a recent recharge map (Dresel et al., "Hanford Site Ground-Water Monitoring for 1993" [PNL-10082] DEIS Vol. 4, Appendix F), indicates recharge from precipitation for much of the 200 West Area is from 5 to 10 cm/yr. This is probably due to engineering/regrading of much of the surface materials which has removed the fine-grained sediments and vegetation, leaving coarse-grained, unvegetated surfaces. Also, page I-22 (Section I.2.2.2.1, second paragraph, second sentence) states that an average recharge rate of 0.1 cm/yr was used for the 200 West Area recharge calculation. However, the previous paragraph on this page states that a rate of 10 cm/yr would not be unreasonable for the tank farm areas. This should be clarified in the Final EIS.

Response Infiltration varies temporally and aerially. Infiltration in the 200 Areas is reported to range from near 0 cm/yr where the ground cover is a shrub-steppe type characteristic of predevelopment conditions to 10 to 13 cm/yr where the ground is unvegetated sand and gravel; characteristic of conditions around the tank farms since the mid-1940s or later.

The temporal variation occurs seasonally with the change in temperature, plant activity, and precipitation. It also varies with climatic change. The spatial variation occurs with changes in vegetation, surficial soil type, and human-made structures such as paved parking lots. In response to infiltration rate changes, the vadose zone flow field varies temporally and spatially. However, it is not directly measurable with conventional techniques and is calculated with the model based on vadose zone parameters and assumed infiltration rate. There is also a lag time between a change in infiltration

rate at the surface and a change in the flow field in the vadose zone as the water percolates into the ground.

For each alternative, the initial infiltration rate (i.e., the rate before remediation and for the No Action and Long-Term Management alternatives) is assumed to be 5 cm/yr. This assumed initial infiltration rate is within the range of reported values for the Hanford Site and is appropriate given: 1) the recent ground cover changes in the tank vicinity; 2) uncertainties in future ground cover conditions; and 3) the one-dimensional vadose zone flow and transport model used for the simulations. Also, for alternatives that include a cap, the sensitivity analysis in Volume Five, Appendix K of the Final EIS shows that the contaminant transport through the vadose zone is not sensitive to the initial infiltration rate.

From a temporal perspective, the higher infiltration in the vicinity of the tanks is a relatively recent occurrence as stated in the comment. This infiltration increase is in response to the ground cover changes that have occurred within the last 50 years. The relatively recent changes in ground cover are not expected to have changed the flow field at depth within the vadose zone from that of predevelopment conditions. For alternatives involving a cap, conditions after the cap is installed are assumed to be representative of predevelopment conditions in that infiltration in the tank vicinity would be low (e.g., a few millimeters/yr). Infiltration is assumed to remain at 5 cm/yr for the No Action and Long-Term Management alternatives.

Spatially, the rate would be lower away from the tanks where vegetation is allowed and surficial soils are of a finer texture. The one-dimensional model used for contaminant transport simulations through the vadose zone does not account for these infiltration changes with time and space. Thus, the assumed infiltration rate of 5 cm/yr was chosen as a conservative estimate. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0045.03 *USDOI*

Comment Page 4-14. First full paragraph, second sentence: The previous comment regarding the 200 West Area recharge also applies to the 200 East Area [Comment number 0045.02].

Response Please refer to the response to Comment number 0045.02.

Comment Number 0069.01 *Pollet, Gerald*

Comment In 1989 our organization asked then Senator Adams and Congressman Don Bonker to ask the General Accounting Office to do a study of the Department of Energy's claims that leaks from the single-shell high-level waste tanks quote "pose no threat to human health or the environment" unquote, and quote "pose no threat to groundwater" unquote. The Department of Energy continues to make that claim essentially, and bases much of this EIS on that claim today. As you can see, in 1989 the General Accounting Office said in fact tank leaks imperil the Columbia River. That tank leaks are likely to be heading towards groundwater today, if they haven't already reached it, and will flow into the Columbia

River. What the department was told, specifically, was that its studies predicting the eventual environmental impact of tank leaks do not provide convincing support for DOE's conclusion that the impact will be low, or nonexistent. This has been ignored in this EIS.

Response Volume One, Section 4.2 and Volume Five, Appendix I describe the affected environment and document that substantial groundwater contamination is known to occur at the Hanford Site and beneath the 200 Areas. The groundwater impacts analysis has predicted that all of the TWRS alternatives would have some impact to groundwater quality and, hence, a potential adverse impact to human health under certain future Site uses scenarios, ranging from relatively low such as for the In Situ Vitrification alternative to quite high as for the No Action alternative. Please refer to the response to Comment numbers 0012.01, 0012.15, 0091.01, and 0030.02.

Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0069.02 *Pollet, Gerald*

Comment The General Accounting Office also said that although DOE's maintained that the environmental impact of leaks will be extremely low, or nonexistent, the studies we reviewed do not provide convincing evidence that this is the case. New evidence, available to the Department of Energy because it was collected by its own contractor, available to the people preparing this EIS, and from which is from the Department of Energy presentation, shows underneath the tanks, that are called the SX Tank Farm, cesium-137 is detectable far below the tank, at 125 feet, basically, where it shouldn't be according to this Environmental Impact Statement. Where it isn't, and will not be, according to this Environmental Impact Statement, until we're all dead. But it is there today.

And here is another visualization of the cesium plume at depth. And here is a logging of the contamination in a bore hole, down to 125 feet. This is the ground level, this is the bottom of the tank. Here you have a massive spike far below the tank, and another massive spike right here at nearly 125 feet. And you say, now wait a minute, the Department of Energy says it will take 130 years at least for the waste to get from here to groundwater. Yet it is at massive concentrations at the bottom of bore holes, 125 feet below the tanks already. We are wondering if the Department of Energy has additional evidence, and is sitting on that evidence until after the public comment period is over, as to what other tank wastes might be beneath the tanks, and moving to groundwater as we speak. This is the Department of Energy's own presentation. It is a significant contradiction to the current model, that cesium-137, that's the radionuclide which is very radioactive, does not migrate far from the leak source. It tears apart this Environmental Impact Statement. What would be much more reasonable is if this Environmental Impact Statement was redone on the basis of an assumption that it takes in the vicinity of 25 years for tank leaks to reach groundwater, and from thence to the river is a matter of 10 to 25 years. The clock is ticking.

Response DOE is implementing a program to obtain the emerging information concerning contaminants beneath the SX Tank Farm, but complete resolution of the issue may not occur for more than a year. These data and others were evaluated for consistency with the groundwater impact assessment approach and for identification of other potential active contaminant transport mechanisms in the vadose zone. The results of these evaluations are provided in Volume Five, Appendix K. Please refer to the response to Comment numbers 0012.15, 0012.01, and 0030.02 for additional information and extensive discussion on the evaluation of contaminants beneath the tanks. Please refer to the response to Comment number 0069.01 for information regarding the description of existing Hanford Site groundwater contamination. Please refer to the response to Comment number 0040.06 regarding consideration of vadose zone contamination in the Volume One, Section 5.13 presentation of cumulative impacts.

Comment Number 0072.165 *CTUIR*

Comment P 5-11: Why do the current drinking water quality standards not apply beyond one thousand years? The people of the CTUIR will be here one thousand years from now and may be impacted.

Response The cited statement is incorrect and has been revised in the Final EIS. The drinking water standard is not limited to 1,000 years. Please refer to the response to Comment number 0036.17.

Comment Number 0072.166 *CTUIR*

Comment P 5-12: bullet 5: The CTUIR technical staff do agree that this bullet is a major assumption.

Response DOE and Ecology acknowledge the comment but believe it should be retained in the Final EIS.

Comment Number 0072.167 *CTUIR*

Comment P 5-19: Sect. Contaminant Groups: Of the one hundred contaminants was their mobility determined using the K_d of chelating agents such as EDTA?

Response The mobility of the contaminants for the impact analysis presented in Volume Four, Appendix F does not include the potential effects of chelating agents. The potential effect that chelating may have on contaminant mobility has been incorporated into the Final EIS in Volume Five, Appendix K. Please refer to the response to Comment number 0012.15.

Comment Number 0072.237 *CTUIR*

Comment P F-10: Sect. F.2.2: There are several assumptions that reduce the effectiveness of this section including, the assumption that there will be only residuals in tanks and vitrified LAW.

The other options such as total tank inventory are not explored. This is unfortunate because a substantial portion of total tank inventory is assumed to already have leaked. Ignoring the leaked fraction will change the risk results. Additionally there is new evidence that the leakage is not a vertical conduit, but has regions that resemble lateral spread, such as with the caliche layers at depth.

Response DOE and Ecology are concerned with the total risk associated with past and future releases from the tanks. The groundwater impacts assessment focuses on those impacts associated with the range of future TWRS remedial alternatives. These evaluations are provided in Appendix F, Section F.3. Assessments of cumulative impacts, including the potential impacts from past tank leaks are provided in Volume One, Section 5.13 and Volume Four, Section F.4.5. For discussion of closure issues that are beyond the scope of the EIS, including past leaks from tanks, please refer to the response to Comment number 0072.08.

Some lateral spreading of contaminants in the vadose zone is expected to occur given the layered nature of the sediments at the Site. The one-dimensional model used in the groundwater impacts assessment did not account for lateral spreading, and does provide conservative predictions of contaminant concentration at the vadose zone/groundwater interface. Conservative predictions mean that the predicted contaminant concentrations are higher than would be predicted had a model been used that included lateral spreading. A discussion of potential contaminant transport mechanisms in the vadose zone and their impacts on the alternatives are discussed in Volume Five, Appendix K. Please refer to the response to Comment number 0012.15 for additional information and discussion on the topic of contaminant transport in the vadose zone.

Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.238 *CTUIR*

Comment P F-11: Sect. F.2.2.2: within this section there should have been discussion related to chelating chemicals such as, EDTA, in regards their ability to mobilize metals. Please include a discussion regarding this both here and in the uncertainty section.

Response Please refer to the response to Comment numbers 0072.167 and 0012.15.

Comment Number 0081.06 *Pollet, Gerald*

Comment I'd also like to submit for the record relevant pages from the United States General Accounting Office report of 1989 regarding tank leaks. And I hope that we have captured the dialogue sufficiently from this evening for the record, so the record will reflect our concerns about the use of any assumption as to the travel time for tank leaks to groundwater. We believe that tank leaks to groundwater travel time in this EIS should be based on the assumption that it takes 25 years or less for

tank leaks to reach groundwater. And that the entire vadose zone, not just the tank itself, needs to be looked at as part of integrated system in this EIS.

Response Please refer to the response to Comment numbers 0069.01, 0069.02, and 0012.15.

Comment Number 0083.02 *Pollet, Gerald (Exhibit)*

Comment The TWRS EIS and USDOE's proposal to leave wastes in tanks forever is based on the false assumption that tank leaks do not move rapidly through the soil to groundwater and the Columbia River.

In 1989, the U.S. General Accounting Office (in a report initiated by Heart of America Northwest) found that the USDOE's claims that tank leaks would not contaminate the groundwater and the Columbia River were false.

The Draft TWRS EIS ignores new evidence found by a USDOE contractor team, headed by a former whistleblower, which found extremely radioactive cesium, 125 feet below the ground near tanks that have leaked.

Response The recently emerging information was discussed in Volume One, Section 3.3 of the Draft EIS. Additional discussions, based on data that became available after the Draft EIS was published, has been included in the Final EIS in Volume One, Section 4.2; Volume Four, Appendix F; and Volume Five, Appendix K. Please refer to the response to Comment numbers 0040.06 and 101.05 regarding cumulative impacts. Please also refer to the response to Comment numbers 0030.01, 0069.01, 0069.02, and 0012.15.

Comment Number 0089.06 *Nez Perce Tribe ERWM*

Comment Page 3-4, Paragraph 1
Results from the current TWRS Vadose Zone Characterization and Monitoring Project in the Tanks Operations Division, indicate that cesium-137 is much deeper in the vadose zone than previously estimated. Cesium nitrate and other cesium salts are quite soluble and if absorption sites on soil particles are occupied by other more attracted ions, nothing will impede the movement of cesium to groundwater. Compounds like ammonium and potassium may replace and release soilbound cesium and initiate further cesium migration. This problem highlights a need for more research and vadose zone monitoring.

Response DOE and Ecology acknowledge this need. The mechanism for transport of these contaminants is currently being investigated with additional boreholes. The source term associated with past leaks is much larger, in terms of liquid released per unit time, than any of the conditions associated with any of the alternatives, including No Action. Thus, the presence of cesium at depth may be

partially explained by the large liquid loss associated with some of the past leaks. Also, please refer to the response to Comment numbers 0012.15 and 0030.02.

Comment Number 0089.08 *Nez Perce Tribe ERWM*

Comment Page 3-38, Paragraph 3
The Hanford Barrier may not be fully adequate as a means of isolating tank waste from the environment. Although the barrier may be successfully used to isolate near surface waste in a dry environment, we do not advocate barrier use to isolate deep-seated contaminated waste beneath 200 Area tanks. The barrier may not halt moisture flow under the barrier along impermeable zones. It will not isolate deep-seated contamination from the probable rise in groundwater elevation if local plans to irrigate on the Hanford Site are realized.

Response A very simple infiltration model would have infiltrating precipitation moving vertically through the vadose zone with no lateral spreading. This is not the case at the TWRS facilities given the layered sediments, caliche layers, and potential vertical and horizontal features associated with clastic dikes. Infiltrating precipitation is expected to have some lateral spreading as these various layers and features are encountered. Knowing this allows for the appropriate design of the Hanford Barrier, particularly the lateral extent of the barrier. Past leaks and other closure issues will be addressed in future NEPA analyses for tank closure. For a discussion of the related closure issue, please refer to the response to Comment numbers 0019.04, 0089.08, and 0072.08.

Deep-seated contamination beneath the tanks would have little impact from irrigation given the observations from groundwater mounding associated with U Pond and B Pond, in conjunction with the assumption that irrigation will not be allowed at or near the TWRS facilities. Observations of the extent of the groundwater mound associated with U Pond on the western portion of the Site indicate that the lateral extent of groundwater level rise is limited to the near vicinity of the surface water application. This happens because of the relatively low permeability of the vadose zone soils in the U Pond area. In the 200 East Area and the eastern portion of the 200 Areas Plateau, the vadose zone soils are more permeable. Water level rise from surface applications (e.g., ponds or irrigation) are expected to be relatively flat with a relatively large lateral extent as indicted by the groundwater mound associated with B Pond. In some important ways, the impact assessment provided in Volume Four, Section F.3.0, could be representative of a future extensive irrigation scenario because it is based on 1979 water level data; a point in time when the B Pond and U Pond groundwater mounds were near their highest point. The discharge from these ponds would correspond to extensive irrigation in these areas. For this EIS, it was assumed future land use would prohibit irrigation near the TWRS facilities. Future NEPA analyses for closure would include the potential land use activities.

Comment Number 0089.13 *Nez Perce Tribe ERWM*

Comment Page F-9, Paragraph 4
The Distribution Coefficient (K_d) of cesium-137 and strontium-90 are discussed as being quite high and therefore not subject to travel from tank leaks through the vadose zone and into the groundwater. Recent information from the Tank Farms Vadose Zone Characterization Project indicates cesium has traveled much further than what would be expected with a K_d of 51, and in fact has already reached groundwater. Information from the vadose zone characterization effort indicates the K_d of cesium may be between 0.7 and 13. A possible cause for the lower than expected K_d may be other ions competing with cesium for adsorptive space on the soils. For example, ammonium and potassium have higher affinity for soil particles than cesium and will preferentially replace and free cesium facilitating cesium movement through the vadose zone. A future irrigation scenario will provide many of the above cesium releasing ions. This information implies more risk to down gradient sources from cesium than the EIS indicates; and we suggest you consider this data.

Response Tank contaminants such as sodium could compete for cation exchange sites in the vadose zone with the result of other contaminants such as cesium (the transport of cesium is retarded primarily by cation exchange) being transported at a rate faster than predicted. Potential mechanisms such as this and many others were assessed. A discussion of the potential causes of the recently emerging information on cesium in the vadose zone was added to Volume Four, Appendix F and Volume Five, Appendix K. Please refer to the response to Comment numbers 0012.15 and 0032.02.

Comment Number 0089.14 *Nez Perce Tribe ERWM*

Comment Page F-66, Paragraph 1
It states the groundwater modeling approach, based on the December 1979 groundwater level data is conservative in light of uncertainties of waste disposal, future land use, climate change and uncertainty in the depth of contamination in the unconfined aquifer. It is not clear that the modeler has accounted for the amount of water added the water table by irrigation and the amount of increase in groundwater table elevation that could occur. Moisture infiltration at sites where irrigation is initiated will increase from a few centimeters per year to several feet per year. Such activities will greatly multiply the speed of unconfined groundwater movement flooding and mobilizing previously soilbound contaminants within the vadose zone. Modeling completed for the Final EIS should give irrigation scenarios more weight.

Response Irrigation that occurs to the west of the Site is accounted for indirectly via the boundary conditions established at the Cold Creek and Dry Creek drainages onto the Site. The potential for irrigation near the tanks, increasing water levels, multiplying the speed of unconfined groundwater movement, and mobilizing previously soilbound contaminants within the vadose zone will be addressed in a future NEPA analysis on closure. For a discussion of the closure issue, please refer to the response to Comment numbers 0101.06, 0019.03, and 0005.17. Please also refer to the response to Comment

numbers 0089.15 and 0089.03, which discuss future land use and irrigation, respectively. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0089.15 *Nez Perce Tribe ERWM*

Comment The most important modeling assumptions and uncertainties are listed. Not included in this list are uncertainties related to land use such as irrigation, which in our view, is the most important uncertainty parameter.

Response Land use issues such as irrigation are important parameters and have been added to the list of important assumptions. It is difficult to predict future land use. For the impact analysis in this EIS, the areas adjacent to the TWRS facilities are not expected to be irrigated. Under some irrigation scenarios, the vadose zone could become thinner due to rising groundwater levels. This would result in a shorter contaminant transport time to the aquifer. Additional thinning of the vadose zone at the TWRS is unlikely, given the observations from groundwater mounding associated with U Pond and B Pond in conjunction with the assumption that irrigation will not be allowed at or near the TWRS facilities. Please refer to the response to Comment numbers 0089.14 and 0089.08 for a discussion of the potential management of irrigation and EIS modeling assumptions.

Comment Number 0090.02 *Postcard*

Comment Please listen to us say no:
to ignoring hard evidence that Hanford's High-Level Nuclear Waste leaks will poison the groundwater and the Columbia River.

Response DOE and Ecology acknowledge the concern expressed in the comment and are committed to a remediation plan that is protective of groundwater and the Columbia River. Emerging information on leaks from the tanks are being evaluated and are incorporated in this EIS primarily in Volume Five, Appendix K and Volume Four, Appendix F. Future information on tank leaks will be addressed by NEPA analyses for tank closure. The predicted impacts to the groundwater for all alternatives are provided in Volume Four, Section F.3.0. The cumulative impacts of past tanks, the TWRS alternatives, and other actions on groundwater quality are addressed in Volume One, Section 5.3 The predicted impacts to the Columbia River are provided in Volume One, Section 5.2.2.2. Using the bounding assumptions of minimum 7-day mean river flow, time of maximum contaminant discharge to river (500 years for Long-Term Management alternative), and highly mobile contaminants, it was found that there would be a slight increase in contaminant levels, but drinking water standards would not be exceeded (see Volume One, Section 5.2.2.2). The preferred alternative, Phased Implementation, was not analyzed for Columbia River impacts because the contaminant release for this alternative is only about one-tenth of that released for the Long-Term Management alternative. Please refer to the response to Comment numbers 0091.01, 0030.02, 0012.15 and 0072.08.

L.5.2.2 Surface Water

Comment Number 0073.02 *Yazzolino, Brad*

Comment You haven't, the people that picked that spot were thoughtful in the sense that yes they found a place with nearly 3 miles of volcanic strata underneath it that is relatively hard, but it of course has relatively soft areas in between it. But the river is sitting on top of all that hard material. The basalt. And so are your tanks. And so it's simply, if you would just apply childhood physics to this matter, you have a rock hard basin with the tanks sitting up on the surface. And you have a very tremendous and powerful river sitting next to those tanks. And that river, if you'll all study the Missouri floods, that very well respected theory, but geologically provable, that river about 11,000 years ago for a period of 2,000 years was flushing water over the top of the Hanford, as I call it, peninsula, at a level of probably more than 800 feet deep. So with the coming atmospheric affects that may take place due to global warming, no one can actually predict whether you will, in the next 4 or 5 hundred years. And I think you need to take a longer term, 130 years. Shame on you all. Does radioactivity observe those kinds of microseconds? No, and you all know that. And you need to begin to face the long life of radioactivity, and the long life of the river. So, in the next 4 or 5 hundred years your likely to see floods on the magnitude overtop the section of Hanford that you have your tanks in. Now that's why you need to move that stuff out of there. It needs to be moved. And of course it costs billions. But these are the things humans are good at, these kind of projects.

Response The current and foreseeable future climatic conditions would preclude catastrophic flooding of the TWRS facilities. This conclusion is supported by the analysis provided in Volume One, Sections 4.2 and 5.2; Volume Four, Appendix F; and Volume Five, Appendix I.

L.5.3 AIR QUALITY

Comment Number 0072.28 *CTUIR*

Comment The emission estimates were not documented.

Response Emission estimates were provided in the Engineering Data Packages for the various alternatives, which are available for public review in DOE Reading Rooms and Information Repositories. Emission rates were calculated from these emission estimates using the construction and operating schedules presented in the packages. The resulting emission rates are presented in Volume Five, Appendix G. Emission calculations in tons emitted for each constituent are contained in the references shown in Volume Five, Appendix G. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.29 *CTUIR*

Comment No onsite receptors were evaluated and no risks were calculated.

Response Onsite receptors were evaluated and risks were calculated in Volume One, Section 5.11 and Volume Three, Sections D.4, D.5, and D.6 of the Draft EIS in Volume Three, Appendix D. A rectangular grid of 834 receptors, which encompasses the entire Hanford Site, was used to evaluate potential air impacts onsite. The risk associated with potential air impacts, along with those from other media evaluated (groundwater and soil), was calculated for each exposure scenario evaluated and presented in Volume Three, Appendix D. Risk contour maps are presented in Volume Three, Section D.5 of the Final EIS.

Comment Number 0072.30 *CTUIR*

Comment Only a small subset of released constituents were modeled.

Response The pollutants presented in Volume One, Section 5.13 represent a small subset of the pollutants modeled. The results presented were for the pollutants that contributed to impacts. The complete list of pollutants and the modeling results are located in Volume Five, Appendix G. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.31 *CTUIR*

Comment There was no recognition that tank farms are only part of the annual Hanford dose; some apportionment is needed.

Response In Volume One, Section 2.0, Purpose and Need for Action, it is stipulated that this EIS addresses Hanford Site tank waste and encapsulated cesium and strontium to reduce existing and potential future risk to the public, Site workers, and the environment. An assessment of the contamination at the entire Hanford facility (Sitewide assessment) would facilitate apportionment of the contribution of TWRS. The Sitewide assessment is not within the scope of this document; consequently, no apportionment is presented. However, Volume One, Section 5.13 does address potential cumulative impacts of TWRS alternative emissions with emissions from ongoing and reasonably foreseeable activities. Please refer to the response to Comment number 0072.243. Because the information requested in the comment was included in the Draft EIS to the extent appropriate for the TWRS analysis, no modification to the document is warranted.

Comment Number 0072.32 *CTUIR*

Comment Particulate deposition should be included, since this is part of the annual NESHAPs reporting requirement.

Response The inclusion of particulate deposition in air emission modeling would reduce airborne concentrations and thus minimize offsite impacts. Ignoring the effect of particulate deposition results in a conservative estimate of air emission impacts. Particulate deposition was accounted for in the

determination of anticipated risks to the general public due to ingestion of vegetation, meat, and milk contaminated by airborne deposition, as discussed in Volume Three, Appendix D. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.239 *CTUIR*

Comment P G-2: Sect. G.2.1: It is not clear whether fugitive emissions are included in the Area Sources. The relation between Stack/Fugitive-Area and Normal/Unplanned releases (per NESHAPs) should be made clearer. Are the stack numbers the same as those reported in the annual NESHAPs report? Is there a 1:1 correspondence between all the sources in the EIS and the NESHAPs reports? Please clarify the regulatory framework. For each source, please add the anticipated duration of operation or emission for the various alternatives (also add columns to the tables after the emission rate columns).

Response This comment contains six sections, each with its separate explanations. For clarity, each explanation has been given a number.

1. When fugitive emissions are included in the Area Sources, the text of the EIS points this fact out. In the Draft EIS, Volume Five, Section G.2.1, the following area sources associated with fugitive emissions are specifically called out: Waste Retrieval Annexes Areas, page G-3; and Process Facilities and Tank Farm Construction, page G-5.
2. All emissions are considered under National Emissions Standards for Hazardous Pollutants (NESHAPs) regardless of their source. There is no relation between Stack/Fugitive-Area and Normal/Unplanned releases, because all contribute to the emissions from the Hanford Site.
3. Because the stack designations used in the EIS are for air modeling and environmental planning purposes and have therefore not been constructed, they will not be found in the annual NESHAPs report.
4. The sources in the EIS are of a conceptual nature. The exact sources that will be active during construction and operation would be determined during final design. Consequently, there is no correspondence between the sources in the EIS and the NESHAPs reports.
5. The regulatory framework of the EIS is explained in detail in Volume One, Section 6.0. In particular, the relevant environmental requirements are detailed in Volume One, Section 6.1.
6. The anticipated durations of the construction and operating phases for each alternative are shown by alternative in Volume Five, Section G.2.2, Model Scenarios.

Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.240 *CTUIR*

Comment P G-13: Sect. G.3.1.2: Please forward information regarding particle sizes, Ranges, densities, and deposition rates for this section. This information was not in the tables referenced. Additionally filter failure rates should also be included.

Response A study conducted on cooling towers (Wistrom and Ovard 1973) shows the size of particulate matter (PM) emitted from cooling towers to range from 20 μm to 2,400 μm. Particles larger than 450 μm settle out within 400 feet from the tower. Approximately 30 percent of tower emissions are less than 450 μm and may drift offsite. These particulates will decrease in size as the water drop evaporates.

Particulate matter nominally 10 micrometers (μm) or less (PM-10) emissions associated with construction mainly are due to engine exhaust and fugitive dust. AP-42 Table C.2-2 (Wistrom and Ovand 1973) shows that 95 percent of PM due to engine combustion is smaller than 10 μm and 90 percent is smaller than 2.5 μm. Fugitive dust emissions tend to be smaller than 30 μm with 20 to 40 percent less than 10 μm, depending on source.

Radiological PM emissions emitted from HEPA air filters will be much smaller than 10 μm. The term HEPA was designated by the U.S. Atomic Energy Commission for filters that are at least 99.97 percent efficient by volume on 0.3 μm particles (Austin and Timmermann 1965). A control efficiency of 99.95 percent per filter was assumed in the Engineering Design Packages, which are cited in the EIS and available for reviews in DOE Reading Rooms and Information Repositories. Particle size data, densities, and deposition rates from the various emission sources are currently not available.

Comment Number 0072.241 *CTUIR*

Comment P G-13: PP 3: What are the filter failure rates for the tank farms and the WESF?

Response WSRC-TR-93-262 gives a recommended value of 5.0E-07 per hour for failure from rupture under regular operating conditions (4.4E-03 per year). The HEPA filtration systems have monitoring and alarm systems. If the filter plugs or blow out, the differential pressure gives indication. HEPA filter failure accidents are not covered in Volume Five, Appendix G but in Volume Four, Appendix E, Accident Analysis.

Comment Number 0072.242 *CTUIR*

Comment P G-15: Sect. G.3.1.4: No onsite receptor locations were evaluated. Since parts of the Hanford Site will be accessible to the public well before the 100 year assumed duration of Site-wide institutional controls is up, some on-site receptors should be added. Public dose limits apply to Site visitors as well as to the offsite boundary receptor. The only points of compliance indicated in this

section were the Site boundary and the nearest residence. Although this is conventional for NESHAPs reporting, it is unacceptable for this EIS.

Response Sitewide institutional controls are designed to protect the public and restrict public access to areas of the Site that may pose a risk. In deciding which areas may be open to the public, a detailed assessment of potential exposure must be made and compared to the public dose limits then in effect. A discussion of anticipated health effects both during and after remediation may be found in Volume One, Section 5.11. Contour maps of potential health effects from air released during remediation are presented in Volume Four, Appendix E and Volume One, Section 5.11. Please refer to the response Comment number 0072.29.

Comment Number 0072.243 *CTUIR*

Comment P G-18: PP 2: The NESHAPs citation (40 CFR 61, Subpart H0 applies to *the entire Hanford Site as a single source*, not to a single program, activity or Area. Therefore, the proper comparison of air modeling results is not to the upper limit of allowed dose, but to a fraction of that limit. NRC uses the term "apportionment" (see, for instance, the WIPP permit) to set limits for individual activities within a larger unit; in the case of WIPP, the storage facility is not allowed to exceed 25 percent of the overall source term. The federal total dose limit for offsite receptors is 100 mrem (all pathways) and 10 mrem (inhalation only). This limits applies to the entire Hanford Site, and the ROD must specify what portion of this limit can be "filled" by TWRS activities. The 1 mrem contour (Phase 2, for instance) occurs in locations where non-rad workers work, and that are outside the bounds of the 200 Area. There is a second impact zone offsite (Ringold area, on the other side of the Columbia River) that will be of concern during actual operations.

Response The 40 CFR 61 Subpart H exposure limit is applied to the Site as a whole. As part of the Hanford Site Air Operating Permit, the annual potential emission from each discharge point has been identified. NESHAPs compliance is based on exposure at the nearest actual residence. Inhalation pathway exposure for the nearest resident for the TWRS alternatives ranges from 0.019 to 2.4 mrem/yr as shown in Volume Four, Tables G.4.0.20 to G.4.0.30. For 1994, the nearest resident received 0.01 mrem by the inhalation pathway from all Hanford Site emissions (PNL 1995). Assuming the other Site facilities emissions continued at the 0.01-mrem/yr rate, the inhalation pathway exposures for the Site, including the TWRS alternatives, would range from 0.029 to 2.41 mrem/yr (0.019 plus 0.01 mrem/yr to 2.4 plus 0.01 mrem/yr). To be conservative, the TWRS EIS analysis also was performed for hypothetical residences at currently unoccupied locations along the Columbia River and Highway 240. All of these hypothetical residence locations were calculated to be below 1 mrem/yr (10 percent of the 10-mrem/yr NESHAPs) except for the In Situ Vitrification alternative, which was 18.8 mrem/yr at the maximum location. The potential for this exposure could be mitigated by including such measures as continued restriction on location of residences in the subject area.

However, because there are no residences at these hypothetical residence locations, the NESHAPs of 10-mrem/yr would not apply and there would be no exceedance. Volume One, Section 5.13 contains

an analysis of the cumulative air quality impacts of the TWRS alternatives and other Site activities. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0072.244 *CTUIR*

Comment P G-36: Table G.3.1.2: No rationale is given for the selection of non-radiological constituents. Please do not refer us to endless other documents - the TWRS EIS is a stahd-alone product that will be the sole basis of the ROD. It must provide complete information for evaluation. In particular, the document "Jacobs 1996" that is cited as the basis for the emission estimates is not publicly available, and may not have received any peer review at all. Presenting table after table of emission rates without any explanation is meaningless, and CTUIR cannot accept any results based on such unsupported data.

Response Incorporation of technical data and information by reference is used as a means to limit the volume of the EIS. Referenced supporting technical data, including Jacobs 1996, are publicly available in the Administrative Record and were provided to DOE Reading Rooms and Information Repositories during the Public Comment Period. An independent technical review of the Draft EIS was completed and a copy of this report is available in the TWRS EIS Administrative Record. This independent technical review found that data used in the analyses were derived from valid and fully documented sources that were traceable, and models used to predict impact analyses either were EPA-approved or accepted by experts as fundamentally sound.

Non-radiological constituents and emission rates for current operations (including the No Action alternative) at the tank farm were derived from the Hanford Site Air Operating Permit Application, which covers existing tank farms and evaporator operation. The selection of non-radiological constituents was based on measured emissions from monitoring instrumentation or tank vapor space sampling results. Constituents and emission rates for waste treatment operations addressed in other alternatives were derived from material balance calculations developed for each alternative.

Comment Number 0072.245 *CTUIR*

Comment P G-57: Table G.3.1.20: Only 5 radionuclides were used for some of the air modeling. 10 nuclides were used for other alternatives, without any explanation. Various sets of hazardous air pollutants were also used. Since the tank contents do not change between the various alternatives, this is illogical. This entire section must be improved.

Response The tables cited in Volume five, Appendix G provided radionuclide emission rates for the alternatives presented in the EIS. The tables showing five radionuclides were based on radionuclides presently reported by the tank farm operations groups. Because no additional information is available, these radionuclides form the basis for emission rates for alternatives where no activities are performed on the tank contents, (i.e., No Action, Long-Term Management, In Situ Fill and Cap). For the remaining alternatives, there is additional information on radionuclide emissions in the flowsheets

contained in the engineering data packages. Where additional information is available, additional radionuclides are shown in the tables for a particular alternative, along with the source (e.g., process plant stack). The hazardous air pollutants referred to in the comment are shown in the preceding tables. The tables for No Action, Long-Term Management, and In Situ Fill and Cap alternatives show the emissions presently reported by the tank farm operations groups. The tables for the remaining alternatives show emissions during construction and operation, which are both taken from the engineering data packages. Construction emissions are those anticipated from use of heavy equipment on the Hanford Site. Operating emissions are those given in the flowsheets in the engineering data packages, which are available for review in DOE Reading Rooms and Information Repositories. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0072.246 *CTUIR*

Comment P G-21: Sect. G.5.3: No description of the presumed filter efficiency (and failure rates), particulate size range and deposition rates were given. Additionally, no consideration whatsoever of the long-term impacts of deposited material (either radiological or nonradiological) was given. If deposition rates had been evaluated, there would have been high impact areas identified (Gable Mountain and White Bluffs). Since federal NESHAPs reporting requires deposition and incorporation into agricultural products as part of the annual dose evaluation, corresponding calculation should be presented in the EIS. If they are not, it will be impossible to demonstrate that any of the alternatives will, in fact, be able to meet compliance limits.

Response Routine emissions are discussed in Volume One, Section G.3.1. HEPA filter efficiency was factored into the emission rates provided in the engineering data packages that support routine emissions. HEPA filter failure accidents are discussed in Volume Four, Appendix E, Accident Analysis. Please refer to the response to Comment number 0072.241.

Dose evaluations from routine emissions are not covered in Volume Five, Appendix G, but are discussed in Volume Three, Appendix D. The intent of Appendix G is to access whether or not the air emissions are in conformance with air quality standards. Please refer to the response to Comment numbers 0072.32, 0072.239, and 0072.240 for related information. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0072.247 *CTUIR*

Comment P G-33: Fig. G.4.0.12: Even without any deposition being included, it is apparent that there are high concentrations at the high elevations on Gable Mountain and Rattlesnake Ridge. This means that tribal members visiting those sites will receive a greater exposure than the general public. Further, more deposition will naturally occur at these higher elevations, thus placing these culturally important areas and the people who visit them at increased risk. This section must be revised and linked to socio-cultural impacts.

Response DOE and Ecology acknowledge the concern regarding potential concentrations of radionuclides on Gable Mountain and Rattlesnake Ridge. Further information on the short-term impacts of air emissions during operation of TWRS facilities is contained in Volume Five, Figures G.4.0.1 through G.4.0.12. At higher elevations, predicted concentrations and dose values could be somewhat greater than in the lower elevations, in the immediate area. For areas near Gable Mountain and Rattlesnake Ridge, predicted radionuclide doses are well below the Washington State Acceptable Source Impact Levels (ASILs) and radionuclide dose limits established by State and Federal standards. It would be reasonable to conclude that, even if the predicted doses are somewhat greater at higher elevations, these doses would not be expected to exceed State or Federal standards. The long-term impacts of remediation on Tribal members are addressed in a separate Native American scenario presented in Volume One, Section 5.11 and Volume Three, Appendix D. For information on this scenario, please refer to the response to Comment numbers 0072.198 and 0072.225 for post-remediation accident impacts.

Comment Number 0072.248 *CTUIR*

Comment P G-20: Sect. G.5.2.2: No description of the actual vitrification operations was given including temperatures, feed materials, emissions, air pollution control device efficiency, effects of startup, trial melts, upsets, and maximum rated capacity. The recent vitrification event at Savannah River should serve as an indication of anticipated variances in emissions.

Response A description of the vitrification operations is provided in Volume Two, Appendix B and was based on information in the referenced Engineering Data Package, which is available for review in the DOE Reading Rooms and Information Repositories. Please refer to the specific data package for vitrification to obtain the most detailed information available. Emissions are based on design rates for the equipment, which should represent peak emissions. Average operating rates (and emissions) are estimated to be approximately 40 percent of the design rates. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.249 *CTUIR*

Comment P G-83: Tables G.4.0.1-19: these Tables seem to have been prepared solely for reporting purposes and have no identifiable relation to dose and risk. Each individual contaminant is compared to a regulatory level, but no other information is presented. The concentrations vary from 1 hour to annual averages, again without explanation as to whether this assumes maximum continuous operation, or something else.

Response As is stipulated in Volume Five, Section G.5.3 (page G-21), these tables were used to screen the potential impacts associated with air contaminants at the Site versus applicable regulatory (State and Federal) levels. The tables compare the modeling results to the Federal and State standards. The maximum 1-hour average concentration that resulted from the modeling was converted to 3-, 8-,

and 24-hour average concentrations to compare to applicable standards when appropriate. The 1-hour average concentration was multiplied by 0.9 to obtain the 3-hour average, 0.7 for the 8-hour average, and 0.4 for the 24-hour average (EPA 1992b).

Predicted maximum emissions for hazardous air pollutants and pollutants for which a Washington State ASIL exists are provided along with the applicable level in Tables G.4.0.1 through G.4.0.19. Some of the pollutants evaluated have Washington State ASIL of Federal Standards reported for 1-hour, 3-hour, 8-hour, or 24-hour concentrations. For instance, PM-10 has a Federal and State 1-, and 8-hour standard. Consequently, for carbon monoxide, the 1-hour model predicted concentration was adjusted by multiplying it by 0.7 to obtain an 8-hour concentration. Because the 1-hour concentration can be altered by multiplying it by the appropriate conversion factor; a conservative estimate of the contaminant concentration is available for comparison to the applicable standards. The modeling results for all alternatives show no exceedances of Federal or State air quality standards for criteria pollutants, hazardous air pollutants, or radionuclides. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.250 *CTUIR*

Comment P G-83: Tables G.4.0.19: Groundshine must be included in the evaluation, with and without an assumption of intervention, and with varying degrees of intervention success.

Response Table G.4.0.19 is not in Volume Five, Appendix G on page G-83 as indicated; it is on page G-105. It is assumed the commentor is to referring to Tables G.4.0.1 to G.4.0.19. Because the constituents presented in Tables G.4.0.1 to G.4.0.19 are not radioactive, these constituents would not contribute to a groundshine pathway. However, Tables G.4.0.20 to G.4.0.30 compare the maximum dose per year from radiological constituents with State air quality standards (the purpose of Volume Five, Appendix G is to measure air emissions against air quality standards). The radiological releases do not exceed the air quality standards so intervention would not be required. The groundshine pathway was included in the evaluation of remediation risk to onsite and offsite receptors. Results of the remediation risk evaluation are presented in Volume Three, Appendix D. These results indicate that the impacts from groundshine are orders of magnitude less than from inhalation. The additive impact from groundshine, therefore, would not change the maximum dose shown in Volume Five, Tables G.4.0.20 to G.4.0.30 and no change to the document is warranted.

Comment Number 0072.251 *CTUIR*

Comment P G-12 - P G-19: Sects. G.3.0 and G.5.1: This section provides insufficient detail about modeling methods. Exposure assumptions must be presented, as well as assumptions about the particulate size range and respirable fraction used in the dose estimation.

Response The model used for this investigation is the Industrial Source Complex Model (ISC2). The model is a Gaussian dispersion model, which can be used for estimating the concentration of

pollutants at a receptor. The model is a guideline air quality model accepted by the EPA for regulatory applications. The assumptions in Gaussian dispersion modeling are as follows.

- Pollutant emissions are continuous.
- Mass of pollutants released remains in the atmosphere during transfer from the source to the receptor.
- Meteorological conditions do not change.
- Diffusion in the downwind direction is negligible in comparison to transfer by the wind. Thus diffusion occurs in only the vertical and crosswind directions.
- Time averaged concentrations in the crosswind and vertical direction are assumed to be distributed normally.

ISC2 was run using the standard rural dispersion coefficients. Standard EPA procedures were followed and the regulatory default option was used. The options implemented included the following:

- Final plume rise that accounts for the effective height of the source of emission;
- Buoyancy-induced dispersion that allows for the plume size to increase at the stack exit point;
- Default wind profile exponents;
- Default potential temperature gradients; and
- Upper bound values for building downwash.

The respirable fraction of particulates is assumed to be those with diameter less than or equal to 10 μm (PM-10). Respirable particulates that are greater than 5 μm typically are trapped by hair follicles in the trachea and never reach the lungs.

The risk calculations for each exposure scenario are calculated in Volume Three, Appendix D. For the residential farmer exposure scenario, the exposure parameters for inhalation are as follows:

Inhalation rate - 20 $\frac{m^3}{day}$

Exposure frequency - 365 $\frac{day}{yr}$

Exposure duration = 6 yrs (child)
24 yrs (adult)

Body weight = 16 kg (child)
70 kg (adult)

Averaging time = 365 $\frac{day}{yr}$ * 30 yr

The exposure parameters for each scenario evaluated are presented in Volume Three, Appendix D. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0100.01 *WDOH*

Comment First, Washington's standard for radioactive air emissions is CAP-88. CAP-88 should be used for the modeling in the EIS.

Response There were several reasons why EPA's preferred radionuclide dose model was not used in this analysis. While portions of the dose calculation methodology of the Clean Air Assessment Package-1988 (CAP-88), as well as other site-specific models such as GENII, may have been incorporated in the risk assessment, the air dispersion algorithms of those models were not. The ISC2 was selected as the general air dispersion model for the following reasons:

- ISC2 is a sophisticated model with capabilities comparable to CAP-88, such as the ability to account for a wide spatial separation of many varied source types;
- ISC2 is an EPA guideline model, and was the choice for assessing traditional pollutants (e.g., dust and combustion products) and air toxic emissions;
- Use of ISC2 for all air dispersion modeling provided for consistency in the EIS; and
- A sitewide compliance demonstration with the radiological standards was not the goal of this EIS.

Volume Five, Appendix G contains a comparison of the ISC2 and CAP-88 modeling results and shows that these results compare closely.

Comment Number 0100.02 *WDOH*

Comment Second, the state standard for total radionuclides is misstated at 25 mrem/yr.

Response The text in Volume Five, Appendix G has been modified to state that the Ambient Air Quality Standard (WAC 173-480) for the maximum accumulated dose equivalent at any offsite receptor from a commercial nuclear facility is 25 mrem/yr. As a Federal facility, the Hanford Site could be expected to comply with the EPA regulation (40 CFR 61), which limits the maximum predicted dose at the nearest residence to 10 mrem/yr dose equivalent.

L.5.4 BIOLOGICAL AND ECOLOGICAL RESOURCES

Comment Number 0019.12 *WDFW*

Comment Page 5-64, third paragraph, third bullet. Should include "candidate" category as well.

Response The EIS text presents this key issue of the biological and ecological resources impact analysis in the following sentence: "... potential impacts on plant and animal species of concern (those

listed or candidates for listing by the Federal government or Washington State as threatened, endangered and sensitive)."

Comment Number 0019.13 *WDFW*

Comment Page 5-65, section 5.4.1, first paragraph. WDFW believes it is more appropriate to discuss the percent loss of shrub-steppe within the waste management zone (WMA) to emphasize the impacts to shrub-steppe there. Currently, there is approximately 5,800 acres of undisturbed shrub-steppe within the WMA. Impacts to undisturbed shrub-steppe would range up to 6 percent in the WMA from the TWRS alternatives.

Response The EIS was modified in Volume One, Section 5.4 to add the percentage of undisturbed shrub-steppe that potentially would be affected by TWRS EIS alternatives within the waste management area.

Comment Number 0019.14 *WDFW*

Comment Page 5-67, Table 5.4.1, Phased Implementation (Total). Impacts do not match what is stated elsewhere in the text. 470 acres is stated here. 540 acres (pg. 5-230) and 690 acres (pg. 5-123) are mentioned elsewhere. Please clarify.

Response The EIS was modified to clarify and correct the potentially affected acreages for the Phased Implementation (Total alternative), based on revisions to the Phased Implementation alternative that occurred since publication of the Draft EIS. Volume One, Table 5.4.1 identifies the total amount of shrub-steppe that would be affected. Volume One, Section 5.4 identifies the total amount of land that would be affected, not only the amount of shrub-steppe. Table 5.14.1 has been revised to indicate that shrub-steppe impacts for the Phased Implementation (Total alternative) would be 94 hectares (240 acres) in the 200 Areas and 140 hectares (350 acres) at the potential borrow sites for a total impact of 240 hectares (590 acres). Volume One, Section 5.7 (page 5-123) indicates that approximately 320 hectares (790 acres) would be the total temporary construction-related land use, including both shrub-steppe and non shrub-steppe areas.

Comment Number 0019.15 *WDFW*

Comment Page 5-71, section 5.4.2, first paragraph. The nesting period should also include a discussion on passerines (sage sparrow, etc.) and that site clearing would avoid the breeding season for these species. These species also receive protection under the Migratory Bird Treaty Act.

Response The EIS has been modified in Volume One, Section 5.4 to include potential impacts on nesting passerine (songbird) species. Mitigation of potential impacts to these species would be described in the Mitigation Action Plan.

Comment Number 0019.16 *WDFW*

Comment Page 5-75, section 5.4.5, first paragraph. WDFW concurs with the importance of the McGee Ranch as a wildlife corridor for species migration, proliferation, and genetic diversity. Impacts to the McGee Ranch would have a significant adverse affect on wildlife.

Response DOE and Ecology acknowledge the position of the WDFW on McGee Ranch and addressed the wildlife corridor in the Affected Environment discussion in Volume One, Section 4.4 and Volume Five, Appendix I, and potential impacts to the wildlife corridor under each of the alternatives in Volume One, Section 5.4. It is important to note that the TWRS EIS will not support decisions associated with closure of the tanks and it is only under the hypothetical closure option analyzed in the EIS that adverse impacts to McGee Ranch would occur. Thus, no action taken as a result of this EIS would affect species migrations proliferation, or genetic diversity associated with the corridor. Please refer to the response to Comment numbers 0019.03 and 0072.08 for related information on how closure is addressed in the EIS and related impacts on potential borrow sites.

L.5.5 CULTURAL RESOURCES

Comment Number 0089.16 *Nez Perce Tribe ERWM*

Comment Page I-60, Paragraph 2
It needs to be emphasized that disturbed areas still have potential to contain cultural resources.

Response The EIS has been modified in Volume One, Section 5.5 to indicate that disturbed areas may contain cultural resources that were not identified during the cultural resources survey. This fact is acknowledged by DOE and Ecology and is the reason why the mitigation measures identified in Volume One, Section 5.20 of the Draft and Final EIS include a commitment to conduct cultural resource surveys, consult with affected Tribal Nations, and mitigate through avoidance whenever feasible.

Comment Number 0101.03 *Yakama Indian Nation*

Comment In addition we consider that the actions should assure that cultural values of the Yakama Nation, not directly related to public health and safety or the ecological aspects of the environment, should be protected. These other cultural values stem from what could be termed religious beliefs and are associated with the sanctity of the land forms and other natural resources at Hanford.

To accomplish objective establishment of performance bases, i.e., a valid suite of scenarios to be used in the performance assessments, we consider experts knowledgeable in predicting future possible demographic conditions and societal land use patterns, including intruder scenarios, should be utilized. Delphi methods for polling expert opinions on such subjective topics should be employed. YIN representatives should be involved with this activity to assure the demographers, anthropologists, archaeologists, geologists and other experts having the knowledge to anticipate future conditions

adequately incorporate scenarios involving Indian usage of the land, the water and the other natural resources, reflecting historical data as warranted. Without the valid determination of such conditions, including those which may occur and would be limiting with respect to the design confidence level, any of the actions described in the subject EIS may be unfounded and not protective of the public health and safety and the environment. In addition, actions justified as a result of the impact assessments may not meet requirements stemming from cultural values discussed above.

Response Please refer to the response to Comment number 0072.149 for a discussion of consultation with Tribal Nations on the TWRS EIS, and Comment numbers 0072.37, 0072.40, 0072.268, 0072.251, and 0072.53 for discussions of changes to the EIS based on Tribal comments on cultural values, cultural sites, and land uses. The discussion of Treaty rights and privileges has been modified in the Final EIS, based on consultation with the affected Tribal Nations, in Volume One, Section 4.4 and Volume Five, Appendix I. The EIS used reference cases, including the Native American subsistence scenario, for comparative purposes to predict unrestricted future land uses beyond the 100-year administrative control period to 10,000 years. These are incorporated into the Native American User Scenario, which is addressed in Volume One, Section 5.11 and Volume Three, Appendix D. For a complete discussion of this issue, refer to the response to Comment number 0072.149. For discussion of how the EIS addresses environmental justice analysis relative to the Tribal Nations, please refer to the response to Comment numbers 0072.271, and 0072.252.

In response to this and other comments by affected Tribal Nations, the risk assessment for the EIS was revised to include an evaluation of anticipated post-remediation risk to a Native American subsistence user of the Hanford Site. Inclusion of a Native American scenario in the Draft EIS was not feasible because a methodology for the assessment had not been developed sufficiently to be incorporated into the Draft EIS. The scenario used for the analysis was developed through consultation with representatives of the affected Tribes and included discussions regarding societal land use patterns, the intruder scenarios, and demographic conditions. Please refer to the response to Comment number 0072.198, which contains a complete discussion of the information included plus a document reference list regarding the addition of a Native American scenario. Please refer to the response to Comment number 0072.225 for a discussion of post-remediation accident impacts to Tribal Nation sacred sites and cultural values.

L.5.6 SOCIOECONOMICS

Comment Number 0072.33 *CTUIR*

Comment Counting the number of Native Americans living in the 3 nearest counties does not satisfy the Environmental Justice Executive Order or DOE policy.

Response As discussed in the response to Comment number 0072.53, the EIS environmental justice analysis provides demographic data in Volume One, Section 4.6 on Native Americans, as well as low-income and minority populations within an 80-km (50-mi) radius of the Hanford Site Central Plateau. This area includes portions of 10 counties in Washington and Oregon. Volume One,

Section 5.19, Environmental Justice, presents a review of all TWRS alternatives' impacts on the natural and human environment that were addressed throughout Volume One, Section 5.0 to determine whether any potentially disproportionate and adverse impacts would occur to the identified minority or low-income populations, including Native American populations. Volume One, Section 5.20 identifies potential mitigation measures that DOE could adopt to address potential environmental justice impacts identified in Section 5.19. Please also refer to the response to Comment numbers 0072.252 and 0072.149.

Comment Number 0072.34 *CTUIR*

Comment Economic impacts of accidents were not included.

Response The model used to analyze economic impacts incorporates historical data on Tri-Cities socioeconomic conditions to test its results (e.g., the accuracy with which the model, using historical data yields output for past employment that agrees with known past employment levels). The model was then applied to future Hanford Site employment under each alternative to estimate area employment, housing prices, and taxable retail sales. Total area employment estimates were used to estimate impacts on public services. This analysis was presented in Volume One, Section 5.6.

DOE's Recommendations for the Preparation of Environmental Assessments and EISs (DOE 1993d) directs that impacts from low-probability events be analyzed with the amount of detail commensurate with their likelihood of concurrence and potential consequence. The likelihood of an accident under the TWRS alternatives that could affect the local economy is low. Further, there are no historical data for the Tri-Cities that could be used to provide a basis for analyzing potential economic impacts of accidents at the Hanford Site. Volume One, Section 5.6 and Volume Five, Appendix H have been modified to explicitly state that economic impacts of accidents have not been analyzed for post-remediation accident impacts. Please refer to the response to Comment number 0072.225 for a discussion of post-remediation accident impacts on Tribal Nation sacred sites and cultural resources and modifications to Volume Four, Appendix E regarding this issue.

Comment Number 0072.35 *CTUIR*

Comment No costs for storage, mitigation or disposal were included

Response An econometrics model was used for the economic impact analysis in the EIS to assess the impacts of TWRS alternatives. Hanford Site employment is used in the model as the key independent variable, and then equations based on historical data for the Tri-Cities area, are used to forecast the impacts of changes in future Site employment on socioeconomic conditions (e.g., total nonfarm employment, housing prices). Employment associated with TWRS activities such as waste storage and disposal is included in the analysis; thus, the costs of storage and disposal are included indirectly in the socioeconomic analysis. The direct costs of storage and disposal under each alternative are provided in Volume One, Section 3.0 and Volume Two, Appendix B. Please refer to the response Comment

number 0072.225 for a discussion of the impact of mitigation of post-remediation accidents. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.36 *CTUIR*

Comment Jobs and housing as the only socioeconomic measures is unsatisfactory.

Response In addition to jobs and housing, the EIS socioeconomic impact analysis includes impacts on taxable retail sales, population, and a wide range of public facilities and services, including schools, police and fire services, medical services, solid and sanitary waste disposal systems and electricity and natural gas energy services in Volume One, Section 5.6 and Volume Five, Appendix H. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.252 *CTUIR*

Comment P H-1: Sect H.1.0: The topics covered in this section include the impact on local jobs, impact on the Tri-Party Agreement Milestone schedule, and impacts on demographics, housing prices and similar items. Therefore, we would expect to also see a full treatment of community and tribal quality of life, and intra- and intergenerational equity. This is, in fact, the intent of NEPA and is required under Executive Order 12898. We are aware that scoping discussions pertaining to this type of analysis were held with contractors and Headquarters personnel, yet it is entirely omitted from the Draft EIS.

Executive Order 12898 and DOE Environmental Justice Policy. The Executive Order states that the human health and environment of minority populations must be evaluated, including differential patterns of consumption, social and economic impacts, and whether there is a disproportionate burden of exposures and/or risks on these populations. DOE's Environmental Justice Strategy includes provisions for identifying high risk populations (including subsistence consumption patterns), and for identifying DOE activities that might have a disproportionately high human health or environmental effects on minority populations. This goes far beyond merely counting the number of Native Americans in the three Hanford counties. ***CTUIR expects DOE to consult with technical staff in order to ensure that adverse impacts on a traditional subsistence lifestyle and characterization of populations at highest risk are adequately evaluated for the baseline conditions and for each alternative for as long into the future as the contamination or post-remediation conditions persist..*** The DOE Strategy also directs programs to "encourage ... participation [of American Indian Tribes] in the development of NEPA documents." Since a typical simple "scoping" briefing does not satisfy this directive, and since many of the deficiencies of this EIS could have been anticipated and corrected before publication of the Draft EIS, ***CTUIR further expects DOE to proceed with the revision of the EIS and negotiation of the Record of Decision to genuinely include CTUIR as an equal participant in the decision-negotiation process and in the development of mitigation action plans.***

Response Volume One, Section 5.19 was devoted to a summary of the environmental justice analysis included in the EIS. Volume Five, Appendix H is intended describe the analysis of the socioeconomic impacts of the TWRS EIS alternatives. A summary of this impact analysis is presented in Volume One, Section 5.6. The impacts of the alternatives on other aspects of the human and natural environment are presented in Volume One, Section 5.0 (e.g., air, water, human health, and land use).

The environmental justice requirement states that the environmental justice analysis should be completed to the "extent practicable and appropriate" (EO 12898). In developing the data to support the analysis, the Executive Order instructs agencies to "collect, maintain, and analyze information on the race, national origin, income level, and other readily accessible and appropriate information for areas surrounding facilities or sites expected to have substantial environmental, human health, or economic effect on the surrounding populations." This information is to be used to determine if "programs, policies, and activities have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations."

The Executive Order mandate to collect data that are readily available on the area surrounding the site likely to be impacted by a proposed action and to analyze impacts that may have disproportionately high and adverse effects on minority and low-income populations is consistent with NEPA requirements. NEPA requires that a sliding scale be applied to analysis of potential impacts on the human and natural environment. "The sliding scale approach to NEPA analysis recognizes that agency proposals can be characterized as falling somewhere on a continuum with respect to environmental impacts. This approach embodies instruction that CEQ has provided (40 CFR 1502.1 and 1502.2, for example) with respect to preparation of EISs. The term 'scale' refers to the spectrum of significance of environmental impact. Do not attempt to quantify impacts on environmental resources when it is clear form the context that any impacts would be virtually absent" (DOE 1993d).

For the purposes of complying with the environmental justice and NEPA requirements, the TWRS EIS adopted the following approach to analysis of potential impacts to minority and low-income populations. The data presented in Volume One, Section 4.0 and Volume Five, Appendix I support the environmental justice analysis by describing the affected environment, including potentially affected populations. Consistent with Executive Order 12898 requirements, Section 4.6 and Appendix I identify minority and low-income populations that may be impacted by the proposed action. The second NEPA requirement is to determine the potential impacts of the EIS alternatives on the affected environment. The analysis of potential impacts to the affected environment is presented in Volume One, Section 5.0. This analysis considers the potential impacts on all populations and if an impact would adversely and disproportionately impact minority or low-income populations, the impact was identified.

Based on the analysis of potential impacts to the human and natural environment, the environmental justice initiative requires the agency to determine if any of the impacts would pose a disproportionately high and adverse impact on minority and low-income populations. This analysis is presented in Volume One, Section 5.19. For each area of potential impact (e.g., land use, human health, air

quality, water quality) impacts presented in Volume One, Section 5.0 were reviewed to determine if there were any potential disproportionate and adverse impacts to the surrounding populations. If an adverse impact was identified, a determination was made as to whether minority or low-income populations would be disproportionately affected. In the Draft EIS, two potential impacts were identified that would present a concern based on the requirements of the environmental justice initiative. The analysis of the impacts for the Final EIS have been reviewed based on comments and consultation with Tribal Nations. The result of this review has been a modification to the text of Volume One, Section 5.19 to indicate that under all of the alternatives, except No Action and Long-Term Management, certain adverse impacts to sacred sites would occur.

The final requirement of the environmental justice initiative is to mitigate any disproportionate and adverse impacts. In the EIS, mitigation measures that address the environmental justice impacts are addressed in Volume One, Section 5.20. Based on the decision documented in the ROD, DOE will prepare a Mitigation Action Plan, which will document mitigation measures to be implemented

For the Draft EIS, the analysis of human health impacts determined that minority and low-income populations would not be disproportionately and adversely impacted by TWRS actions compared to non-minority and non-low-income populations. However, one area of potential differential impacts could not be fully analyzed in the Draft EIS. This area of potential impacts, long-term risks to human health under a Native American Subsistence scenario, could not be incorporated into the Draft EIS because a methodology for the analysis had not been developed to a level sufficient to support incorporation into the EIS. Subsequent to publication of the Draft EIS, a Native American subsistence scenario has been developed for use on the Hanford Site. Following consultation with affected Tribal Nations, this scenario has been incorporated into the Final EIS. This analysis is presented in Volume Three, Appendix D and summarized in Volume One, Section 5.11. For discussion of consultations with Tribal Nations, please refer to the response to Comment number 0072.149.

Throughout the NEPA process, DOE and Ecology have been proactive in consulting with the affected Tribal Nations regarding the content of the TWRS EIS. Many substantive portions of the Draft EIS were the result of consultation with affected tribes from scoping to the publication of the Draft EIS; just as many of the changes in the Final EIS reflect consultation that has occurred since the Draft EIS was issued for comment. Consultation is a valuable part of the NEPA process. As with any intergovernmental relationship, DOE and Ecology understand that the consultation process requires improvement and will continue to work with the affected Tribal Nations to that end. A proactive consultation process results in the meaningful exchange of technical information between both parties and a shared understanding of the challenges, issues, and concerns that the agencies and Tribal Nations face as they work to improve the environment of the Hanford Site. Please also refer to the response to Comment numbers 0072.53 and 0072.271 for related discussions. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.253 *CTUIR*

Comment P H-2: Sect H.1.1: This section deals solely with Hanford employment numbers. We would also expect to see baseline information about local services (for example, school attendance and student-teacher ratios; number of emergency and enforcement personnel per capita, and so on). Various economic impact analysis methods, such as economic base models, econometrics analysis, or input/output models, would require some of this data.

Response Baseline data about local services (e.g., schools, police, and fire services) are provided in Volume Five, Appendix I (Affected Environment), rather than Volume Five, Appendix H (Socioeconomic Impact Modeling). The model used in the EIS uses the historical statistical relationship between Hanford Site employment and other socioeconomic factors (i.e., total nonfarm employment, population, and housing prices) to predict the effects of the TWRS alternatives employment on total nonfarm employment, population, and housing prices. Changes in Hanford Site employment drive the changes in these other socioeconomic aspects of the Tri-Cities area. The model outputs, in terms of future population changes, then were used to assess the TWRS alternatives potential impacts on school enrollments, police and fire services, and other local services. The assessment of impacts on these services was performed by evaluating how the additional TWRS demands on the service systems would affect their ability to meet the total demand (non-TWRS related demands plus TWRS-related demands). This element of the assessment did not involve using the socioeconomic impact model. Please refer to the response to Comment number 0072.36.

Comment Number 0072.254 *CTUIR*

Comment P H-4: Sect. H.2.0: No documentation for the 2.4 multiplier (2.4. non-Hanford jobs created/lost for each Hanford job) is provided. Various estimates have been used by local civic planners.

Response The socioeconomic impact assessment model uses the historical statistical relationship between Hanford Site employment and total Tri-Cities nonfarm employment as the basis for predicting how changes in future Site employment would affect total area nonfarm employment. The analysis of historical data shows a relationship of approximately 2.4 non-Hanford jobs created/lost (for each Hanford job). This 2.4 multiplier is in reasonably close agreement with employment multipliers used in other Site NEPA analysis. For example, the Final SIS EIS used an employment multiplier of 2.2, based on socioeconomic input/output analysis performed by PNL in 1987 and 1991 (DOE 1995i). The socioeconomic model used for the TWRS EIS also was used for another recent Hanford NEPA document, the HRA EIS. The socioeconomic model used in the TWRS EIS is the most recent model specifically designed to analyze the Tri-Cities economy and incorporated the most recent data available at the time the Draft EIS was prepared.

Comment Number 0072.255 *CTUIR*

Comment P H-6: Sect. H.2.3: There needs to be identification of the age distribution was used, only total population seems to be here.

Response The socioeconomic impact assessment model utilizes and predicts total population only. The model does not utilize or predict age distribution of the local population. Age distribution modeling would have limited utility in analyzing the relative difference in impacts among the alternatives. For the purpose of this EIS, the only socioeconomic indicator reliant on age distribution in the population would be the impact to public schools in the Tri-Cities area. For this analysis, it was assumed that the age distribution in the future population under each alternative would be the same as the present age distribution (Volume One, Section 5.6). The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.256 *CTUIR*

Comment P H-7: Sect H.2.4: This section needs to be edited to count for accident impacts.

Response The socioeconomic impact assessment model and methodology used for this EIS does not incorporate possible economic impacts of potential accidents. Language has been added to Volume One, Section 5.6 and Volume Five, Appendix H.2.4 to inform the reader that the economic impact analysis does not address potential impacts associated with accidents. The probability of an accident that would have major economic impacts is extremely low, as described in Volume One, Section 5.12 and Volume Four, Appendix E. Please refer to the response to Comment number 0072.225 for a discussion of post-remediation accident impact on Tribal Nation sacred sties and cultural resources. Please also refer to the response to Comment number 0072.34 for a discussion of economic impacts caused by accidents.

Comment Number 0072.257 *CTUIR*

Comment P H-7: Sect H.3.0: Same comment as above. (See Comment number 0072.256.)

Response Please refer to the response to Comment number 0072.256, 0072.34, and 0072.225.

L.5.7 LAND USE

Comment Number 0036.18 *HEAL (Exhibit)*

Comment EIS does not deal with most important aspect of permanent land-use commitments. According to the EIS, there are no potential implications for future land use that need to be dealt with in this EIS. This is because the EIS does not include closure decisions, and Hanford's land use plan is not done. According to the EIS, "No exclusion or restricted use zones have been defined, but this type

of land-use issue is expected to be addressed in the land use planning process for the Hanford Site that is currently underway" (p. 5-121). This is a cop-out. The decisions that will be made in this EIS have clear, far-reaching, and critical future land use implications.

The alternatives leave behind waste resulting in risks for future generations that are between significant and downright scary. Some of the alternatives result in risks that absolutely mandate land use restrictions. Potential land use restrictions are a real and important aspect of determining an alternative's impacts.

By limiting the land use commitments to essentially the amount of shrub-steppe that is torn up, the agencies ignore the important health and economic aspects of potential future land use restrictions. In dealing with deadly tank wastes, a few acres of shrub-steppe is nothing compared to keeping Hanford off-limits forever.

Response Volume One, Section 5.7 addresses three distinct land-use implications of the TWRS alternatives. These include permanent land use commitments in the 200 Areas associated with the remedial activities addressed in the EIS, permanent land use commitments in the 200 Areas associated with the potential closure scenario included in the EIS to support a comparative analysis of the alternatives, and land use commitment implications outside the 200 Areas associated with the remedial activities and potential closure scenario.

The impact analysis for commitments in the 200 Areas associated with remedial activities concluded "Temporary and permanent proposed land use commitments for remedial activities under all TWRS EIS alternatives would be consistent with past and existing land uses for the 200 Areas, as well as with proposed use of the area as an exclusive-use waste management area." These land use commitments would range from 0 to 99 acres according to which alternative was implemented and would largely consist of the tank farms and LAW disposal vaults.

For permanent land use commitments associated with the potential closure scenario presented in the EIS, the EIS concluded that land use commitments would include, "the areas that would be covered by the Hanford Barriers under all alternatives except No Action and Long-Term Management." These land use commitments would require approximately an additional 20 to 40 acres beyond those committed under that remedial phase of the implemented alternative.

For land use implications outside the 200 Areas, the EIS indicates that "Groundwater contamination has land use implications. While land uses might not be precluded because of underlying groundwater contamination, the value of land for potential future uses such as agriculture could be diminished or restricted because the underlying groundwater could not be used. Under all EIS alternatives, TWRS activities would contribute to future Site groundwater contamination."

The EIS also states that "No exclusion or restricted use zones have been defined, but this type of land use issue is expected to be addressed in the land use planning process for the Hanford Site that is

currently underway." This land use planning process, the CLUP, would consider the implications of the impacts of the TWRS alternatives in the identification of land areas requiring exclusive and/or restricted use. Thus, the information provided in the EIS is a critical part of the land use planning process and provides an important basis for future decisions. When considering the impacts of land use options associated with the TWRS alternatives, land use planners will have available for consideration an extensive amount of information regarding risks to future generations under various land use scenarios. The EIS analyzes health risks associated with alternative land uses in Volume One, Section 5.11 and Volume Three, Appendix D, including residential farmer, industrial worker, and shoreline recreational user. Since the publication of the Draft EIS, a Native American subsistence user scenario has been added to the analysis. For more information on this scenario, please refer to the response to Comment number 0072.198. The EIS also provides information regarding the implications for the waste site intruder or residential farmer who uses waste site drilling spoils site. Finally, the EIS provides data regarding the extent of groundwater contamination that potentially could result from each alternative. All risks and impacts analyzed were extended to 10,000 years into the future.

The EIS does not limit the analysis of land use commitments to "essentially the amount of shrub-steppe that is torn up." None of the land use impacts identified are based on shrub-steppe disturbance as a criteria for determining land use impacts. Rather, for temporary land use commitments, the EIS does identify the amount of land that is not currently disturbed within the 200 Areas that would be needed to support "construction and operating the alternatives and construction activities associated with closure." This land would be unavailable for alternative uses during the period of construction or operations and then after construction or operations was completed. Permanent land use commits land used for waste disposal facilities to permanent waste disposal. These areas become unavailable for alternative uses. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

L.5.8 VISUAL RESOURCES

No comments were submitted for this topic.

L.5.9 NOISE

No comments were submitted for this topic.

L.5.10 TRANSPORTATION

No comments were submitted for this topic.

L.5.11 ANTICIPATED HEALTH EFFECTS

Comment Number 0005.16 *Swanson, John L.*

Comment I would like to see the cancer risk estimates presented in the context of comparison with the cancer risk to the involved population due to background radiation and to other "naturally" occurring cancers. I would also be interested in seeing estimated values of something like "dollars per cancer prevented" for the alternatives.

Response The context requested by the comment is presented in Volume One, Sections 4.11 and 5.11, which discuss the effects of radiation on humans, including the cancer risk from exposure to natural or background radiation sources. DOE and Ecology believe that presenting estimates such as dollars per cancer prevented would be inappropriate because such estimates could be construed as a value judgment. The purpose of the EIS is to provide decision makers and stakeholders with a balanced, unbiased assessment of the impacts associated with the alternatives.

Comment Number 0072.197 *CTUIR*

Comment P D-2: Table D.1.0.1: The first bullet in the post remediation risk is unacceptable because closure was addressed within earlier sections, and the leakage is tank waste leakage, not some other form or source of leakage.

Response The existing contaminants from past practice are not in the scope of this EIS. The impact of closure is not evaluated for this EIS. DOE will conduct an appropriate NEPA review in the future (59 FR 4052). For purposes of comparing the alternatives, a single and consistent method of closure, closure as a landfill, was assumed for all alternatives. This does not mean that closure as a landfill is proposed or necessarily would be selected in the future. Volume One, Section 3.3.1 discusses the closure issue in greater detail. The leakage of tank waste during the remediation is considered in the risk assessment in this EIS. Past tank waste leaks are considered in the analysis of cumulative impacts presented in Volume One, Section 5.13 and Volume Four, Appendix F. For additional information on the relationship between closure and this EIS, please refer to Comment numbers 0072.08 and 0101.06 for discussions of the closure issue and 0030.02, 0091.01, and 0012.15 for a discussion of vadose zone contamination. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.198 *CTUIR*

Comment P D-12: Sect. 2.1.3: Please insert a subsistence Native American scenario into this section. The subsistence Native American scenario represents a Native American living on the land subsisting from all the natural resources inherent on the Hanford site. This scenario involves complete acts or activities, is assumed to have access to ground water and is assumed to live anywhere on the site or anywhere along the Columbia River.

Response In consultation with the affected Tribes, a Native American scenario has been developed and used to evaluate the post-remediation risk to a Native American user of the Hanford Site. This scenario represents exposures received during a 70-year lifetime by a Native American living on the land and subsisting on its inherent natural resources. Subsistence activities included in this scenario include hunting, fishing, and gathering of plants and materials. Pathways include those defined for the residential farmer scenario in the Hanford Site Risk Assessment Methodology (HSRAM) (DOE 1995c), plus additional pathways, such as sweat bathing, which represent activities unique to the Native American subsistence lifestyle. The ingestion rates of native foods are based on a combination of EPA-suggested intake rates (EPA 1989b), intake rates used for the Native American scenarios in the Columbia River Comprehensive Impact Assessment (Napier et al. 1996), and data obtained through consultation with the affected Tribes. A complete description of the Native American exposure scenario and the method for its evaluation have been added to Volume Three (Appendix D, Section D.2.1). Results of the post-remediation risk calculations for the Native American scenario have been added to Volume Three (Appendix D, Section D.5.0). A summary of the scenario description and the risk results have also been added to Volume One (Section 5.11.2). For related information on post-remediation accident impacts to Tribal Nation sacred sites and cultural resources, please refer to the response to Comment number 0072.225.

Comment Number 0072.199 *CTUIR*

Comment P D-14: Please insert the subsistence Native American scenario here.

Response The risk assessment for the EIS was revised in Volume One, Section 5.11 and Volume Three, Appendix D to include an evaluation of anticipated post-remediation risk to a Native American user of the Hanford Site. Please refer to the response to Comment number 0072.198 for more information on the Native American scenario.

Comment Number 0072.200 *CTUIR*

Comment P D-16: Please insert table D2.1? Exposure pathways included in subsistence Native American Scenario: Subsistence Native American Exposure factors; Subsistence Native American Summary Intake factors.

Response Three new tables containing the data and assumptions used for evaluating post-remediation exposures for the Native American scenario were added to the post-remediation methodology discussion presented in Volume Three, Appendix D, Section D.2.1.3. Table D.2.1.2 presents the exposure pathways included in the Native American scenario, Table D.2.1.3 presents the Native American scenario exposure factors, and Table D.2.1.4 presents the Native American scenario summary intake factors. In addition, please refer to the response to Comment number 0072.198 for more information on the scenario.

Comment Number 0072.201 *CTUIR*

Comment P D-23: External-exposure route shielding is spelled incorrectly.

Response The spelling error has been corrected in Volume Three, Table D.2.1.6.

Comment Number 0072.202 *CTUIR*

Comment External-other factors 'shielding' is spelled incorrectly.

Response The spelling error has been corrected in Volume Three, Table D.2.1.6.

Comment Number 0072.203 *CTUIR*

Comment Same comment as above. (see comment number 0072.202)

Response The spelling error has been corrected in Volume Three, Table D.2.1.6.

Comment Number 0072.204 *CTUIR*

Comment P D-32: The Strenge-Chamberlain 1995 reference does not differentiate between roots and leafy matter.

Response The risk calculation for all receptors indicates that the contribution of roots and leafy vegetables to the overall risk is very small compared to drinking water. This is demonstrated in the uncertainty analysis developed for the Final EIS and presented in Volume Five, Appendix K.

Comment Number 0072.205 *CTUIR*

Comment P D-33: The fish ingestion pathway should be based upon the whole fish and not just on what is considered to be 'edible' portions. For further information contact CTUIR technical staff regarding this issue.

Response The concept of edibility varies from culture to culture and Native Americans might consume portions of fish and other animals not commonly consumed by other cultures. The Native American scenario added to the Final EIS, which was developed through consultation with the affected Tribal Nations, includes pathways for ingestion of fish organs, animal organs, and wild bird meat. Intake of fish organs was accounted for by increasing the total fish muscle tissue intake by 10 percent and assuming that contaminated concentrations in fish organs were 10 times the concentrations in fish muscle tissue. Intake of animal organs and wild bird meat was similarly accounted for by increasing the total meat ingestion rate. Please refer to the response to Comment number 0072.198.

Comment Number 0072.206 *CTUIR*

Comment P D-35: Please re-look at this paragraph, it is awkward and needs to be redone in relation to recent material regarding the Chernobyl accident. Additionally, there is new information regarding genetic affects as presented in NCRP no. 116.

Response Although some epidemiological data for the Chernobyl accident are available in the scientific literature, the studies are not yet complete and the ICRP has not yet issued revised recommendations for hereditary risk factors based on Chernobyl data. The international risk community is now evaluating the hereditary effects of the Chernobyl accident by tracking the incidence of hereditary effects in the progeny of the exposed population and statistically comparing this incidence to that of a nonexposed control population. Until these studies are complete and the ICRP publishes revised recommendations regarding hereditary risk, it would not be appropriate to use Chernobyl data as the basis for an evaluation of hereditary risk.

In response to this comment, the genetic effects information in National Council on Radiation Protection and Measurement (NCRP) No. 116 has been reviewed. This information suggests that the human and animal genetic studies mentioned in the EIS might underestimate the genetic effects of ionizing radiation. The text of the EIS in Volume Three, Section D.2.1.3.3 has been modified to indicate that genetic effects might be greater than indicated by previous human and animal studies, but that the data are not sufficiently validated to permit analysis at this time.

Comment Number 0085.04 *Klein, Robin*

Comment At the same time, we must act aggressively and do what we can now to prevent further calamity and contamination. Also, the Draft EIS considers these hypothetical users over the next 10,000 years. It is ludicrous to consider such bearing uses, or to consider controls or restrictions for use of soil, groundwater, whatever, so many years hence. Therefore we have a responsibility, an obligation to clean up the site to the fullest extent possible, and as aggressively as we can to reduce spread and impact of the contaminants.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Consideration of land uses over long periods of time extending into the future was carried out for purposes of comparing alternatives that would have impacts far into the future. The alternatives evaluated represent a reasonable range of alternatives for accomplishing the TWRS mission. Long-term impacts are calculated to support the decision-making process. The EIS also presents short-term impacts associated with implementation of the alternatives and within the 100-year administrative control period. Both long-term and short-term impacts are presented to provide the public and the decision makers with information on environmental and human health impacts that support the comparison of the impacts among the alternatives. Because both short- and long-term impacts are provided, no change to the document is warranted.

Comment Number 0085.05 *Klein, Robin*

Comment For the record, the anticipated numbers of cancers and fatalities in the Draft EIS that would result from various scenarios and alternatives are a subject of scientific and political controversy in and of themselves, and should not be taken as absolute in this Draft EIS, but rather as relative measures.

Response The risk calculations were performed to support the impact assessment and comparison of alternatives. These risks were not intended and should not be interpreted to represent absolute risks. The Final EIS in Volume One, Section 5.11 and Volume Three, Appendix D presents ranges of risk for each alternative, which provides a better estimate of the potential risks associated with each alternative. For the Final EIS, an expanded uncertainties analysis has been incorporated in Volume Five, Appendix K. This analysis addresses the nominal bounding risk estimate.

L.5.11.1 Remediation Risk

Comment Number 0005.56 *Swanson, John L.*

Comment One page 5-154 it is said that the cesium and strontium capsules contain no nonradiological chemicals. This is not true; they contain nonradioactive isotopes of cesium and strontium as well as stable isotopes produced on decay of the radioactive isotopes, and also the added chloride and fluoride. (On page 6-22 it is said that these capsules contain hazardous, characteristic, and/or listed wastes).

Response Wording to clarify that the capsules contain chloride, fluoride, and decay products (barium-137 and zirconium-90), in addition to the cesium and strontium, has been added to Volume One, Section 5.11. Risk from nonradiological chemicals during remediation was not evaluated because no nonradiological chemical emissions are associated with any of the capsule alternatives. Wording to clarify this point has also been added to Volume One, Section 5.11.

Comment Number 0028.01 *DHHS*

Comment The Draft EIS TWRS section dealing with potential adverse human health effects resulting from environmental releases of radioactive or hazardous materials, Volume Three and Appendix D, appears to be well developed and comprehensive:

1) Radiological and hazardous waste exposures to the public from treatment, storage, and disposal operations were estimated using information on waste loads (source terms) and potential at-risk years. Exposure modeling included meteorological data, hydro-geologic data, and potential release scenarios that included both facility and transportation accidents. Pathway modeling included use of GENII-S environmental modeling code. The function and source of each model type are well documented.
2) Risk estimate endpoints for the public included a) cancer incidence from radionuclide and chemical exposures, b) cancer fatalities from radionuclide exposure, c) adverse effects from transportation and/or transportation accidents.

3) Risk from radiological exposures were estimated using ICRP 60 risk factors. The uncertainties in the risk analysis procedure included model uncertainty, scenario uncertainty, and parameter uncertainty (sampling error, data sources).
4) The risk to public health from the transportation and storage of DOE waste materials, as expressed by the Draft EIS TWRS are reasonable.

Response DOE and Ecology acknowledge the comments concerning risk assessment. In response to public comments, the risk assessment has been enhanced by adding a Native American scenario to the evaluation of anticipated post-remediation risk and the analysis and presentation of risk ranges to request uncertainties. Please refer to the response to Comment number 0072.198 for a discussion of the Native American scenario and Comment number 0085.05 for a discussion of risk ranges.

Comment Number 0069.08 *Pollet, Gerald*

Comment Next, it is wrong to assume that the public in the near term, that is between now and the year 2028, will remain at the Site boundary in calculating risks. Even if you use the Site boundary, the risk calculations are out of date, and fail to consider risks from people using the river, and the new residences that are far closer than the previous north Richland case used.

Response The risk assessment in the Draft EIS addressed users of the Columbia River, the Fitzner Eberhardt Arid Lands Ecology Reserve, and areas of the Hanford Site north of the Columbia River. This information is presented in Volume One, Section 5.11 and Volume Three, Appendix D. The risk assessment in the Draft EIS does not use north Richland as the Site boundary. Rather, the assessment uses a modified boundary, which includes areas likely to be released by DOE in the near future. The maximally-exposed individual receptor is assumed to be located much closer to TWRS contamination sources than north Richland. The site boundary and receptor locations are discussed in Volume Three, Section D.2.2.3. Potential changes in onsite and offsite population and its effect on the risk calculation are addressed in the uncertainties discussion in Volume Five, Appendix K, which has been added to the EIS.

Comment Number 0069.09 *Pollet, Gerald*

Comment Third, the EIS must clearly show the risk from releases and explosions during the remediation period for each alternative. It's important that you show and use a conservative assumption as to the impact of delay. Throughout the EIS, in determining costs, you use a 40 percent cost contingency factor. In other words the costs are inflated just 40 percent as a contingency. Risk is a function of time, and what is amazing is that there is no contingency factor for time throughout this EIS in calculating risks. So we say that a plant will run 4 years, because that's the design basis for Phase 1 plant. Well if we have a 40 percent contingency for cost, one would also rationally say we might want to have a 40 percent contingency in terms of delay for that same plant. Therefore we have to re-calculate the risks.

Response Risks from releases during remediation were addressed in the Draft EIS in Volume One, Section 5.11 and Volume Two, Appendix D and remediation accidents, including explosions, were addressed in Volume One, Section 5.12 and Volume Four, Appendix E. The EIS analysis used bounding assumptions in analyzing health and accident impacts. A 60 percent efficiency factor was calculated into the remediation operations for each alternative. This assumption is presented in Volume One, Section 3.4.1. This is reflected in the length of operation time for each alternative in the TWRS EIS, and therefore, provides a contingency in the schedule. The probability of an accident (which would drive the risk) is based on the operation duration with the 60 percent efficiency factored in. Based on the assumed efficiency factor, the substance of the comment's suggestion that the EIS use a conservation estimate for facility operations has already been incorporated into the analysis, and therefore no change to the document is warranted. Please also refer to the response to Comment numbers 0072.225 and 0069.09 for discussions of accident risk during remediation and the 100-year administrative period.

Comment Number 0072.17 *CTUIR*

Comment For each scenario, the airborne release fraction (ARF) and respirable fraction (RF) should be presented separately, not as a single factor, because the nonrespirable fraction would be the fraction that deposits.

Response The airborne release fraction (ARF) and respirable fraction (RF) for planned atmospheric releases, such as would occur during routine TWRS remediation operations, would be the same. This is because planned releases would pass through a filtration system and all particulates that escape the filter would be in the respirable size range. Nevertheless, these particulates would eventually deposit, although they would stay suspended for long periods of time and be dispersed over large areas. The exposure calculation accounts for the contribution from these deposited particles. Please refer to the response to Comment numbers 0072.250, 0072.251, and 0072.17 for related information. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.207 *CTUIR*

Comment P D-87: Ground releases resulting in contaminant error concentrations would result in exposure to subsistence Native Americans.

Response The receptors evaluated for the remediation risk assessment (involved worker, noninvolved worker, and general public) were selected to represent a reasonable range of plausible onsite and offsite exposure scenarios that could arise during the construction and routine operational phases of the TWRS program. Because use restrictions and administrative controls would be in place at the Site throughout the remediation period, an onsite Native American scenario is not plausible. Plausible onsite exposures would be to the TWRS workers and noninvolved workers having access to the Site routinely during the remediation period.

Although an offsite Native American scenario is plausible during remediation, the exposures for such a scenario would not differ appreciably from the exposures presented in Volume Three, Section D.4.0 for the general public. This is because the inhalation pathway, which dominates all other pathways in the offsite remediation risk calculation, does not vary between the Native American scenario and the general public scenario. Because the remediation risk for the general public provides a reasonable approximation of the risk to the Native American, risk during remediation to the Native American has not been calculated separately and the EIS has not been changed. For a discussion of inhalation exposure for onsite receptors, please refer to the response to Comment number 0072.29, and for a discussion of inhalation impacts during remediation associated with sacred sites please refer to Comment number 0072.247.

The onsite Native American scenario, although not plausible during remediation, is considered plausible for the period following remediation. DOE and Ecology have developed a Native American scenario in consultation with the affected Tribes. This scenario has been added to the analysis of post-remediation risk presented in Volume Three, Appendix D and Volume One, Section 5.11.2 of the EIS. Please refer to the response to Comment number 0072.198.

Comment Number 0072.208 *CTUIR*

Comment P D-89: Sect. D 4.2.2: Please indicate what fraction of the Hanford site permit would be the allowable admission rates for the tank farms tank waste retrieval and evaporators.

Response At this time, it is not known what alternative will be implemented, and potential emissions associated with tank waste disposal actions are not covered by existing permits. Once the decision is made, the applicable permits would be obtained including possible revision or amendment of existing permits. Volume One, Section 6.0 discusses possible permitting necessary for implementation of the different alternatives. The chemical emissions for each of the alternatives are presented in Volume Five, Appendix G and are compared with the applicable Federal and State standards or permissible levels. Please refer to the response to Comment numbers 0072.243 and 0072.246 for related discussions. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.209 *CTUIR*

Comment P D-102: PP2: Please change dilution to dispersion.

Response Dilution has been changed to dispersion in the discussion of transport for this and all other alternatives in Volume Three, Section D.4.1 through D.4.9.

Comment Number 0072.210 *CTUIR*

Comment P D-105: What portion of each tank is expected to volatilize during gravel filling. As the tanks liquid is displaced by the gravels mass, raising the liquid level and disturbing the settled contents, a portion of the tanks contents can be assumed to exhale.

Response Tank emissions during gravel filling were calculated and included in the impact assessment. Emission data are provided in Volume Five, Section G.3. Additional technical data are provided in the Administrative Record for the TWRS EIS and are available for public review in the DOE Reading Rooms and Information Repositories locations listed in Volume One, Section 7.0. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.211 *CTUIR*

Comment P D-118: Sect. 4.1.1: Please indicate what portion of the overall source term is represented by the tanks contents.

Response One hundred percent of the source term is from the tank contents as presented in Volume Two, Appendix A. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.212 *CTUIR*

Comment P D-268: Sect. D.4.14: The mention of accumulation of contaminants in food products indicates that there may have been discussion of Native American food products. Please indicate when and where you have consulted with the affected Tribes regarding this topic.

Response The cited statement refers to a generic source of food products used for the remediation risk analysis. The remediation risk assessment in the Draft EIS addresses risk to the TWRS worker, the noninvolved worker, and the general public, but does not specifically address risk to a Native American receptor. Risk to a Native American receptor during the remediation period would be dominated by the inhalation pathway. For this reason, it would be similar to the risk presented in Volume Three, Appendix D, Section D.4.0 for the general public. The discussion of uncertainty in the risk assessment has been moved from Volume Three, Appendix D to a new Volume Five, Appendix K.

In response to Tribal Nations comments, DOE and Ecology have consulted with the affected Tribes and have developed a Native American scenario for inclusion in the post-remediation risk assessment for the Final EIS. The analysis of post-remediation risk to the Native American receptor has been added to Volume Three, Appendix D, Section D.5.0. Please refer to the response to Comment numbers 0072.149, 0072.55, 0072.198, 0072.207, and 0072.225 for more information on this topic.

Comment Number 0072.213 *CTUIR*

Comment P D-271: PP1: The consideration that age dependence is not expected to be as important as other factors is unacceptable to the people of the CTUIR whose very lives depend on the health and safety of their elders.

Response The statement regarding age dependency pertains to the internal dose calculation and its sensitivity to the overall dose and risk results. The statement "Age-dependent variations are considered to be less important because the generally higher internal dose factors (ICRP 1975) for the lower age groups are offset by lower breathing and food consumption rates" does not support or oppose the risk response for low or high age groups. For clarity, this sentence has been changed in Appendix D to read "Age-dependent variations are considered to be less sensitive..." In addition, the exposure duration for the Native American scenario added to the risk assessment assumes 70 years instead of the 30 years used for the other receptor scenarios. Please refer to the response to Comment number 0072.198 for related information. The information requested in the comment represents a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.214 *CTUIR*

Comment P D-272: PP 2: This paragraph is confusing, where was the total population evaluated?

Response The population for the onsite and offsite risk calculations is presented in Volume Three, Tables D.2.2.3 and D.2.2.4, respectively.

Comment Number 0090.05 *Postcard*

Comment Please listen to us say no:
I urge USDOE and the State of Washington to fully calculate the risks of explosions and leaks from any delay in vitrifying these wastes.

Response For a discussion of the relationship between closure, including past tank leaks, please refer to the response to Comment numbers 0012.15, 0072.08, 0101.05, and 0101.06. The risk of tank deflagrations and explosions has been further analyzed by DOE and Ecology for the Final EIS. The results of the new analysis have been incorporated into the Final EIS in Volume Four, Sections E.2.2, E.3.3, E.4.3, E.5.3, E.6.3, E.7.3, E.8.3, E.9.3, E.10.1, and E.10.2. A bounding risk from delay in vitrifying these wastes is presented in Volume Four, Section E.2.2 where the risk is shown from accidents that could result if vitrification is delayed indefinitely under the No Action alternative. Please refer to the response to Comment numbers 0069.10, 0069.12, and 0081.07 for more information regarding risk analysis relative to delays in remediation.

L.5.11.2 Post-Remediation Risk

Comment Number 0009.02 *Broderick, John J.*

Comment Potential health effects must be reasonable--not zero. There is not enough money to try to clean Hanford so completely that there will be no health impacts. For this reason, the remediation of the tank waste must permit leaving some waste in place with reasonable number of potential health effects.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. The risk assessment is intended to provide an unbiased analysis of the anticipated health effects associated with the alternatives, and health effects are only one of many impacts analyzed in the EIS.

Comment Number 0012.17 *ODOE*

Comment Risk Assessment
The risk assessment in the EIS is sufficient to support the proposed action. We do not believe it is sufficient to support any decision which would leave waste in Hanford tanks.

The risk assessment shows long-term substantial environmental and public risks across most of the Hanford Site. The uncertainty in these estimates is so large, we believe the risk assessment should therefore not be relied upon or used as a decision making tool to micro-manage cleanup. It should only be used as a rough measure of the relative effectiveness of the various alternatives at reducing risks. The risks shown are large and justify complete removal and vitrification of all tank wastes.

The risk assessment shows great risk reduction from ISV. It does not however, include the large uncertainty in the technical feasibility of this alternative. ISV has only been demonstrated to a depth of 15 feet in soil. It has not been demonstrated for the depth and areas required for ISV of tank wastes. The risk assessment gives no indication a large uncertainty exists for this alternative. The uncertainty this creates in the ultimate risks is too large for this to be considered a viable alternative.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

The risk assessment was conducted to support a comparison of alternatives rather than to determine the absolute risk associated with a particular alternative. Health effects are but one of many impacts considered in selecting the preferred alternative.

DOE and Ecology understand the concern regarding uncertainty and have identified the need to provide additional information in the EIS to clarify the sources and magnitude of uncertainty in the risk calculations. Further uncertainty analysis has been completed and presented in the EIS in Volume Five, Appendix K. Issues concerning uncertainty in the implementability of the ISV alternative are discussed in Volume One, Section 3.4 and Volume Two, Appendix B. The ISV design is recognized as being conceptual in nature and having a high degree of associated uncertainty.

Comment Number 0036.12 *HEAL (Exhibit)*

Comment Risk from tank waste may be underestimated.
For the preferred alternative, the risk calculations assume that 99 percent of the waste will be retrieved. HEAL supports this assumption and the goal of total retrieval. However, it is unlikely that fully 99 percent will actually be retrieved given current and reasonably foreseeable technologies. Therefore, the risk may actually be much greater due to a larger amount of waste left in the tanks. This is not a request to change this assumption. Rather, it is a point stressing the importance of retrieving all the waste.

Response As is pointed out in Volume Four, Appendix F, Section F.2, the goal of the Tri-Party Agreement is to leave no more than 1 percent of the waste in the tanks after retrieval. Until waste from a sufficient number of tanks has been retrieved, it is not known whether the residual content will be greater or less than the goal of the Tri-Party Agreement. The amount and type of waste that would remain in the tanks after retrieval is also uncertain. The engineering data for the waste retrieval and transfer function common to all ex situ alternatives were developed using 99 percent retrieval as a goal. This information is presented in Volume One, Section 3.4 and Volume Two, Appendix B.
The retrieval assumption also included a conservative assumption that the 1 percent residual would be as soluble as the 99 percent retrieved from the tank. This assumption provides a bounding case for impacts to groundwater and health risks under conditions where less that 99 percent of the waste is retrieval. Please refer to the response to Comment numbers 0005.18, 0089.07, 0072.59, and 0076.01 for related information. Because of the uncertainties associated with waste retrieval and the assumptions used in the EIS to bound the impact analysis, no change to the document is warranted.

Comment Number 0036.19 *HEAL (Exhibit)*

Comment Risk confirms importance of this program.
The high human health risks posed by all of the alternatives emphasize the importance of the Hanford tank waste disposal program. While the uncertainty involved with the EIS's risk calculations is high, the calculations still serve as a rough guide to future health risks.

The EIS shows that the human health risks are directly related to the amount of tank waste left behind. Assuming only 1 percent of the waste is left behind still leaves the farmer at 10,000 years with a 3 in 10,000 chance of cancer. The risk resulting from tank waste being left behind is demonstrated by the Ex Situ/In Situ Combination alternative in which 90 percent of the contaminants are removed by

retrieving 50 percent of the waste volume. The risks resulting from this alternative for the farmer at 10,000 years are 3 in 1,000 -- an increase of an order of magnitude over the ex situ alternatives.

The reduction in risk gained in removing 99 percent of the contaminants as opposed to 90 percent shows the importance of the tank waste treatment and disposal program.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

Comment Number 0038.04 *Reeves, Merilyn*

Comment It has also been assumed that the Hanford tank wastes pose a great risk to future generations. And this EIS confirms that assumption.

The EIS shows that the future risk is directly correlated to the amount of waste left behind in the tanks.

The impact of leaving only a small amount of contamination behind is evidenced by the difference in long-term risk for the preferred alternative, where one percent of the waste is left in the ex situ, in situ alternatives, where there is 10 percent left behind, and by leaving nine percent more waste the risk for the residential farmer in 5,000 years increases the factor by 10. These clearly show that the only responsible solution is to retrieve all the waste.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

Comment Number 0040.03 *Rogers, Gordon J.*

Comment I reject dangers to hypothetical intruders as not a realistic concern (for the In Situ Fill and Cap alternative); which is also connected to the administrative control assumption.

Response It is common for purposes of NEPA assessment to assume that government agency administrative controls will end after a period of 100 years. In the absence of administrative controls, there is a probability of inadvertent human intrusion into the waste remaining onsite. To assist in differentiating between the alternatives, and to provide a more complete picture of the health risks posed by leaving waste onsite, the risk assessment included a hypothetical intrusion scenario. The scenario analyzed, well drilling, was considered the most likely intruder scenario. The probability of occurrence of this scenario is evaluated in the uncertainty analysis presented in Volume Five, Appendix K. Please refer to response to Comment number 0101.01 for a related discussion.

Comment Number 0041.02 *Berry, Bill*

Comment On Appendix D, the long-term analysis of risks, which unavoidably involves uncertainty to the point of being meaningless, assumes that a large industrial facility of 2,200 workers might exist on the Site in the future. The analysis then assumes that the facility would have a land use area of 785 sq. km., yielding a population density of 2.81 individuals/sq. km. Although this analysis may produce a type of average risk assuming the facility could be randomly located anywhere within the 785 sq. km. area (the facility clearly would not require anything near the entire area), a better approach would be siting the facility within the area of highest risk. This approach would provide a bounding estimate of risks to workers in the vent that the future industrial facility was located at the worst possible location.

Response The uncertainties regarding the risk assessment are presented in Volume Five, Appendix K, which has been added for the Final EIS. The industrial worker scenario is not land-area dependent; therefore, in calculating the total risk to the industrial worker, the population density of 2.81 and land use area of 785 km^2 were not used. As discussed in the response to Comment number 0041.03, population density and land use area were needed only for the residential farmer calculation. Volume Three, Table D.5.14.1 has been modified to show that population density and area of land use are not applicable to the industrial scenario. Please refer to the response to Comment number 0012.17.

The comment suggestion regarding the assumed siting of the industrial facility was considered. In response to this comment, the risk to the industrial worker has been recalculated assuming the facility is located in the area of highest risk. The text in Volume Three, Section D.5.14, has been modified to reflect the revised assumption.

Comment Number 0041.03 *Berry, Bill*

Comment In Table D.5.14.1 the population density for the recreational scenario appears incorrect (1950/104=18.75). I did not check the calculated incidence and fatalities to determine the population density that was used in the calculation. Those numbers should be checked or an explanation of why the lower population density was used should be provided as a footnote with the table.

Response The population density value given in Volume Three, Table D.5.14.1 for the recreational scenario was in error and has been changed. However, the cancer incidence and cancer fatality calculations are correct. To perform these calculations, a value for receptor population was required for each scenario. For the residential farmer scenario, a population estimate was not available; therefore, the population was calculated by multiplying an assumed population density by the Hanford Site area. Population estimates were available for the other scenarios; therefore, a population density was not needed. Population densities are shown in the table for all scenarios for the sake of consistency. The text in Volume Three, Section D.5.14 has been modified to clarify how population density was used in the calculations.

Comment Number 0055.07 *Martin, Todd*

Comment Moving off of costs, the risks that we see in the EIS are profoundly troublesome to me and I think they under estimate the actual risk. This is not something that I think should be changed, but I think it should be noted. 99 percent retrieval is probably a dubious assumption. It is the correct assumption and it is where we should be going but we are probably not going to get there. In addition, if sluicing does result in more leaked waste we can expect to see much higher risks when you are seeing a residential scenario 10,000 debt years down of three in 10,000 cancer rate with only 1 percent of the waste left behind. Imagine what it is for 2 percent, 3 percent, or maybe 10 percent.

Response As discussed in Volume One, Sections 3.3.1 and 3.4.1, there are many technical uncertainties associated with the alternatives for remediating tank waste. Although the design information for these alternatives is an early planning stage, the technologies represented are considered sufficient to bound the range of viable technologies that are applicable to tank remediation. For purposes of analysis, 99 percent retrieval efficiency was considered a reasonable assumption for the ex situ alternatives. Please refer to the response to Comment number 0036.12 regarding tank waste retrieval assumptions and Comment numbers 0005.18, 0089.07, 0072.59, and 0076.01 for additional discussions regarding the 99 percent retrieval assumption.

Because of uncertainties regarding the amount and type of residual waste that would remain in the tanks, it was assumed for the ex situ alternatives that the residual waste would contain 1 percent of all constituents in the original tank inventory, including the water-soluble constituents. In actuality, the residuals would contain less of the water-soluble constituents because they would be preferentially retrieved through sluicing. The assumption that 1 percent of the water-soluble waste remains in the tanks thus provides an upper bound on the impacts associated with the ex situ alternatives. The In Situ Fill and Cap and Ex Situ/In Situ Combination 1 and 2 alternatives leave more waste in the tanks and provide an upper bound on the impacts associated with the amount and type of waste disposed of onsite. Additional discussion of the uncertainties surrounding retrieval are presented in Volume Five, Appendix K.

Regarding leaks during sluicing, the predicted groundwater contaminant concentrations used for the risk analysis in the Draft EIS were calculated assuming that SSTs leaked a volume of 15,000 liters (4,000 gallons) per tank during retrieval. Detailed discussion of the tank release assumptions used for the groundwater modeling effort is presented in Volume Four, Appendix F, Section F.2.2. For additional discussion regarding this assumption, please refer to the response to Comment numbers 0029.01, 0030.03, and 0072.75.

Comment Number 0069.03 *Pollet, Gerald*

Comment This is a long-term risk scenario where the risks to people in this area here from groundwater contamination are essentially 1 person dies out of every 100 exposed. And that is without taking into account the type of assumption that should be made for leaks today. That means, the risks

are far greater if we leave any tank waste in-place. Call it in situ capping, it's gravel, folks. It's cemented gravel on top of it. It will reach groundwater.

Response For the No Action, Long-Term Management, and In Situ Fill and Cap alternatives, the maximum anticipated post-remediation risk (incremental lifetime cancer risk) reaches levels as high as 1 in 100. However, as shown in Volume One, Table 5.11.4, the post-remediation risk for the other alternatives is anticipated to be less (i.e., no risk or risk less than 1.0E-06).

Impacts associated with past leaks from the tanks, based on data that became available following publication of the Draft EIS, are addressed in Volume Four, Appendix F and in the cumulative impacts discussion in Volume One, Section 5.13. For more information related to this issue please refer to the response to Comment numbers 0012.05, 0030.02, and 0091.01.

Comment Number 0069.06 *Pollet, Gerald*

Comment Now I come to the issue of risks. The, I'm going to turn this off, Environmental Impact Statement makes a number of assumptions about risks that are clearly erroneous, and out of date as well. First, it apparently uses a recreational exposure scenario for calculating risk, which we have criticized repeatedly recently, of the public using the Columbia River just 56 hours a year. It is ludicrous. In fact, we believe that a rational scenario for recreational exposure is 1,040 hours a year. The risks shown for recreational exposure, and I want to remind everyone that and for the record remind everyone that risk is a function of time, therefore the risks presented for these scenario's are 18 times too low.

Response The exposure scenarios used in the risk assessment were based on the recommendations published in the HSRAM (DOE 1995c). These recommendations have been approved by the signatories to the Tri-Party Agreement for use in Hanford Site risk assessments. In the case of the recreational shoreline user scenario, the HSRAM scenario was modified to increase the exposure duration from one week to two weeks for 30 years. This provided a more bounding estimation of risk than would have resulted from using the HSRAM scenario and is considered by DOE and Ecology to be appropriate. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0069.07 *Pollet, Gerald*

Comment Second point as to this exposure scenarios along the Columbia River, folks where is the Native American Treaty Right usage? It is not presented here. That is a usage, guaranteed by the Treaty of 1855, which one can rationally assume will be asserted during this timeframe, and which allows Native American treaty right tribes to live along this area of the Columbia River, and to gather foods and fish in the usual accustomed places while living along the river for extended periods of time.

Response Please refer to response to Comment numbers 0072.37, 0072.198, 0072.252, and 0072.225 for discussions of the analysis of impacts in response to Comments submitted by Tribal Nations regarding treaty rights, cultural resources, and future land use.

Comment Number 0072.18 *CTUIR*

Comment No Native American exposure scenario is included. During the revision of the EIS, if such a scenario is added, it *must be preceded by consultation with CTUIR.*

Response The risk assessment for the EIS has been revised to include an evaluation of anticipated post-remediation risk to a Native American user of the Hanford Site. The scenario used for the analysis was developed through consultation with representatives of the affected Tribes. Please refer to the response to Comment number 0072.198 for more information on the Native American scenario. For impacts associated with post-remediation accidents, refer to the response to Comment number 0072.225.

Comment Number 0072.19 *CTUIR*

Comment Deposition of particulates was not included.

Response The size of the particulates released during remediation would be very fine. These particulates would stay suspended in the atmosphere for long periods of time and would be transported over very large distances. A typical deposition velocity for particulates dispersed in the atmosphere is 1.0E-03 m/s. The post-remediation risk from deposition of particulates released to the atmosphere during remediation is very small. This risk is 3 to 4 orders of magnitude smaller than the inhalation risk during remediation. Anticipated health risk during and after remediation is contained in Volume One, Section 5.11, and Volume Three, Appendix D. Air quality issues are discussed in Volume One, Section 5.3. Please refer to the response to Comment numbers 0072.32 and 0072.240. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.20 *CTUIR*

Comment Genetic effects must be included, both for individual generations and for multiple generations.

Response The health effects endpoints used for the risk assessment (cancer incidence and cancer fatalities) were selected for consistency with other EISs prepared by DOE and with the endpoints used for the accident analysis presented in Volume Four, Appendix E. Cancer incidence and cancer fatalities are the endpoints commonly used for NEPA reviews, where the purpose of the assessment is to compare impacts among alternatives rather than to calculate absolute risks. A calculation of hereditary effects would not affect the ability of the decision makers and stakeholders to discriminate

among the alternatives, because the results of the calculations would provide data that would support the same understanding of the relative difference among alternatives as does the existing calculation of cancer occurrences and cancer fatalities. For this reason, the decision to omit consideration of genetic risk from the EIS is considered appropriate, and the EIS has not been changed. The anticipated hereditary effects associated with the alternatives may be calculated by multiplying the radiological doses (rem) presented in Volume Three, Appendix D by the dose-to-risk conversion factor of 1.3E-04 (genetic risk per rem) published by the ICRP in 1991. Please refer to the response to Comment number 0072.206.

Comment Number 0072.21 *CTUIR*

Comment Existing soil and groundwater contamination was not included in the source term.

Response Existing soil and groundwater contamination are not included in the scope of the TWRS program and were specifically excluded from consideration in this EIS. However, existing soil contamination is addressed, in terms of its cumulative impacts with the TWRS alternatives in Volume One, Section 5.13 and Volume Four, Appendix F. Please refer to the response to Comment numbers 0030.02, 0072.08, 0012.15, 0091.01. Because the analysis requested in the comment is not within the scope of the EIS, no modification to the document is warranted.

Comment Number 0072.22 *CTUIR*

Comment No evaluation of socio-cultural quality of life was included.

Response Volume Three, Appendix D is the technical support document for analyzing remediation and post-remediation health risks to human health and ecological and biological resources. This appendix does not and was not intended to provide an assessment of quality-of-life issues. The human health analysis presented in Volume Three, Appendix D is summarized in Volume One, Section 5.11. Impacts to ecological and biological resources are summarized in Volume One, Section 5.4.

To the extent that impacts to human health and biological and ecological resources are an indicator of the socio-cultural quality of life, the relative differences in impacts reported in Volume One, Sections 5.11 and 5.4 provide the public and decision makers with information on which a comparison among the alternatives may be formed. This same statement would apply to all areas of impact assessment summarized in Volume One, Section 5.0. In addition to human health and ecological and biological impacts, Section 5.0 documents potential impacts by alternative to geology, air quality, water quality, land use, biological and ecological resources, the economy, public services, and visual effects, among others. In total, the analysis presented in Section 5.0 represents the potential impacts of the alternatives on the human and natural environment and hence on the socio-cultural quality of life.

The broad range of data regarding potential impacts are presented in the EIS so that the public, agencies, Tribal Nations, and decision makers can be aware of potential impacts during the decision

making process. It is the role of each of these participants in the decision making process to compare the impacts and apply their values when determining which among the factors that will influence the selection of the alternative to be implemented should be considered in comparison to other factors. The role of the EIS is to objectively present alternatives, provide a comparison of impacts among alternatives, and provide an opportunity for public, agency, and Tribal Nation participation in the NEPA process. Please refer to the response to Comment numbers 0072.37, 0072.53, 0072.271, and 0072.252. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.23 *CTUIR*

Comment For ecological evaluation, instantaneous dilution in the River is unacceptable.

Response The ecological impact analysis presented in Volume One, Section 5.4 and Volume Three, Appendix D does not assume instantaneous dilution of groundwater reaching the Columbia River. Potential hazards were estimated for direct exposure to the groundwater before dilution, with organisms using no other water source. Please refer to the response to Comment number 0072.217 for a discussion of dilution factors used in the analysis. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.24 *CTUIR*

Comment The ecological dose limits need to be revised (terrestrial is more protective than aquatic), and the ecological Hazard Indexes (HI) that were developed for the EIS need to add a safety factor for sensitive life stages.

Response The ecological radiation dose limits used for terrestrial and aquatic receptors are consistent with those recommended by the International Atomic Energy Agency (IAEA) (IAEA 1992) and NCRP (NCRP 1991), respectively. IAEA states that "It would appear that chronic does of 1 $mGyd^{-1}$ or less to even the more radiosensitive species in terrestrial ecosystems are unlikely to cause measurable detrimental effects in populations and that up to this level adequate protection would therefore be provided....In the aquatic environment it would appear that limiting chronic dose rates to 10 $mGyd^{-1}$ or less to the maximally-exposed individuals in a population would provide adequate protection for the population" (1$mGyd^{-1}$ equals 0.1 rad d^{-1}, and 10 mGy d^{-1} equals 1.0 rad d^{-1}, the units used as benchmarks in the text) (IAEA 1992). NCRP (NCRP 1991) addresses aquatic organisms only and concurs with the 1.0 rad d^{-1} value used as a benchmark in the EIS.

It is unclear what safety factor would be appropriate to protect sensitive life stages. The ecological hazard indexes (HIs) used in the EIS to estimate potential hazards from nonradioactive chemicals are conservative in that they are based on high exposure parameter exposures. For example, the No Action alternative analysis assumes direct contact with stored wastes, which is highly unlikely. Adding a safety factor to the HI in this scenario would not alter the conclusion in the EIS that such exposure

would be lethal. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.54 *CTUIR*

Comment Hypothetical Future Land Users should include specific Native American usage scenarios - these are not "hypothetical" but inevitable.

Response The risk assessment for the EIS has been revised to include an evaluation of anticipated post-remediation risk to a Native American user of the Hanford Site. The land use scenarios analyzed in the risk assessment are referred to as hypothetical in the sense that they would not occur until TWRS activities and other remediation activities outside the scope of this EIS are completed. Please refer to the response to Comment number 0072.198 for information on the Native American scenario.

Comment Number 0072.215 *CTUIR*

Comment P D-274: Sect. D.5.0: It is noted that there is no Native American scenario. Please insert a Native American scenario after consultation with affected Tribes.

Response The risk assessment for the EIS was revised to include an evaluation of anticipated post-remediation risk to a Native American user of the Hanford Site. The scenario used for the analysis was developed through consultation with representatives of the affected Tribes and the results of the analysis are presented in Volume One, Section 5.11 and Volume Three, Appendix D. Please refer to the response to Comment number 0072.198 for more information on the Native American scenario.

Comment Number 0072.216 *CTUIR*

Comment P D-275: Sect. D.5.1: Please insert MUSTs after DSTs.

Response The text of Volume Three, Section D.5.1 has been changed as requested in the comment.

Comment Number 0072.217 *CTUIR*

Comment P D-276: PP4: What exactly is the dilution factor used here? In addition, all contaminates in the ground water must be evaluated in the surface water.

Response As stated in the referenced paragraph (Volume Three, Section D.5.1.2), the dilution factor used is 1.21E-04. This factor indicates that a groundwater plume intersecting the river with a concentration of 1.0 Ci/L will produce a surface water concentration of 1.21E-04 for the entire Columbia River (from Hanford to the Pacific Ocean). Not all contaminants were addressed because some contaminants are not mobile in groundwater. The analysis addresses those groundwater contaminants that are the most mobile and contribute appreciably to risk. The transport of

contaminants from tanks to groundwater and surface water is discussed in Volume Four, Appendix F. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.218 *CTUIR*

Comment P D-277: Sect. D.5.14: PP4: There are no risk free areas, please indicate exactly what this means.

Response This paragraph was included to explain why "holes" appear in the risk distributions on certain risk contour plots. These "holes" appear as white areas that have risk values less than the minimum contour interval (i.e., less than 1.0E-06). They are not risk free but have less risk than lowest value contoured. The text in Volume Three, Appendix D has been modified to clarify this point.

Comment Number 0072.219 *CTUIR*

Comment P D-279: PP 1: The surface water exposures should have been calculated for all constituents, not just five using an unknown dilution factor.

Response All the constituents are used in the analysis, but only five constituents (i.e., carbon-14, technetium-99, iodine-129, neptunium-237, and uranium) with high mobility (low K_d) will contribute appreciably to risk within the 10,000-year time period. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0072.220 *CTUIR*

Comment P D-284: Sect. D.5.6.1: Other sources that should be evaluated here should include tank leakage, because the one percent if left in the tanks will add to the current leakage inventory and continue to migrate just as current leakage inventory does.

Response The effects of contamination from past activities are not within the scope of the EIS but will be addressed in a future NEPA analysis on tank farm closure. Please refer to the response to Comment number 0072.08. The potential cumulative impacts of past tank leaks, TWRS alternatives, and other Site actions are addressed in Volume One, Section 5.13 and Volume Four, Appendix F. Because the analysis requested in the comment is not within the scope of the EIS, no modification to the document is warranted.

Comment Number 0072.221 *CTUIR*

Comment P D-432: Sect. D.6.2.2: Ecological effects that should be documented here include loss of habitat, disintegration of habitat, loss of diversity.

Response Loss of habitat, disintegration of habitat, and loss of diversity are examples of the "variety of potential indirect effects on other ecological variables" mentioned in the text of Volume Three, Section D.6.2.2. These items have been added to the text of the methods and results sections for clarification. The following sentences have been added to Volume Three, Section D.6.

"Examples of potential indirect effects include decreased biodiversity, habitat loss or alteration, and impacts on productivity and nutrient turnover. Any direct effects on individual organisms exposed to stored wastes could lead to a variety of indirect effects on the ecosystem, including decreased biodiversity, habitat loss or alteration, and impacts on productivity and nutrient turnover. Since the direct impacts of air and groundwater exposure are estimated to be small, any associated indirect impacts on the ecosystem would be correspondingly minor. Thus, potential direct impacts on organisms and any associated indirect impacts on the ecosystem would be expected to be relatively small. Corresponding indirect impacts on the ecosystem would be similarly unlikely."

The direct impacts of loss of habitat, fragmentation of habitat, and loss of diversity for ecological and biological resources are provided in Volume One, Section 5.4.

Comment Number 0072.222 *CTUIR*

Comment P D-433: Sect. D.6.2.4: The conceptual model for terrestrial organisms needs to take into account impacts that result in the loss of diversity and associated potential ecosystem imbalances.

Response The conceptual model is intended to illustrate potential pathways by which ecological receptors may be exposed to contaminants. Loss of diversity and other alterations in the ecosystem, though important, are potential indirect effects of organism exposures to contaminants, and were not used as assessment or measurement end points in the analysis. Potential indirect effects have been added to the text of Volume Three, Section D.6.2.2 and to Volume One, Section 5.4. Please refer to the response to Comment number 0072.221.

Comment Number 0072.223 *CTUIR*

Comment P D-434: There should be an arrow from waste to plants and animals and an arrow from plants to all of the animals. It is well known that hawks and shrikes use vegetation for nesting, soil for dusting. Coyotes have been known to eat plants and are in constant contact with the soil.

Response The conceptual model figure shows those pathways that were evaluated in the analysis. The scenario examining direct exposure to stored wastes assumed the "soil" contaminant concentrations were identical to those in the waste, effectively connecting "waste" compartment directly to the "plant" compartment, as suggested. Adding additional exposure pathways with a very small contribution to total risk would not alter the conclusion in the text that direct exposure to stored wastes would be lethal. The information requested in the comment represents a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.224 *CTUIR*

Comment P D-435: The CRITRII model uses simple food chain and bioaccumulation factors to estimate doses to a very few select species in a very complex set of ecosystems. This model extrapolates from grain values and leafy vegetable values eaten by standard wild animals (the pocket mouse and the male deer) assuming that the biochemistry is similar to the typical lab rat. There is no differentiation for embryos, fetuses, pregnant females, developing young, or very old animals. Additionally there are assumptions for biological steady states which negates underlying health problems an animal could have. It would seem then that because of the large amount of unknowns associated with the biochemical uptake and transfer mechanisms, the resulting uptake factors, the impacts to different age groups and sexes of the assessment group, the lack of information of underlying health, the small receptor group size, the lack of true representativeness, the role of each species in stabilizing the biodiversity, that the uncertainty analysis would have explained the results noting these factors.

Simply leaving the reader to assume that the only secondary sources of uncertainty are those which are the most easily quantified is very unfortunate. Please address the uncertainties listed above.

Response The conceptual model used to estimate hazards to terrestrial organisms and the CRITRII model used for estimating maximum radiation doses to aquatic organism exposed to groundwater entering the Columbia River make a series of simplifying assumptions, including the use of representative species. These models do not distinguish among species subpopulations, such as differing age groups, and they assume steady-states for such factors as the transfer of contaminants through the food chain.

Volume Three, Appendix D does not address sensitive subpopulations, but transfer factors used to estimate uptake by plants and assimilation in the mouse are mentioned as uncertainty sources, as are the No Observed Adverse Effect Levels used to estimate HIs. In addition, the analysis used bounding assumptions such that risk is more likely to be overstated than understated. For example, the No Action alternative analysis assumes direct contact with stored wastes and consumption of contaminated groundwater with no dilution of the water in the Columbia River, both of which are highly unlikely. It is unlikely that detailed uncertainty analysis would alter the conclusion that direct exposure to stored wastes would be lethal. The uncertainty discussion in Volume Three, Section D.6.5 has been modified to address the issue raised in the comment by adding the following sentences.

> "The CRITRII model was used only for estimating maximum radiation doses to aquatic organism exposed to groundwater entering the Columbia River at 300 and 500 years. These estimates were all lower than one millionth of a rad per day, the benchmark recommended by NCRP (1991) as protective of aquatic organisms. It is unlikely that detailed uncertainty analysis would alter the conclusion that groundwater risks to aquatic organisms are very low."

Comment Number 0081.09 *Pollet, Gerald*

Comment I have two minor points that I wish to say. One is, I think that in this EIS something unique was done that is very valuable, and we'd like to thank Ecology and U.S. DOE for including these visualizations of the risks. In these risk isopleth maps for the first time. It allows the public to see that if in fact you take a look at leaving waste behind, along the Columbia River, the risk of fatal cancer at a glance you can see there are areas that have extremely high risks of fatal cancer. I think this is, it's an innovation to not just present data in tables, but to present this as a map where you can visualize what the risks are for different locations.

Response DOE and Ecology acknowledge the comment regarding the contour plot method used in the EIS to illustrate the areal risk distributions resulting from the risk calculations. DOE and Ecology continually strive to present these complex issues in an understandable form and believe the areal distribution of risk is one of the best innovations in presenting the results of risk assessments.

Comment Number 0089.12 *Nez Perce Tribe ERWM*

Comment Page D-15
The Hanford Site use scenarios including, Residential Farmer, Industrial, Recreational Shoreline User and Recreational Land User are not adequate to describe a Native American use scenario.
The recreational scenarios only assumes usage for 14 days per year for 30 years. Information is now being compiled on the Hanford Site for Native American use scenarios. This information is currently being prepared through the Columbia River Comprehensive Impact Assessment effort. Please contact Joe Fitch of the Nez Perce Tribe ERWM for specific information regarding Nez Perce Tribal use and Native American use scenarios.

Response The risk assessment for the EIS has been revised to include an evaluation of anticipated post-remediation risk to a Native American user of the Hanford Site. The scenario used for the analysis was developed through consultation with representatives of the affected Tribes. Under this scenario, an individual engaged in a subsistence Native American lifestyle is assumed to spend 365 days per year on the Site over a 70-year lifetime. Please refer to the response to Comment number 0072.198 for information on this scenario. For information on the recreational use scenario, please refer to the response to Comment numbers 0041.03 and 0069.06.

Comment Number 0101.02 *Yakama Indian Nation*

Comment In order to base performance assessments on assumptions that are consistent with providing reasonable assurance of protecting public health and safety and the environment far into the future, a design confidence level for the entire Hanford Site's performance must be established. Then, the suite of scenarios developed to define conditions to be evaluated over the time frame protection is intended must be objectively established, consistent with providing the design confidence level intended.
The legal term frequently used to define the necessary confidence level is "reasonable assurance."

This is generally recognized to be a very high level of confidence, consistent with the intent of various environmental laws and the Atomic Energy Act to protect public health and safety and to protect the environment.

Response DOE and Ecology recognize the potential for diversity of criteria across the projects at Hanford and concur with the consistent Hanford Sitewide environmental performance design criteria. The level of confidence in the TWRS EIS risk assessment provides reasonable assurance that impacts will not be higher than the level assessed in the EIS. In the TWRS EIS, the long-term scenarios are based on 95 percent confidence that they are bounding risks.

In accordance with CEQ requirements, the EIS is prepared early in project planning well in advance of detail design criteria, which would be needed for rigorous probabilistic risk assessment. As more information becomes available relative to the tank waste, the level of uncertainty will be reduced and more precise estimates of impacts will be possible. Please refer to the response Comment number 0101.03 for a related discussion and 0072.225 for a discussion of the NEPA requirement to analyze impacts commensurant with their likelihood and potential consequences.

L.5.12 ACCIDENTS

Comment Number 0012.21 *ODOE*

Comment Table E.15.0.2 on page E-248 of Volume Four considers loading of waste glass with 40 weight percent of waste oxide. It reports a population dose of 7,900 person-rem for the Ex Situ Intermediate Separations alternative. This is beyond the limit by weight that waste oxide can be put in glass. Loadings of over 30 weight percent waste oxide are no longer glass. They are sodium silicates. As a consequence, the population dose is wrong. Errors such as this greatly increase the uncertainty in the potential real risk to the population, as compared to the modeled risk in the EIS.

Response The 40 percent waste oxide loading used for this sensitivity analysis also included a 1.5 blending factor. Use of the 1.5 blending factor would result in a net waste oxide loading of 27 percent. Published literature supports waste oxide loadings in excess of 30 weight percent. Therefore, the populations dose of 7,900 person-rem for the Ex Situ Intermediate Separations alternative is appropriate for analysis and no change to the document is warranted.

Comment Number 0072.225 *CTUIR*

Comment P E-3: PP 4: bullets 3-4: Page E-3: These bullets state that "unmitigated consequences" would be the basis of comparison, while page E-27 states that ingestion and groundshine were not evaluated as accident consequences because mitigation measures were assumed to occur. This is inconsistent. In addition, mitigation is never 100 percent successful, and the potential impact areas, food interdiction requirements, evacuation and relocation costs, and many other factors are all clearly consequences of the more severe accidents. Assuming that intervention is only partially effective (as is really the case), also means that, depending of the half lives of the materials released, there would be

long-term and multigeneration impacts from some of the accidents. Intervention itself can be extremely destructive, as an example of event consequences that must be included. Regardless of the habitual methods for performing Safety Analyses, a full accident evaluation must include all potential consequences. CTUIR technical staff can also provide recommendations for translating environmental concentrations into human, environmental and socio-cultural risks.

Response The bullets are in reference to unmitigated consequences being compared to the Hanford Site risk acceptance guidelines for developing safety controls for the TWRS Accelerated Safety Analysis. DOE and Ecology have further analyzed the risk from the unstabalized tanks collapsing after the 100-year institutional control period. Because this is a likely event and there would be no institutional controls, evacuation and interdiction of food consumption would not be a mitigative barrier. The resulting analysis includes the added risk from groundshine, ingestion, and deposition. The new analysis is presented in Volume Four, Sections E.2.3 and E.3.4. Text also has been added to the methodology in Volume Four, Section E.1.1 to reflect this change.

All other remediation accident scenarios either have very small offsite consequences or the probability of the event is extremely unlikely. The Final EIS provides an analysis of the environmental and socio-cultural impacts from these accidents with the amount of detail commensurate with their likelihood and potential consequences as directed in Recommendations for the Preparation of Environmental Assessments and EISs, Office of NEPA Oversight, DOE, Washington, D.C., May 1993 (DOE 1993d). The text has been modified in the methodology in Volume Four, Appendix E to provide a qualitative assessment of the potential environmental and socio-cultural impacts and mitigative measures that would be taken. Please refer to the response to Comment numbers 0072.226 and 0072.26.

Comment Number 0072.226 *CTUIR*

Comment P E-13: Sect. E.1.1: Accident risk evaluation in general has a long history, yet methods are still archaic. As we have described elsewhere, the evaluation of risk from normal operations and from accidents needs to span the full range of potential impacts, including not only human dose, but also environmental and socio-cultural impacts. Methods are available for deriving guidelines for accident risks that include risk acceptance criteria for different accident frequency classes for each risk measure. For any revision of such risk acceptance guidelines, CTUIR expects to see risk acceptance criteria for each type of impact that could occur from accidents, and can offer technical and regulatory guidance in selecting appropriate risk levels.

Response The direction from Recommendation for the Preparation of Environmental Assessments and EISs, Office of NEPA Oversight, DOE, Washington D.C., May 1993 (DOE 1993d) is to calculate the potential risk from accidents (e.g., the number of LCFs from exposure to radiological constituents). The risk is not to be measured against risk acceptance guidelines, but against potential risks calculated in the other proposed alternatives. Risk is measured against risk acceptance guidelines in safety analysis reports for operation and facility design. Risk assessment guidelines help provide guidance in

establishing administrative and mechanical barriers to mitigate or prevent unacceptable accidents from occurring. No change to the document is warranted.

Comment Number 0072.227 *CTUIR*

Comment P E-27: PP 4: Groundshine and ingestion pathways must be included.

Response DOE and Ecology have further analyzed the risk from the unstabalized tanks collapsing after the 100-year institutional control period. Because this is a likely event and there would be no institutional controls, evacuation and interdiction of food would not be a mitigative barrier. The resulting analysis includes the added risk from groundshine, ingestion, and deposition. The new analysis is presented in Volume Four, Sections E.2.3 and E.3.4. Text also has been added to the methodology in Volume Four, Section E.1.1 to reflect this change. Please refer to the response to Comment number 0072.225 for a discussion of impacts of remediation accidents.

Comment Number 0072.228 *CTUIR*

Comment P E-29: PP 3: Maximally-Exposed Individual General Public: Since the conventional offsite boundary dose was omitted from the evaluation, the MEI noninvolved worker dose (at 100m) must be considered the MEI offsite dose as well. Although not clearly stated, we presumed that the general population dose was estimated either by 160 annular sector analysis or by assuming that at each distance the entire population resides at plume centerline. In either case, the single point estimate result represents an average, with half the population being at higher risk. For this reason, we assume for the rest of this evaluation that the population dose is an average and the MEI worker dose is the same as the public MEI dose.

Response The conventional offsite boundary dose for the maximally-exposed individual (MEI) was not omitted from the evaluation (e.g., Volume Four, Table E.2.2.2 shows the MEI general public dose from a spray release due to a mispositioned jumper).

The population dose is not an average. Onsite and offsite population dose calculations were based on population-weighted Chi/Q values generated from onsite and offsite population distributions (i.e., estimates of the distribution of the population relative to the facility where the accident is postulated to occur). Both the Site and offsite areas were broken up into 16 sectors. The sector with the bounding population-weighted Chi/Q was assumed in the scenario. In addition, bounding 99.5 percent maximum sector Chi/Q values were used in the dose calculations.

The MEI worker dose is not the same as the public MEI dose. Dose is dependent on Chi/Q, which is dependent on distance. These values are reflected in the Chi/Q values (time integrated atmospheric dispersion coefficient) used for each receptor in the analysis. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.229 *CTUIR*

Comment P E-38: Table E.2.2.1: The column labeled "risk" either needs to be explained or omitted. The column labeled "severity" also needs some explanation - what does "No" mean with respect to severity, and how was this determined? Does this entire table apply to each tank individually? If so, then all of the anticipated accidents summed over all the tanks suggests that there would be several reportable incidents per year. Since the consequence analysis did not include any risk measure except dose, the consequences of these events (and especially programmatic impacts) are probably greatly underestimated.

Response Table E.2.2.1 in Volume Four is a screening table that is similar to those used elsewhere in the document. The table and purpose of the table were defined in Volume Four, Section E.1.1.2, which contains the explanations of "risk," "severity," and "no" and how the data were determined. The table does not apply to each tank individually but to the tank farms collectively. The intent of the analysis was to measure only health effects resulting from accidents; therefore, no change to the EIS is warranted. Please refer to the response to Comment numbers 0069.06, 0072.225, and 0072.226.

Comment Number 0072.230 *CTUIR*

Comment P E-40: Sect. E.2.2.1.1: It would be helpful if the discussion of the particular accident scenarios included the numerical reference from table E.2.2.1.

Response The accident scenario described can be traced to Volume Four, Table E.2.2.1 by using the name of the accident; therefore, no change to the document is warranted.

Comment Number 0072.231 *CTUIR*

Comment P E-40: Table E.2.2.2: Please note that in these tables there is information presented for the MEI public, although the prior discussion did not indicate that this would be the case. If this is also done consistently in the later tables, the discussion at the beginning of the section should include description of the MEI public offsite individual's location.

Response The location of the general public MEI is defined in Volume Four, Section E.1.1.5, Receptor Location. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.232 *CTUIR*

Comment P E-42,43,44,45,46: Tables E.2.2.4-E.2.2.5: The totals from Tables E.2.2.4 and E.2.2.5 should be added, because exposure to toxics and corrosive would be simultaneous and the effects are not necessarily independent. For the mispositioned jumper accident, the MEI worker would experience

both effects at the same time, though the same portal of entry (the lungs), and therefore the effects are at least additive if not supra-additive.

Response Toxic and corrosive effects are independent and for that reason these efforts are not additive. Corrosive chemicals cause localized destructive physical damage to the exposed cells and underlying tissue with which there is direct contact (e.g., skin, eyes, and lining of the lungs). Toxic chemicals are absorbed through the cell membrane wall into the blood stream or lymphatic system where target organs are affected. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0072.233 *CTUIR*

Comment P E-57: PP1: What is the reason for using the 50 percent inventory rather than the 100 percent inventory? Is there an official Record of Assumption to track when and by whom this decision was made? This section indicates an onsite residential population of 183 people, but this is not described earlier under receptor locations. Please clarify. Given the current controversy around the possibility of any dome collapse (for example, with overload and filtration of releases upward through gravel, and so on), it might be useful to discuss all dome collapse and dome failure scenarios in a little more detail.

Response A discussion of the 100 percent inventory is found in Volume Four, Appendix E, Section E.1.1. As defined in Section E.1.1, the highest radioactivity concentration for each radionuclide was combined to define a hypothetical highest concentration tank inventory or "super tank" used to bound accidents. For single tank accidents or spray releases, this methodology is reasonable. However, for multiple tank accidents it would be unreasonable to represent all the tanks as the super tank; therefore, the nominal tank inventory would be more reasonable when an accident involves multiple tanks.

The decision to use a nominal inventory for accidents involving multiple tanks was made during the consequence analysis of the post-remediation accident scenario. The population living on the Hanford Site after the institutional control period was assumed to be 10 percent of the current Hanford Site population work force or 1,090, as discussed in Volume Four, Appendix E, Section E.2.3. The dome collapse and dome failure scenarios have been addressed in detail in Volume Four, Appendix E, Section E.2.3 and this analysis has been modified in the Final EIS to address information unavailable for inclusion in the Draft EIS analysis.

L.5.12.1 Nonradiological Occupational and Transportation Accidents

Comment Number .0072.25 *CTUIR*

Comment The accident scenarios need to be better described in the EIS, without referring the reader constantly to other documents, especially since there is such controversy about how frequently the accidents might happen, or even if they could happen at all.

Response The information requested is contained in the referenced documents in DOE Reading Rooms and Information Repositories for public review. The use of references in the EIS is consistent with CEQ guidance that EISs be as concise as feasible and that where appropriate supporting data and technical analysis be incorporated by reference (40 CFR 1502.21). The document is very lengthy and DOE and Ecology believe they have struck an appropriate balance between presentation of analysis in the EIS and incorporating by reference supporting materials. The information requested in the comment is a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0072.26 *CTUIR*

Comment The SAR approach to accident risks is inadequate for an EIS type of analysis: the full range of types of risk (including environmental and socio-cultural) need to be included since all of these would be affected by accidents.

Response DOE and Ecology have further analyzed the risk from the unstabalized tanks collapsing after the 100-year institutional control period. Because this is a likely event and there would be no institutional controls, no recovery action is accounted for. The resulting analysis includes the added risk from deposition to the environment and cultural resources. Therefore, the airborne release rate (ARR) and RF are presented separately in the EIS. The analysis is presented in Volume Four, Sections E.2.3 and E.3.4 of the Final EIS. Text also has been added to the methodology in Section E.1.1 to reflect this change.

All other scenarios occur within the 100-year institutional control period and have either very small offsite consequences or the probability of the event is extremely unlikely. DOE and Ecology have determined to evaluate the environmental and socio-cultural impacts from these accidents with the amount of detail commensurate with their likelihood and potential consequences as directed in Recommendations for the Preparation of Environmental Assessments and EISs, Office of NEPA Oversight, DOE, Washington, D.C., May 1993 (DOE 1993d) and following consultation with the commentor. The evaluation added to each alternative does not include a rigorous quantitative analysis but provides a qualitative assessment of the potential environmental and socio-cultural impacts resulting from deposition and mitigative measures that would be taken to offset these impacts. Please refer to the response to Comment number 0072.225.

Comment Number 0072.234 *CTUIR*

Comment P E-100: Sect. E.6.0: Where is the discussion of the environmental Impact due to the removal of the sand, gravel and silt? Additionally, where are the discussions regarding the impacts to known cultural sites associated with the proposed borrow sites?

Response Environmental and cultural site impacts associated with removal of sand, gravel, and silt are analyzed in Volume One, Sections 5.1, 5.5, and 5.7, and summarized in Section 5.14.

Comment Number 0072.235 *CTUIR*

Comment This table indicates that under the intermediation separation alternative (the preferred alternative), the closure caps (the Hanford Barriers) will require approximately over 85,000 trips to bring silt from McGee Ranch, 97,000 trips from Borrow Pit 30 for tank fill material, 122,000 trips to bring riprap from Vernita Quarry, and 100,000 trips to bring sand from Borrow Pit 30. What total volume of each material does this represent? This table indicates that *all* of this material is needed for the barriers, and no alternative sites are presented. Since the selection of a preferred alternative includes a de facto decision about closure, this EIS must include a discussion of the environmental and cultural harm that will be caused by this huge amount of clean fill, and the mitigation that will be performed should this closure plan be pursued. Closure is an inseparable part of the preferred alternative, so an excuse that closure is not in the scope of this EIS will be unacceptable.

Response The total volume of material removed from the potential borrow sites for hypothetical closure scenario is as follows:

- Silt from McGee Ranch = 853,000 yd^3
- Tank fill from Borrow Pit 30 = 986,000 yd^3
- Riprap from Vernita Quarry = 1,220,000 yd^3
- Sand from Borrow Pit 30 = 1,000,000 yd^3

The environmental and cultural impacts to the borrow sites listed are discussed in Volume One, Sections 5.1, 5.4, 5.5, and 5.7, and summarized in Section 5.14.

A hypothetical closure scenario was addressed to show the relationship between closure and remediation of the tank waste. For discussion of the closure scenario, please refer to the response to Comment numbers 0072.08 and 0101.06 and for more information regarding borrow site impacts, refer to the response to Comment number 0019.03. Because the analysis requested in the comment is not within the scope of the EIS, no modification to the document is warranted.

Comment Number 0081.07 *Pollet, Gerald*

Comment There is one other area of risks that we would like to spend another piece of paper on, and that has to do with explosion risks. We believe that the assumptions used are erroneous, and the Department of Energy had more than ample time to incorporate additional data about the risk of explosions in far more tanks than that are on the watch list today. The Wyden Safety Watch List Law requires the listing of tanks that have the potential for uncontrolled release of fission products, i.e., an explosion. We know that the Department has been sitting for months and months on a recommendation that 25, in other words twice as many tanks, have the potential to explode. That greatly changes the risk assumptions used and the presentation of data in the EIS.

Response In December 1995, Westinghouse Hanford Company (WHC) recommended to the DOE that 25 additional tanks be added to the Flammable Gas Watchlist. DOE-RL submitted the same

recommendation to the U.S. Department of Energy, Headquarters (DOE-HQ), the organization responsible for formally making the decision. DOE-HQ requested that the Chemical Reactions Sub-Panel review and comment on the basis for the recommendation. DOE-HQ, on the basis of the sub-panel review, recommended to DOE-RL that the recommendation to add the tanks to the Watchlist to be withdrawn. DOE-RL withdrew the recommendation about the same time that WHC withdrew its original recommendation to DOE-RL.

The risk of tank deflagrations and explosions has been analyzed further by DOE and Ecology. The results of the new analysis that shows the event to be more credible (a higher annual frequency) have been incorporated into the Final EIS Volume Four, Appendix E, Sections E.2.2, E.3.3, E.4.3, E.5.3, E.6.3, E.7.3, E.8.3, E.9.3, E.10.1, and E.10.2.

L.5.12.2 Radiological Accidents

Comment Number 0069.10 *Pollet, Gerald*

Comment Fifth, we know that there are five times as many tanks with the potential for a hydrogen gas explosion as this EIS assumes. This assumption, found in the documents provided which are Westinghouse documents, the assumption is six flammable gas tanks. There are 25 awaiting to be added to the Watchlist. Which is the Wyden Watchlist. They've been awaiting being put on that Watchlist, which is a legal requirement for tanks of the potential to explode, since long before this EIS was issued. The department has known that tanks, additional tanks have the potential for hydrogen buildup above the flammability limit for a year now. It is not shown in the EIS at all. You should be clearly showing the annual risk of delay in terms of tank leaks, pressure vents, and explosions. Clearly show the risks per year of each alternative, and reveal which wastes would be retrieved, and which delayed in each alternative.

Response The annual frequency of a hydrogen deflagration as analyzed in the Draft EIS was based on 25 flammable tanks (Volume Four, Appendix E, Section E.2.2). Please refer to the response to Comment number 0081.07.

A bounding risk from the delay in remediating these wastes is presented in Volume Four, Section E.2.2, where the risk is shown from accidents that could result if remediation is delayed indefinitely under the No Action alternative. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0069.11 *Pollet, Gerald*

Comment The ultimate question is which alternative gets on with retrieval of wastes, with what risks on the fastest timeline... beyond the design basis accident, i.e., greater than 10 to the -6th one million events. It's also incredible that the same one million chance, or greater, is given to red oil exothermic reactions. Based on the Westinghouse report which say's that the exothermic reaction will only occur by the 135° centigrade. Yet, in 1994, when the Department of Energy agreed not to restart the

Plutonium Finishing Plant, it had placed administrative controls on the calciner, which are equivalent to the evaporators in many respects, had place administrative controls because it's own studies, including those done at Los Alamos and at Hanford, showed that the exothermic reactions could occur at temperatures far less than 135°. This data was available, but ignored. It basically means that the risks presented here are entirely underestimated. Especially for tank explosions and pressure events, and other releases.

Response The Hanford solvent extractions separations plants (e.g., Plutonium Finishing Plant) operate with nitric acid systems where tributyl phosphates could react to form red oil. The exothermic events relating to red oil have occurred in mixtures of fuming nitric acid and normal paraffinic hydrocarbons (which are commonly called red oil). The explosion occurs when the mixtures are overheated and low molecular weight gaseous decomposition products are generated. Safeguards have been put in place at these facilities to limit the chance for a runaway thermal reaction, which would produce large quantities of flammable hydrogen gas. Unlike the Plutonium Finishing Plant, the waste in the Hanford Site tanks has been neutralized before transfer to the tanks and the waste is being maintained at an alkaline and not at an acidic pH. The material used for construction of the Hanford Site tanks is not suitable to store acidic wastes; therefore, alkalinity was and is measured and controlled before waste is placed or transferred into the tanks.

Red oil, a reaction product of tributyl phosphate, nitric acid, and heavy metal nitrates, cannot be formed on the alkaline wastes stored in the tanks. In the unlikely event that red oil is routed to the waste complex due to a process upset in an operating plant (i.e., material is not neutralized with sodium hydroxide [caustic]), contact with the large volume of diluted caustic in the storage tanks would neutralize the waste. Because the Hanford Site tank waste is in an alkaline and not an acidic state, a red oil exothermic reaction was determined to fall in the incredible range (less than 1.0E-06/yr) and the potential risks have not been underestimated in the EIS. The information relative to this issue was included in the Draft EIS in Volume Four, Appendix E; therefore, modification to the document is warranted.

Comment Number 0069.12 *Pollet, Gerald*

Comment One must wonder is the Department of Energy delaying placing additional tanks on the legal Watchlist until this comment period is closed? Why aren't we showing the risks from hydrogen events and from exothermic reactions, as the Department's own studies have shown them to be?

Response These decisions regarding placement of tanks on the Watchlist were made independent of the EIS schedule and do not reflect an intent to not address these issues in the EIS. Please refer to the response to Comment numbers 0069.10 and 0081.07.

Comment Number 0069.13 *Pollet, Gerald*

Comment As Todd Martin said earlier this evening, all that we know about some of these events is that they have a far greater probability than 1 the million. We cannot put a definitive figure on them. I would agree with that. We can't put a definitive figure on them. But we do know, for instance for the exothermic reaction, we know that the Department of Energy has had 3 explosions, at Hanford and Savannah River, involving this same material, same exothermic reaction. Yet this EIS is based on a Westinghouse study that assumes the possibility of one event is greater than one in a million. We have had three events, therefore, in the last 50 years and that does not equal a rate of occurrence of one in a million.

Response Please refer to the response to Comment numbers 0081.07 and 0069.11, which address similarly worded comments.

Comment Number 0072.27 *CTUIR*

Comment Deposition needs to be included, and therefore the ARF and RF need to be presented separately.

Response Please refer to the response to Comment numbers 0072.17, 0072.26, and 0072.251, which address similarly worded comments.

Comment Number 0089.19 *Nez Percè Tribe ERWM*

Comment The risks from tank wastes to the environment and the public appear to be understated and inconsistent with those on the Risk Data Sheets for the Hanford Site.

Response The risks to the environment and the public from tank waste as stated in the TWRS EIS are based on more current data and analyses than those used in the RDSs. Also, they serve different purposes. RDSs are used to obtain funding for Hanford operations and evaluate the cost of environmental, socio-economic, and health impacts. The TWRS EIS only evaluates the health risks in terms of health effects, not cost; therefore, no change to the document is warranted.

Comment Number 0090.03 *Postcard*

Comment Please listen to us say no:
to ignoring the risk of tank explosions.

Response Please refer to the response to Comment numbers 0081.07 and 0069.11, which address this issue.

Comment Number 0098.05 *Pollet, Gerald*

Comment Explosion risks in this EIS. This EIS is based on a 1995 Westinghouse document that assumes a plutonium or uranium nitrate and tributyl phosphate or other solvent exothermic reaction, i.e., a red oil explosion, will only initiate at a 135 degrees centigrade and bases a lot of the risk estimates in terms of things like evaporator risks and explosion risks on that assumption. That assumption was disproven by Los Alamos National Laboratory study a year before this Westinghouse report which is the basis of the EIS. I would like to know why we are paying contractors to ignore official findings of the Department of Energy including there at Hanford which said, We had to put administrative controls on Plutonium Finishing Plant because of an acknowledgement that this reaction could occur temperatures far below 135 degrees centigrade. I think that Westinghouse should be penalized for producing a document that ignored the rest of the data at Hanford and from Los Alamos National Lab about the risk of a red oil explosion. The state needs to take a look at that and take a look at how those explosion risks are calculated because frankly, they did the same thing that the state fought in terms of the Plutonium Finishing Plant and they continue to try to get away with saying that this exothermic reaction only occurs at 135 degrees. Secondly, the data ignores the fact that the evidence shows that these reactions release hydrogen at flammable ... above the flammable limits at far lower temperatures and you're likely first to get a hydrogen explosion before you get the explosion from the red oil.

Response Red oil explosions are considered an incredible event and not discussed in the risk evaluations in the EIS; however, data pertaining to red oil explosions in the Hanford waste tanks are presented in Volume Four, Appendix E. Please refer to the response to Comment number 0069.11, which provides a more extensive discussion of the issue in response to a similarly worded comment.

L.5.12.3 Potential Toxicological Accidents

No comments were submitted for this topic.

L.5.13 CUMULATIVE IMPACTS

Comment Number 0019.17 *WDFW*

Comment Page 5-210, section 5.13.3.1; second paragraph. The EIS states that "closure of the SSTs and DSTs is beyond the scope of this EIS." If closure is beyond the scope, WDFW believes it is inappropriate to mention potential borrow sites for post-remediation activities since a thorough analysis has not being performed.

Response Although closure is not included in the TWRS EIS scope, as discussed in Volume One, Section 3.3.1, a generic closure method was included in all the alternatives (except No Action and Long-Term Management) to allow meaningful comparison of the in situ and ex situ alternatives on a relatively equal basis. It is necessary to address potential impacts at borrow sites in order to identify all impacts that may occur. The borrow sites shown in the Draft EIS were used only for calculational purposes. The EIS was modified in the Summary and Volume One, Sections 1.0, 3.3.1, and 5.0 to

clarify that the borrow sites addressed are only identified for calculational purposes. A decision on which sites would be used will be made in the future when NEPA analysis is prepared for closure purposes. Please refer to the response to Comment numbers 0078.08 and 0019.03 for more information on this topic. Because the information contained in the Draft EIS is correct, no change to the text was made at the location specified in the comment.

Comment Number 0053.02 *Carpenter, Tom*

Comment I think that we have got waste that have leaked into the ground under the tanks. The figure varies. I have heard 950,000 gallons is the official figure of what has leaked from the single-shell tanks into the ground; however, a number of engineers out there have told me that, for instance tank 105A which had a serious steam event back in the mid-60's resulted in a great deal of contamination going down to the ground underneath the tank and the 500,000 gallon tank ended up needing over a million gallons of cooling water. So cooling water or evaporating water that was not counted as leaks to the ground. So that 950,000 gallon figure is not accounted into there.

Response Approximately 600,000 to 900,000 gallons of liquid are known or assumed to have been released to the soil beneath leaking tanks and this information is presented in the EIS in Volume One, Section 1.0 and 4.2. Cooling water that may have leaked from SSTs would be included in that volume. Cooling water that has evaporated would not be included in the leak volume. It is because of the insufficient information available regarding contamination of soil and groundwater that closure is not within the scope of the TWRS EIS. For more information on this issue, please refer to the response to Comment numbers 0091.01, 0030.02, 0072.63, and 0072.08. The Final EIS analysis of cumulative impacts, including soil contamination from past leaks has been modified and is presented in Volume One, Section 5.13 and Volume Four, Appendix F.

Comment Number 0101.05 *Yakama Indian Nation*

Comment Need to Consider Cumulative Impacts--Consideration of key actions and their resulting impacts having already occurred or potentially occurring in the future should be assessed by the subject EIS, consistent with NEPA guidance regarding consideration of cumulative impacts. Particular attention should be paid to impacts from other waste disposal sites, partially remediated sites or contaminated ground water posing an additional hazard from either simple additive effects and/or more complicated synergistic effects.

We consider it is inappropriate to base actions on a partial evaluation of impacts affecting the public health and safety and the environment, particularly when it is known or expected that other impacts from known or expected actions are cumulative.

Response Cumulative impacts of past, present, and future Hanford operations, together with the potential impacts of the TWRS alternatives, are included in the cumulative impacts section (Volume One, Section 5.13) of the EIS. No potentially synergistic effects were identified.

L.5.14 UNAVOIDABLE ADVERSE IMPACTS

Comment Number 0019.18 *WDFW*

Comment Page 5-230, Table 5.14.1, Phased Implementation alternative, Row on Biological Resources. There is a discrepancy between the figures on shrub-steppe habitat loss here (540 acres total) and that mentioned on 5-123 which states 690 acres. This is the second comment regarding clarification on upper impact level for the Phased Implementation alternative. What is the correct figure?

Response Please refer to the response to Comment number 0019.14 for the corrected information on the potentially affected acreages.

L.5.15 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

No comments were submitted for this topic.

L.5.16 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

No comments were submitted for this topic.

L.5.17 CONFLICTS BETWEEN THE PROPOSED ACTION AND THE OBJECTIVES OF FEDERAL, REGIONAL, STATE, LOCAL, AND TRIBAL LAND-USE PLANS, POLICIES, OR CONTROLS

No comments were submitted for this topic.

L.5.18 POLLUTION PREVENTION

No comments were submitted for this topic.

L.5.19 ENVIRONMENTAL JUSTICE

Comment Number 0072.53 *CTUIR*

Comment Despite initial scoping agreements to include environmental justice as a separate section (per Executive Order 12898), no such section was prepared. The mere counting of the number of Native Americans residing in the three closest counties is not adequate.

Response DOE agrees that re-compiling existing demographic information would not satisfy the intent of Executive Order 12898. The environmental justice initiative has a technical component that involves analyzing whether there is a disproportionately elevated and adverse health or environmental impact on any minority community or low-income community and, if such impacts are identified, mitigating those impacts. In response to the environmental justice requirement, the TWRS EIS project included the following tasks.

- Identify potentially affected low-income populations and minority populations within an 80-km (50-mi) radius of the Hanford Site central plateau.

- Conduct technical analyses to establish if disproportionately high and adverse impacts to low-income and minority populations are associated with any EIS alternative.
- Identify mitigation measures, if appropriate.

The basic EIS consists of a description of the affected environment and environmental consequences in Volume One, Sections 4.0 (supported by a more detailed analysis in Volume Five, Appendix I) and Section 5.0 (supported by detailed analysis in Volumes Two through Five), respectively. Volume One, Section 4.0 contains a description of the potentially affected minority, Native American, and low-income populations (Section 4.6). Section 4.0 also contains, where appropriate, other information pertinent to those populations within the affected environment including relationship of Native Americans to the Hanford Site in Section 4.4 (biological and ecological), Section 4.5 (cultural resources), Section 4.7 (land use), and Section 4.8 (visual resources). A more detailed description of each is provided in the associated section of Volume Five, Appendix I.

Identifying potentially affected minority populations, Native American, and low-income populations in the 80-km (50-mi) area surrounding the Hanford Site central plateau involved analyzing census data (Section 4.6). Identifying this area for analysis conforms to the geographic maximum extent of potential environmental impacts as described in the other sections of the EIS. This area included Benton County, Washington, and portions of nine other counties in Washington and Oregon, as well as portions of the Yakama Indian Reservation. The 1990 census was used as the source of the population data. Data were produced and analyzed for all census blocks located completely or partially within the 80-km (50-mi) area surrounding the Site. The results are summarized in Volume One, Section 4.6 and provided in greater detail in Volume Five, Appendix I. This section also included an acknowledgement that Tribal Nations located outside of this area "have historical and treaty interest in the Hanford Site area."

Socioeconomic data presented in Volume One, Section 4.6 were limited to Benton and Franklin Counties, Washington. The more limited area was identified because the socioeconomic impacts (e.g., jobs, tax revenue, retail sales, housing, and public facilities and services) of the Hanford Site on areas beyond the two-county area historically have been slight. Considering a smaller area does not diminish the impact of the Hanford Site on the Tribal Nations who have treaty rights and privileges to the Site. Other links to the Site are described in the relevant sections of the description of the affected environment.

The second portion of the environmental justice analysis was a description of the analysis of the potential environmental consequences of each of the TWRS alternatives presented in Volume One, Section 5.0, and in the other related appendices. Generally, these sections (i.e., Section 5.1 through 5.12) address impacts to air and water, ecological and biological resources, and human health and safety. Sections 5.13 through 5.20 contain analysis issues such as the impact of the alternatives on commitment of resources and land uses as well as environmental justice and mitigation measures.

For the environmental justice analysis, based on the minority, Native American, and low-income populations within the 80-km (50-mi) area, as well as Tribal Nations outside the 80-km (50-mi) area with treaty interests in the Hanford Site, each of the areas of technical analysis presented in the EIS was reviewed to determine if any "potentially disproportionate and adverse impacts" would occur. If "an adverse impact" was identified, a determination was made as to whether the impacts on minority, Native American, or low-income populations would be "disproportionately affected."

Volume One, Section 5.19 of the Draft EIS identified two areas of potentially adverse and disproportionate impact relative to Tribal Nations -- continued access restrictions to portions of the 200 Areas that would continue under long-term land use restrictions and potential disproportional post-remediation health impacts under in situ disposal alternatives. Subsequent to the publication of the Draft EIS, consultation with Tribal Nation identified other areas of concerns regarding potential adverse impacts to cultural resources. This section has been modified to identify those areas of concern. As required by the environmental justice initiative, Section 5.20 identifies potential mitigation measures that DOE could adopt to address the potential environmental justice impacts identified in Section 5.19.

Please refer to the response to Comment numbers 0072.149 and 0072.252 for information regarding consultation with Tribal Nations.

Comment Number 0101.08 *Yakama Indian Nation*

Comment Requirements-Based Alternative Designs Needed -- The TWRS design alternatives in the EIS that are considered fail to reflect a requirement-based approach in the conceptual design process. This effectively forecloses consideration of Yakama Nation cultural values and associated requirements. Hence, impacts within the realm of socio-economic impacts related to these values and requirements are not addressed in the EIS. For example, the potential economic burden on future generations or the impact of alternative closure designs for waste sites or interim storage facilities on the Indian use of nearby religious sites are not assessed in the subject EIS, although the values affected by these impacts are of prime importance to the Yakama Nation.

Response The TWRS alternatives considered in the EIS reflect a requirement-based approach to the conceptual design, but because of the large number of potential alternatives, a broader range of requirements was taken to develop the full range of reasonable alternatives. As indicated in the Draft EIS Volume One, Section 3.3.1, the alternatives were developed using the following requirements:

- That a No Action alternative be addressed in the analysis (NEPA);
- That the EIS developed representative alternatives for detailed analysis that bound the full range of reasonable alternatives when a wide range of alternatives were available for analysis (NEPA);
- That 99 percent of the waste from the tanks will be retrieved for the ex situ alternatives (except for the ex situ/in situ combination alternatives); and

- That management and disposal practices of radioactive waste, as well as the degree of separations required to facilitate near surface disposal of LAW and offsite disposal of HLW, will be consistent with DOE and Atomic Energy Act regulations.

This process allowed the analysis and consideration of cultural values and other associated issues in the EIS. For each of the alternatives, impacts to the human and natural environment, including impacts to Tribal Nation cultural values, were analyzed in the EIS. A description of the existing environment was provided in Volume One, Section 4.0 and Volume Five, Appendix I and impacts to the environment were provided in Volume One, Section 5.0 and associated appendices. Based on comments submitted by Tribal Nations and consultation with affected Tribal Nations during and following the comment period, the text of the EIS has been modified to reflect comments regarding the affected environment and potential impacts to Tribal Nation cultural values. Please refer to the response to Comment numbers 0037.01, 0072.271, 0072.53, 0072.154, 0072.252, and 0072.268 and 0072.149 for discussions of changes to the EIS based on consultation with Tribal Nations.

Regarding potential burdens to future generations, the EIS addresses potential health impacts to future generations, out to 10,000 years into the future, for a variety of potential future Site users. The Final EIS was modified to include a Native American Subsistence scenario based on consultation with affected Tribal Nations. Please refer to the response to Comment number 0072.198 for a discussion of this scenario. Other potential burdens to future generations are addressed to the extent the impact analysis indicates that a natural resource would be adversely impacted. Other impacts, such as impacts associated with accident risk, are not addressed in detail in the EIS because their small likelihood and potential consequences. Please refer to the response to Comment numbers 0072.26 and 0072.225 for discussions regarding accident impacts.

Impacts associated with alternative closure designs for waste sites were addressed within the context of the scope of the TWRS EIS. Closure is not within the scope of the EIS, hence, the EIS addressed a single closure scenario to provide the public, Tribal Nations, and decision makers with information needed to compare the relative impacts of each alternative. Please refer to the response to Comment number 0072.08 and 0019.03 for a discussion of closure and its relationship to the EIS.

L.5.20 MITIGATION MEASURES

Comment Number 0019.06 *WDFW*

Comment The Final Environmental Impact Statement Safe Interim Storage (SIS) of Hanford Tank Wastes made a firm commitment to develop a stand alone Mitigation Action Plan. The SIS project should be commended for being consistent with USDOEs Land and Facility Use Plan. The SIS project is part of the TWRS program. However, the TWRS EIS does not make the same explicit commitments as the SIS EIS did for mitigation of Priority Shrub-Steppe Habitat. There appears to be inconsistency within the TWRS program in interpreting and implementing the Land and Facility Use Policy.

The TWRS project will impact from 540 to 690 acres of shrub-steppe habitat. WDFW has several specific comments asking for clarification on acreage (refer to specific comments). WDFW strongly recommends compensatory mitigation for this project. The project should develop a stand alone Mitigation Action Plan, since the Biological Resource Mitigation Strategy has not been completed or reviewed by the natural resource agencies. At this point in time, the Biological Resource Mitigation Strategy may not meet mitigation requirements defined by WDFWs and USFWs mitigation policies. Besides biological arguments, this recommendation is based on USDOEs Land and Facility Use Policy which states "it will sustain the natural resources for which it is steward." By performing compensatory mitigation for this project, USDOE-RL is consistent with its Land and Facility Use Policy.

Response There is no inconsistency within the TWRS program. The EIS explicitly states that a Mitigation Action Plan will be performed as required by NEPA. Like the SIS project, the TWRS EIS program will make commitments for mitigation will be made in the TWRS EIS, the specific requirements will be contained in the Mitigation Action Plan. Under the regulations that implement NEPA (40 CFR 1500-1508), the EIS is not the place to document the specific mitigation measures that will be performed. The mitigation measures for the TWRS EIS may be far more complex than the measures identified by the SIS EIS so it is not feasible to document these in the Final EIS.

The 540 to 690 acres of shrub-steppe habitat mentioned in the comment refer to disturbances during tank farm closure activities, which is outside of the scope of this EIS and will be addressed in a future NEPA analysis. Please refer to the response to Comment number 0019.14 for more information on the potentially affected acreages. The information requested in the comment represents a level of detail that DOE and Ecology believe is not necessary for meaningful discrimination among the alternatives.

Comment Number 0019.19 *WDFW*

Comment Page 5-260, section 5.20.2. Request the word "Potential" be removed from section title. The section includes discussion of mitigation for shrub-steppe habitat, but vague language is used throughout without any firm commitment to doing mitigation. Again, WDFW strongly recommends mitigation for impacts to shrub-steppe.

Response General commitments for mitigation are contained in the TWRS EIS. The Mitigation Action Plan (MAP) will contain the specific requirements for mitigation. The term potential mitigation measures is the correct term because, as explained in Volume One, Section 5.20, page 5-260 of the Draft EIS, the mitigation measures included in this section are not included in the alternatives. One or more of these mitigation measures identified in Volume One, Section 5.20.2 could be included in the alternative selected for implementation. One likely mitigation measure is to mitigate impacts to the shrub-steppe habitat, as DOE has done for numerous other projects at Hanford. Following publication of the Final EIS, a Mitigation Action Plan will be prepared identifying additional mitigation measures DOE intends to implement.

Comment Number 0019.20 *WDFW*

Comment Page 5-262, section 5.20.2, third paragraph containing bullets. WDFW strongly recommends this idea be developed under its own section and that an explicit commitment be made for development and implementation of mitigation for the loss of shrub-steppe habitat. This would be consistent with Secretary Hazel O'Leary's Land and Facility Use Policy which states "USDOE will sustain the natural resources for which is steward", and would also be consistent with an earlier TWRS program EIS action.

Response Please refer to the response to Comment numbers 0019.06 and 0019.09 for discussions that respond to this issue.

Comment Number 0072.06 *CTUIR*

Comment Regardless of the proposed final Hanford tank waste retrieval and closure plans developed under the TWRS-EIS process, and prior to permitting of a treatment/disposal facility by the state under RCRA, a CTUIR aboriginal-lands human health and environmental sampling and analysis network must be established in order to help the CTUIR identify and mitigate potential future contamination impacts in a variety of environmental media. Existing environmental networks, albeit fragmentary, in both northeastern Oregon and southwestern Washington long have measurably demonstrated the regional environmental distribution of Hanford-source radionuclide and hazardous contaminants in air, water, soil, vegetation, and wildlife.

Response Cultural and archeological surveys of the areas that might be impacted by the project were performed and are summarized in Volume One, Section 5.5. Future environmental impacts on all environmental media were fully assessed and are presented in Volume One, Section 5.0 and associated appendices. A Native American exposure scenario is included in the Final EIS in Volume One, Section 5.11 and Volume Three, Appendix D. DOE annually samples and reports the regional contaminant levels in all environmental media on and near the Hanford Site in the Annual Hanford Site Environmental Report (PNL 1996), which is made available to the public and is summarized in Volume One, Section 4.0 and Volume Five, Appendix I of the EIS. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

L.5.21 MISCELLANEOUS

Comment Number 0034.01 *Belsey, Richard*

Comment Health and safety, the Hanford tanks are the greatest threat to public health and worker safety and the environment in the whole Hanford Site.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating

the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

Comment Number 0046.02 *DiGirolamo, Linda Raye*

Comment Scientist and technicians got the DOE into a horrible, life threatening, INDUSTRY in Washington State and they are dancing around the gravity of the "CRUD" this industry creates. This nuclear "CRUD" is not only not biodegradable it is also EXPANDING in its lethal abilities...making it a true, toxic hazard which will not only never degrade but will most probably lead to the cause of the destruction of our whole planet. How? a) Nuclear winters (already experiencing), b) climate changes, c) Atmospheric interruptions d) river poisonings e) well water poisonings f) human and animal mutations...etc. (too many impacts to list on this page).

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste.

Comment Number 0061.02 *Longmeyer, Richard*

Comment If there are any planned activities which will disturb or destroy these monuments, NGS requires not less than 90 days' notification in advance of such activities in order to plan for their relocation. NGS recommends that funding for this project include the cost of any relocation(s) required.

Response DOE and Ecology acknowledge the comment and the notification requirements. DOE and Ecology intend to comply with all requirements. No change to the text was appropriate based on this comment.

Comment Number 0072.164 *CTUIR*

Comment P 5-3: PP 2: Please indicate the process of determining which environmental component has uncertainties to be discussed. This is a VALUE laden statement which needs definition and consultation with the CTUIR.

Response The process for determining which environmental component has uncertainties associated with the environmental impacts analysis involved determining whether the methodology used in the impacts analysis involved using data regarding waste characteristics, technologies, or processes that were uncertain due to the level of confidence in the quality of the data or the maturity of performance data regarding the technology or process. In cases where data are incomplete or unavailable, NEPA requires DOE to "make clear that such information is lacking" (40 CFR 1502.22). If the incomplete information is relevant to reasonably foreseeable significant adverse impacts, the agency must: 1) include information in the EIS that informs the decision maker of the status of the

information; 2) summarize the existing credible scientific evidence relevant to evaluating the potential impacts; and 3) evaluate the potential impacts "based on theoretical approaches or research methods generally accepted in the scientific community."

For the TWRS Draft EIS, this process was accomplished by including in the analysis of each environmental component a discussion of the assumptions used in the impact analysis, information on the implications of the assumptions used, and information on the uncertainties associated with the data, assumptions, and/or methodologies used in the analysis. Based on this and other comments received on the Draft EIS, a new appendix (Volume Five, Appendix K) has been included in the Final EIS to provide a single-source of information regarding the uncertainties associated with the analysis of the proposed action.

The referenced statement, as well as the entire Draft EIS, has been subject to consultation with the CTUIR, other affected Tribal Nations, and other interested parties. Please refer to the response to Comment number 0072.149. The changes to the EIS mentioned previously were a result of the consultation process, as well as other comments received on this and other related issues. Other comments and consultation input from Tribal Nations resulted in changes to specific assumptions and uncertainties analysis. These changes are documented throughout in this appendix. Please refer to the response to Comment number 0101.08 for a related discussion.

Comment Number 0098.04 *Pollet, Gerald*

Comment Groundwater data. I find it incredible and I am going to address this, make this personal - Mike Thompson from the Department of Energy - for you to stand in front of the audience and talk about the borehole probably being contaminated when the Department of Energy's own occurrence report conclusively states that, Borehole contamination is not the cause of the contamination found in ... underneath the SX Tank Farm. That the correlation between boreholes, this proves the claim that an individual borehole was contaminated and that would be the source of this cesium finding. Now if that is the official position of the Department of Energy in its occurrence report, I think it is not permissible for you to stand up and without even acknowledging the official position, try to destroy the credibility of the data presented from your contractor.

Response The position stated by Mr. Thompson at the Seattle TWRS EIS Meeting, and in previous meetings with the Hanford Advisory Board was, "although the conceptual model describing cesium-137 in an aerially extensive plume as deep as 125 feet may eventually prove to be correct, there are other conceptual models (involving preferential contaminant flow down the drywells) that can explain the observed data. There is insufficient evidence in hand to conclusively discriminate between the two primary potential conceptual models for cesium-137."

At the time of the TWRS EIS meetings, the SX Tank Farm Report was not written. Only the data reports were available for review. The interpretation, displayed in graphical form, showing a plume of cesium-137 to a depth of 125 feet (and possibly beyond) was not substantiated by published analysis of

the full suite of data. It was unknown if there had been adequate consideration of all pertinent data required to discriminate between multiple viable conceptual models that could result in the observed data. The release and distribution of graphical representation of one of several potential conceptual models prior to release and distribution of the data analysis report has prompted considerable debate in the technical community. The debate focuses on the interpretation of the distribution of cesium-137 in the soil. Debate over the potential transport of mobile contaminants (technetium-99, tritium, and chromium) is considerably less polarized. Please refer to the response to Comment number 0012.15.

Cesium-137 has been found in the lower regions of some of the drywells in the SX Tank Farm. The occurrence of gamma-emitting radionuclides (presumably cesium-137) in these drywells has been known for years, and has previously been interpreted to be borehole contamination. The new interpretation that there is an aerially extensive plume of cesium-137 in the soil is not consistent with what is known about cesium-137 transport through the soil as demonstrated by laboratory studies and field observation. Cesium-137 is an alkali element, univalent cation, with properties similar to other alkali elements (lithium, sodium, potassium, and rubidium). Adsorption preference on mineral surfaces behaves according to Coulomb's Law, in the Lyotropic Series (adsorption to mineral surfaces for cesium is greater than rubidium, potassium, sodium, and lithium); cesium-137 adsorbs with higher affinity than other alkali metals. In laboratory studies and in Hanford soil washing tests, it also has been demonstrated that cesium-137 ions absorb into the structure of molecules, specifically to "wedge sites" of micas, where they can substitute for potassium ions, and are hard to displace. Cesium-137 does not complex (interact with common inorganic anions such as ferrocyanide) and has little interaction with most organic chemicals. Ammonium ions may displace cesium-137. Cesium-137 exhibits high adsorption coefficients K_ds ($> 1{,}000$) in dilute solutions. K_ds decrease with solution strength, but even at a K_d as low as 4.5, the contaminant should move as little as approximately 20 feet through the soil column.

The SX Tank Farm drywells have been drilled through contamination from tank leaks. The drywells are not sealed to prevent the flow of contamination down the annular space between the casing and the soil. A drive shoe is attached to the bottom of the casing, which is larger in diameter than the casing, thus providing for a potential annular space for vertical contaminant transport. When these wells were deepened, the existing (potentially contaminated) casing was driven deeper as new pipe was welded to the top of the casing string and driven downward. Flooding of drywells has been known to occur in other tank farms, providing another transport mechanism for contaminants. There are data showing the two deep drywells are contaminated on the inside of the casing. The data indicate that contamination has entered the boreholes.

The DOE commissioned an expert panel to review the SX Tank Farm drywell logging data and the interpretations to determine which conceptual model for cesium-137 transport is correct: 1) an aerially extensive cesium-137 plume to at least 125 feet or 2) a more shallow soil plume and deeper, localized contamination due to preferential flow down the unsealed drywells. The panel has requested additional field data to make that determination.

There are a number of potential mechanisms that may have caused the contamination recently measured. Until additional data are collected, the mechanism or mechanisms responsible cannot be reliably determined. Volume Five, Appendix K contains a discussion of the levels of contamination measured, potential mechanisms that could have caused the contamination, and how each mechanisms might affect the results presented in the EIS.

L.6.0 STATUTORY AND REGULATORY REQUIREMENTS

L.6.1 RCRA/CERCLA

Comment Number 0019.01 *WDFW*

Comment Environmental restoration at the Hanford Site includes new construction associated with remedial and response actions as result of release(s) of hazardous substance. These activities are within the realm of the Comprehensive Environmental Response, Compensation, Liability Act (CERCLA) and Resource Conservation and Recovery Act. WDFW considers this proposed action to be within the ambit of CERCLA.

Response The Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) defines the applicability of RCRA and CERCLA and the Washington State Hazardous Waste Management Act for the various actions being taken at the Hanford Site. The proposed action and alternatives addressed in the TWRS Draft EIS have been determined in the Tri-Party Agreement to be within the bounds of RCRA regulation. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0072.02 *CTUIR*

Comment As a stand alone document this EIS should clearly state its relationship with the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the State of Washington's applicable hazardous waste management laws. The impacts of privatization including the entering of contracting obligations must be specifically addressed in the TWRS EIS. Furthermore, the DOE's trust responsibility to American Indian tribes and its natural and cultural resource steward responsibilities must also be specifically addressed in the TWRS EIS.

Response As stated in Volume One, Section 6.0, the Tri-Party Agreement defines the applicability of RCRA, CERCLA, and the Washington State Hazardous Waste Management Act at the Hanford Site. The TWRS program is primarily a RCRA compliance action and remediation of the tank waste is a RCRA action, not a CERCLA action. The State of Washington has been delegated the authority to administer the RCRA program. The environmental impacts of the Phased Implementation alternative, which are similar in impacts to the privatization effort, have been stated in the Draft EIS. No other environmental impacts of entering into contracting obligations have been postulated. Any contractors involved in Hanford work must comply with the Tri-Party Agreement and applicable Federal, State,

and local laws and regulations. Regarding DOE trust responsibilities, a statement has been added in Volume One, Section 6.0 that defines DOE's policy on interacting with Native American organizations.

Comment Number 0072.03 *CTUIR*

Comment The idea of RCRA is to cover all aspects of the "cradle-to-grave" management of hazardous wastes: generation, transportation, storage, treatment, disposal and closure. The goal of the TWRS-EIS should be to safely and effectively retrieve, treat, and isolate, from the human and natural environment certain Hanford wastes that may seriously harm human, natural, and cultural resources through time. However, the current TWRS-EIS does not achieve this goal.

Response As stated in Volume One, Section 6.0, the EPA has delegated authority to Ecology to administer the RCRA program in the State of Washington. EPA, Ecology, and DOE have negotiated the Tri-Party Agreement, which defines actions necessary to comply with RCRA for Hanford tank waste. A goal of the TWRS program is to comply with the Tri-Party Agreement. Several alternatives analyzed in the TWRS EIS, including the preferred alternative, achieve that goal. Those alternatives are shown to safely and effectively retrieve, treat, and isolate tank waste in ways that comply with applicable regulations and minimize ecological and human risk. For a discussion of this issue, please refer to Volume One, Section 6.2. Please refer to the response to Comment number 0072.02.

Comment Number 0072.04 *CTUIR*

Comment CERCLA is applicable in this case because of widespread subsurface contamination and the designation of numerous Operable Units in the Tank Farm areas. These areas resulted from the long-term degradation of Hanford tank farms that allowed such dangerous and persistent high-level radioactive and hazardous mixed wastes to leak into the subsurface. Historically and today, the contaminated subsurface continually leaches contaminants further into the vadose zone, into the groundwater, and ultimately into the Columbia River--a critical Tribal resource. Comprehensive source-term identification and control must be a fundamental component of the overarching TWRS program.

Response The existing vadose zone and groundwater contamination is not within the scope of the TWRS EIS. Inventory characterization and control during tank waste retrieval, treatment, and disposal has been addressed in the Draft EIS in Volume One, Section 3.4 and Volume Two, Appendix B. Please refer to the response to Comment numbers 0072.08, 0101.06, 0012.15, 0030.02, 0098.04, 0019.03, and 0091.01 for discussions of the issues of closure, vadose zone contamination, and the applicability of CERCLA to the TWRS action, respectively.

L.6.2 TRI-PARTY AGREEMENT

Comment Number 0032.01 *Heacock, Harold*

Comment We consider the cleanup, stabilization, processing, disposal of the tank waste to be the focal point of the Hanford cleanup program.

We also strongly support the Tri-Party Agreement as the definitive document for the Hanford cleanup program. Compliance with the Tri-Party Agreement is a major responsibility and obligation of the Department.

The Department must in its selection of an alternative for the cleanup of tank wastes maintain and comply with its commitments under the Tri-Party Agreement.

Several of the alternatives considered in this Draft EIS do not meet the requirements of either the Tri-Party Agreement or statutory cleanup requirements for waste cleanup and disposal and should not be considered further.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

As required by CEQ, the TWRS Draft EIS identifies and analyzes the range of reasonable alternatives for the proposed action and the alternative of no action. Potential violation of existing laws, regulations, or agreements is not considered a basis for eliminating otherwise reasonable alternatives from consideration under NEPA guidance. Please refer to the response to Comment number 0072.05 for a discussion of NEPA requirements to consider a range of alternatives and 0072.52 and 0072.80 for a discussion of why an EIS is required to analyze all alternatives, even when they do not comply with regulations.

Comment Number 0047.03 *Ahouse, Loretta*

Comment It is of the utmost importance the Tri-Party Agreement be abided by. Please, do not delay, just get on with the cleanup. The Tri-Party Agreement outlines clearly what are the priorities for citizens in Washington State.

I am very concerned that the Department of Energy is considering not abiding by this agreement.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. DOE fully intends to abide by the Tri-Party Agreement. The preferred alternative, Phased Implementation, is consistent with the Tri-Party Agreement requirements and major milestones.

Part of getting on with the cleanup is complying with Federal law (i.e., NEPA), which requires preparation and public review of an EIS for any major Federal action including an action such as defined in the Tri-Party Agreement. Please refer to the response to Comment numbers 0072.80, 0034.05, 0072.05, 0038.02, and 0009.01.

Comment Number 0062.01 *Longmeyer, Richard*

Comment I've been following the process of the cleanup at Hanford for many, many years now. I have made comments at public meetings before, and I'm well aware of the action that had been going on for many years in trying to accomplish the process. It concerns me some that we've seen many mile posts, or milestones missed in the Tri-Party Agreement. The original Tri-Party Agreement when it was enacted was touted as the way of accomplishing the cleanup, and when we began to see that we weren't going to accomplish some of the mile posts, they just decided well we'll just renegotiated the agreement. And it has somewhat lessened the impact that it was intended to have of putting some time bounding on the process of cleaning up Hanford.

In particular, this year we now have the new process of privatization of the vitrification plant. And really what we've done is just push the process of accomplishing the vitrification farther and farther behind, as we've gone on and on. And as the individual from HEAL during his comments stated, we study and we study, and really don't accomplish much in the way of a cleanup.

Response DOE is committed to complying with the Tri-Party Agreement and making every effort to meet Tri-Party Agreement milestones. Tri-Party Agreement milestones are identified in Volume One, Section 6.0. Please refer to the response to Comment numbers 0047.03, 0072.02, 0072.03, and 0072.52.

Comment Number 0068.01 *Martin, Todd*

Comment The Tri-Party Agreement has been spoken about several times tonight, and I want to address that as well. One of the problems we've had, indeed what is left us with the legacy of Hanford is the problem of accountability. How do we make the Federal government accountable? The Tri-Party Agreement is that mechanism. It is up to this point we've had a Tri-Party Agreement that has had a very long list of specific dates DOE must meet, as well has intermediate steps to get to those dates. These are things that we can hold DOE accountable to. The Tri-Party Agreement, as it now exists under the privatization plan, has been reduced to just a few handful of milestones that are generally way out in the future. Those are very easy ones for the Federal government to sign up to, because they don't have to necessarily make the progress to meet those. There is no affective accountability mechanism being built into the Tri-Party Agreement right now.

Response The TWRS EIS is providing the required environmental impact analysis for the proposed action and alternatives in support of compliance with the Tri-Party Agreement and applicable Federal and State regulatory requirements. DOE is accountable to Washington State and the EPA, which have

enforcement authority for the Tri-Party Agreement. Please refer to the response to Comment numbers 0062.01, 0047.03, 0072.02, 0072.03, 0038.02, and 0009.01.

Comment Number 0069.14 *Pollet, Gerald*

Comment We think it is wrong for the departments to put into the EIS an assumption that waste that remains at Hanford forever and is dubbed low-activity waste, is anything but high-level nuclear waste. And in fact the State of Washington has taken that position before. And it would require a new policy issuance from the Department of Ecology to reverse course on that.

Response The terms used in the EIS are defined by or consistent with the Tri-Party Agreement and regulatory authority and opinion. Ecology is a party to the Tri-Party Agreement and a co-preparer of this EIS and has agreed to dispose of Hanford tank waste as set forth in the Tri-Party Agreement. Under the Tri-Party Agreement, the tank waste will be processed into two fractions, a concentrated HLW fraction containing the majority of the radioactive constituents, which would be disposed of offsite in a potential geologic repository, and a LAW fraction containing a low concentration of radioactive constituents, which would be disposed of onsite at the Hanford Site. The NRC staff concluded that the low-activity fraction would not be HLW. Please refer to the response to Comment numbers 0035.04, 0052.01, 0069.05, 0072.118, and 0072.111. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0072.52 *CTUIR*

Comment It is still not logical to evaluate alternatives which violate the Tri-Party Agreement, which is a volume-based retrieval agreement. The sentence (p. S-13) stating that the Tri-Party Agreement allows privatization in order to "improve performance and reduce costs without sacrificing worker or public safety of environmental protection" suggests that there is room for negotiating variations in the retrieval/disposal/closure process that combines risk-based and volume-based approaches. If this is the case, then CTUIR must be a party to the discussions so that the proper technical and regulatory issues are adequately addressed. The Tri-Party Agreement currently requires that each tank be retrieved to a pre-determined percentage, and only if this is not practicable will negotiations be started on an individual tank basis for an alternative remedy. The TWRS EIS did not seem to recognize this.

Response Major Federal actions significantly affecting the environment are required by NEPA to consider alternatives to the proposed action. Neither NEPA nor its implementing regulations (40 CFR 1500-1508) make any provision for excluding an otherwise reasonable alternative from the analysis on the basis of noncompliance with existing law, regulation, or agreement. Rather, an EIS must state how alternatives considered will or will not achieve requirements of environmental law and policy (40 CFR 1502.2d). For a related discussion please refer to the response to Comment numbers 0072.80 and 0072.05.

DOE recognizes the CTUIR interest in the Tri-Party Agreement. Section 10.10 of the Tri-Party Agreement acknowledges and defines the involvement of affected Tribal Nations. DOE remains committed to fulfillment of the stated requirements.

Any item in the Tri-Party Agreement may be renegotiated if agreeable to the parties. Tri-Party Agreement Milestone M-45-00 does not include the word "only" as stated in the comment. Therefore, the Tri-Party Agreement identifies circumstances that could result in modification of retrieval criteria. It does not exclude modification in response to other circumstances.

Comment Number 0094.02 *Moore, Jennifer*

Comment I think the Tri-Party Agreement should adhere to be ... I mean, excuse me, I think the Department of Energy should adhere to the Tri-Party Agreement which they entered into willingly.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Having agreed to the Tri-Party Agreement, DOE has complied with and will continue to comply with the Tri-Party Agreement. The Tri-Party Agreement provides a mechanism for dispute resolution, annual review, and renegotiation. This mechanism permits accommodation of unforeseen implementation problems, new information, better, faster, or cheaper technology, or other factors that the parties agree require consideration and decision. Please refer to the response to Comment numbers 0062.01 and 0072.52.

Comment Number 0101.09 *Yakama Indian Nation*

Comment The EIS should be revised to take into consideration the conditions and regulatory impacts, including potential cost impacts, associated with the potential future regulation of privatized and/or Government nuclear facilities and nuclear material possession and handling.

Response The potential effect of regulation on privatization was considered throughout the analysis of potentially applicable regulations. Other than the likelihood of NRC licensing of privatized facilities, no major difference was noted. Any change in regulation of government nuclear facilities is speculative and without basis for analysis in the EIS; therefore, no change has been made to the EIS.

L.6.3 INCIDENTAL WASTE

Comment Number 0005.57 *Swanson, John L.*

Comment On page 6-19 it is said (following a sentence regarding incidental waste) "Therefore, DST waste not exceeding the Class C standards would be suitable for disposal as incidental waste." This is an illogical conclusion (with reference to the preceding sentence), and I do not believe that it is a correct interpretation of "policy."

Response This sentence was not intended to be a conclusion. The sentence has been revised to state that the incidental waste would not exceed the concentration limits for Class C LLW, as defined in 10 CFR 61.

Comment Number 0069.05 *Pollet, Gerald*

Comment When we look at these alternatives. Let me go back up, throw on this slide for the alternatives. When we look at the alternatives, we look at, what we're talking about is claiming some fraction of these wastes are high-level, and some fraction are low-level. This EIS is based on assumption that violates Federal law. Federal law considers all wastes that are in the tanks as the by-product of the nuclear weapons separations process, and the reactor created fuel that was basically melted down, turned into the liquid high-level waste. All of it is high-level waste. And one question is whether not we as the public, and the State of Washington, should be willing to say that, oh, after you separate it some portion is going to be claimed to be low activity, and therefore low-level waste and can be buried at Hanford forever, and only a tiny smidgeon needs to be considered legally high-level waste. The law is very clear. It is all high-level waste. Therefore, no matter how you calculate this repository fee, because it is based on essentially the waste content, it really doesn't vary. It doesn't vary legally, because it is based on the waste content. So whether or not you separate it, the repository fee isn't going to vary.

Response No Federal law requires placing DOE HLW in a geologic repository or prohibits separating HLW components from a residual of other waste components. Nor are there Federal laws that prohibit disposal of the LAW residual in accordance with applicable LLW disposal criteria. In support of a denial of petition for rulemaking (58 FR 12342), the NRC reviewed DOE's earlier plans to separate Hanford Site tank waste into concentrated HLW for geologic disposal and LAW for disposal onsite in near-surface vaults. The NRC concluded that, on the condition that most of the originally generated radioactive material would be recovered, the residual waste material should be classified as incidental waste because these wastes are incidental to the process of recovering HLW. The NRC concluded that the residual waste would not be HLW and therefore not be subject to NRC licensing authority (58 FR 12342). DOE has authority to dispose of the incidental waste in accordance with LLW disposal criteria. Applicable regulatory requirements are discussed in the Summary and Volume One, Section 6.0.

The amount of HLW that ultimately could be accepted at a national repository is a function of available subsurface area and emplacement constraints among HLW and SNF within this area. In addition, there is a statutory limit on emplacement of HLW and SNF in a first repository (70,000 MTHM) until a second repository is in operation. As a planning basis, the Department has allocated 10 percent of the statutory capacity of the first repository for defense SNF and HLW.

The physical amount of available subsurface area for HLW and SNF disposal and the associated number of packages of HLW and SNF would be defined through repository design and performance assessment activities based on information collected during repository scientific investigations. Neither

of these activities is completed. However, for planning purposes, the repository Advanced Conceptual Design assumes that 12,900 canisters of defense HLW, each containing 0.5 MTHM, can be accommodated within the statutory limit.

A number of factors are important in estimating disposal costs including number and size of canisters handled, number of waste packages, operation and capital costs, and number of shipments to a repository. In addition, there are common costs that must be allocated among waste generators, such as development and evaluation costs, to ensure full cost recovery. Using radionuclide inventory of Hanford HLW relative to other waste would not provide an equitable basis for cost estimating. Please refer to the response to Comment numbers 0004.01, 0057.04, and 0081.02 for information regarding repository cost and capacity issues. Because the information contained in the Draft EIS is correct, no change to the text was made.

L.6.4 OTHER

Comment Number 0005.08 *Swanson, John L.*

Comment Going into this review, I was most interested in seeing how the HLW disposal aspects were handled-because I have been hearing different stories for some time regarding not only what the costs of such disposal were likely to be, but also what are the laws/rules governing such disposal and what are peoples interpretations/speculations on things such as how much space will be available for defense HLW in the first repository. Unfortunately, this EIS did nothing to clarify the issues; in fact, I feel that it contains misinterpretations of the facts. I feel that a much greater effort should have been devoted to understanding and explaining the issues involved in this area. Maybe the picture is really so muddled that it is not possible to understand; if so, it is a pretty sad commentary on the abilities and actions of the DOE. Some examples of my and/or your confusion in this area are:

(a) I do not believe that there is a "canister count" limit for defense HLW in the first repository, but this draft repeatedly assumes one- and compares the number of canisters estimated for the different alternatives to that assumed number.

(b) I do believe that there is a MTHM limit on the first repository; and that all of the alternatives that send all of the HLW to the repository would contribute the same to this limit (e.g., the extensive separations and the ex situ/no separations case would send essentially the same amount of radioactivity to the repository).

(c) I have heard that there is an "equivalent MTHM" value that is to be applied to defense HLW, but I see no mention of it in this EIS. (The EIS says that ~100,000 MTU were processed at Hanford, and that the TOTAL limit on the first repository is 70,000 MTHM; unless there is an "equivalent MTHM" factor, the Hanford waste alone would exceed the total capacity of the first repository).

I hope to be able to dig into these issues to resolve them to my satisfaction, but that likely won't happen until the EIS comment period has expired so I will send these comments now. If I should be able to learn more in time, I will send you additional comments.

Response As noted in Section 6.2.1, DOE's Waste Acceptance System Requirements Document contains a limitation of 13,200 canisters of defense HLW at the first repository (DOE 1994g). The EIS uses the best estimates of future HLW storage capacity for comparisons.

As noted in Section 6.2.1, the OCRWM has set aside 7,000 MTHM of the first repository capacity for disposal of DOE-owned spent nuclear fuel and HLW. This capacity allocation only addresses the thermal and radioactivity loading of the repository. There also may be practical limitations to the volume capacity if large volumes of relatively dilute HLW are to be disposed of, such as under the Ex Situ No Separations alternative. The extensive separations and no separations alternatives would contribute essentially the same to the thermal and radioactivity loading but orders of magnitude different volumes.

The Nuclear Waste Policy Act, under section 114, requires the NRC to limit the emplacement in a first repository to a quantity of spent fuel containing in excess of 70,000 MTHM or a quantity of solidified HLW resulting from the reprocessing of such a quantity of spent fuel until a second repository is in operation. For planning purposes, DOE has assumed that a standard canister of solidified HLW contains 0.5 MTHM. This is based on equating the relative fuel burnup in megawatt-days per metric ton for HLW compared to the burnup for a standard nuclear fuel. Under this assumption, the repository Advanced Conceptual Design can accommodate up to 12,900 canisters of vitrified HLW in a first repository within the statutory limit on the first repository and the allocation of 7,000 MTHM for defense SNF and HLW. Please refer to the response to Comment numbers 0004.01, 0081.02, and 0069.05 for related discussions. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0005.58 *Swanson, John L.*

Comment Also on page 6-19, it is said "DST waste is currently designated HLW." I thought that the DST wastes in the two NCRW tanks and in the PFP tank were considered to be TRU waste instead of HLW.

Response The sentence has been revised in the Final EIS to state that, "most DST waste is currently designated as HLW."

Comment Number 0009.13 *Broderick, John J.*

Comment Some of the sections on Implementability use compliance with DOE policy or Federal and State requirements after 100 years as a decision criterion. Do not do this. They will change in a hundred years. Use only the status of the waste and health effects based on scientific analysis as the decision criteria.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. It is agreed that Federal and State requirements may change. However, current requirements must be considered in making decisions that could incur a future commitment for additional action. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0036.17 *HEAL (Exhibit)*

Comment In addressing the contamination of groundwater, the EIS states, "Current drinking water quality standards do not apply beyond 1,000 years. Therefore, contaminant levels as reported beyond 1,000 years are for comparison to the current standards and are not exceedances of the standards" (p. 5-11). What does this mean? What is the purpose and intent of this passage?

Response The two sentences are incorrect and have been deleted from the Final EIS.

Comment Number 0040.04 *Rogers, Gordon J.*

Comment Regulatory compliance (for the In Situ Fill and Cap alternative) will of course require resolution; however, here is a perfect example of the appalling unfairness of spending huge sums of limited taxpayer funds to reduce already low risks from nuclear wastes when other risks of injury or death to workers and the public are far larger. I think Congress will see the light on this; and I want to see them tackle this issue.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives. NEPA requires that all reasonable alternatives be evaluated, regardless of compliance to existing regulations. However, DOE and Ecology intend to comply fully with all Federal, State, and local regulations and ordinances applicable to tank waste remediation. The EIS is not a cost benefit analysis. An EIS presents costs and risks in an even handed manner for the public and the decision makers to support a comparison among alternatives. Please refer to the response to Comment numbers 0072.52 and 0072.80 for related discussions.

L.7.0 SCOPING, PUBLIC PARTICIPATION, AND CONSULTATIONS

Comment Number 0012.19 *ODOE*

Comment Appendix J of Volume Five contains "Consultation Letters" to various regulatory agencies, States and Tribes. While perhaps complying technically with the legal requirements, the "Consultation Letters" do not meet what we believe is the intent of NEPA. That is to consult with and obtain the comments from agencies with regulatory authority or special expertise, States and Tribes. The letters

were sent with little information and without discussion. Lacking detailed information, the recipients cannot make meaningful comment on USDOE's plans. Oregon did not have sufficient information until receipt of the draft EIS and was not invited to participate in the formulation of the EIS. NEPA requires cooperation of Federal Agencies in preparation of environmental analyses from inception to ensure good analyses are performed and good decisions are reached based on a through understanding of the potential problems and impacts. A letter near the end of the process which describes the purpose of the EIS in the broadest terms does not accomplish these goals and does not meet the intent of NEPA. Oregon expects to be included from the inception in future analyses and throughout environmental analyses of actions which may impact the Columbia River.

Response The consultation letters contained in Volume Five, Appendix J represent one of several forums for consultation with agencies and Tribal Nations that were provided in accordance with NEPA (i.e., 40 CFR 1501.2, 1501.5-7, 1502.25, 1503.1-4, and 1506.02) and SEPA (i.e., 197-11 WAC) regulations. DOE and Ecology value the input from stakeholders, Tribal Nations, and State and Federal agencies and believe that the intent and spirit of NEPA and SEPA regarding consultation and public involvement during the NEPA process have been met.

The consultation process formally began with the publication of the Notice of Intent Notice of Intent in the Federal Register on January 28, 1994 (FR 4052). At that time, DOE announced its intent to prepare the TWRS EIS and invited all interested parties, including the public, State and Federal Agencies and Tribal Nations, to comment on the scope of the TWRS EIS, as well as significant issues that DOE should consider when preparing the EIS. The Notice of Intent provided background on the scope of the EIS, information on the TWRS program, information on the purpose and need for agency action, alternatives that would be considered in the EIS, and the regulatory framework for the EIS. The Notice of Intent also announced a scoping period of 45 days during which DOE would accept written comments. Further, during the scoping period, DOE conducted five public meetings at which oral and written comments were accepted. Two hearings were held in the State of Oregon. During the scoping period, several state and Federal agencies submitted comments to DOE that were used to define the scope of the EIS, alternatives to be considered in the EIS, and areas of impact analysis to be included in the EIS.

Subsequent to the public scoping process and prior to the publication of the Draft EIS on April 12, 1996, DOE and Ecology held meetings with stakeholders, the Hanford Advisory Board, the Hanford Natural Resources Trustee Council, Tribal Nations, and various state and Federal agencies regarding the preparation of the EIS. Many of these meetings were initiated by DOE or Ecology to solicit input regarding specific issues to be addressed in the EIS or to receive input regarding emerging data relevant to the TWRS EIS. Other meetings were initiated by stakeholder organizations, Tribal Nations, or agencies to receive information from DOE and Ecology regarding the progress and content of the TWRS EIS.

In November 1995, to supplement the scoping process and other consultation activities following the scoping period, DOE and Ecology transmitted formal consultation letters to local, state and Federal

Agencies, and Tribal Nations. In response, several state and Federal agencies, and Tribal Nations provided written information on issues considered important to address in the EIS or to request additional consultation meetings to discuss specific concerns.

The next step in the consultation process, as specified by NEPA, is to provide a copy of the Draft EIS to applicable local, state and Federal agencies, and Tribal Nations to obtain comment on the Draft EIS. The Draft EIS was distributed to more than 30 local, state and Federal agencies, and four Tribal Nations. This distribution also included Oregon Department of Energy, Oregon Hanford Waste Board, Oregon Department of Transportation, and Office of the Governor. A notice of availability was published in the Federal Register on April 12, 1996, and April 15, 1996, and a public notice was published in the Portland and Hood River newspapers on April 12, 1996. These notices provided information regarding the alternatives considered in the Draft EIS and solicited written comments from interested agencies, Tribal Nations, and the public during the public comment period (April 12, 1996 to May 28, 1996). During the comment period, a public hearing was held in Portland, Oregon so that agencies and other interested parties could provide oral comments on the Draft EIS. Oregon Department of Energy participated in the planning and operation of the Portland hearing. Oregon Department of Energy also submitted oral comments at this meeting, as well as written comments on the Draft EIS.

Oregon Department of Energy and other agency comments were considered when preparing the Final EIS. Response to the Department's comments on the Draft EIS are provided in this appendix and changes to the EIS have been incorporated as indicated in the responses. DOE and Ecology value the Oregon Department of Energy's comments and believe these comments contributed to improving the EIS. Please refer to the response to Comment numbers 0072.149, 0072.252, 0072.53, and 0072.271 for a discussion of consultations with Tribal Nations.

Comment Number 0101.10 *Yakama Indian Nation*

Comment The Yakama Indian Nation (YIN) previously commented on the scope of the subject EIS in a letter of March 28, 1994 and on the Tank Waste Remediation System (TWRS) functions and requirements document (DOE/RL-92-60) in a letter of March 23, 1995.

These letters, copies of which are attached to this letter, address issues, many of which remain unresolved with the TWRS Draft EIS. All of the issues addressed below have been previously identified in YIN ER/WM meetings with DOE and DOE contractor personnel working on the subject EIS.

Response DOE and Ecology considered the comments of the Yakama Indian Nation submitted on the scope of the TWRS EIS in developing the scope of the EIS, the alternatives to be considered in the EIS, and the areas of environmental impact analysis included in the EIS. The DOE and Ecology responses to the comments of the Yakama Indian Nation on the scope of the EIS are documented in the Implementation Plan for the Draft TWRS EIS (DOE 1995b). Among the comments incorporated into

the EIS alternatives and/or impact analysis were 1) evaluation of an alternative involving the disposal of all wastes to an offsite repository (the Ex Situ No Separations alternative); 2) evaluation of an option that would calcine rather than vitrify the waste stream (calcination option to the Ex Situ No Separations alternative); 3) evaluation of retrieval storage of treated waste; 4) evaluation of railcars for transportation and storage of tank waste (addressed in the interim action SIS EIS [DOE 1995i]); 5) addressing of land-use restriction associated with each alternative; 6) addressing of impacts associated with leaks associated with retrieval; 7) management of gaseous waste streams; and 8) impacts to cultural and natural resources.

The issues addressed in the remainder of the comment letter on the Draft TWRS EIS are addressed elsewhere in this Appendix (please refer to the response to Comment numbers 0101.01 to 0101.09). As indicated in the comment, DOE and Ecology met with the Yakama Indian Nation and other affected Tribal Nations throughout the NEPA process for the TWRS EIS. These meetings and meetings following the publication of the Draft EIS for public comment have resulted in substantive changes to the Final EIS based on the advise and input of representatives of the Tribal Nations. For a discussion of the consultation process, please refer to the response to Comment number 0072.149. Please also refer to the response to Comment numbers 0072.37, 0072.40, 0072.156, 0072.160, 0069.07, 0101.03, 0072.198, 0072.252, and 0072.225 for discussions of selected changes to the EIS based on comments by Tribal Nations. Because the information contained in the comment is addressed elsewhere (e.g., in the Implementation Plan for the EIS, in responses to other comments, or in the text to the Draft EIS), no modification to the document is warranted.

L.8.0 LIST OF PREPARERS

No comments were submitted for this topic.

L.9.0 NEPA-RELATED COMMENTS

L.9.1 EIS PRESENTATION AND DISTRIBUTION

Comment Number 0042.02 *EPA*

Comment EPA has authorized the Washington State Department of Ecology to be the single regulatory authority for Resource Conservation and Recovery Act requirements on the Hanford Site. Although the formal public comment period began on April 12, 1996, copies of the draft EIS were not received by our Environmental Review Program office in Seattle until May 10, 1996, 30 days into the 45-day comment period. Therefore, we will not be conducting a detailed review of this Draft EIS. However, based on our previous endorsement of the single regulatory authority approach and the extensive involvement of Ecology as a co-preparer of this Draft EIS, we do not foresee having any critical environmental objections to the proposed project.

Response DOE submitted five copies of the Draft EIS to EPA headquarters in Washington, D.C. on April 5, 1996. Subsequently, copies were requested by EPA Region X for purposes of review and an additional five copies were sent to EPA Region X on the day the request was received by DOE. After the EIS had been received by EPA, DOE and Ecology met with EPA staff to facilitate the EIS review.

DOE and Ecology informed EPA that the agencies would provide whatever support was necessary to ensure a timely and complete review of the EIS. EPA Region X subsequently informed DOE and Ecology that the agency would not be conducting a detailed review of the EIS. Please refer to the responses to Comment numbers 0007.01 and 0044.01 for information related to this comment.

L.9.2 CLOSURE

Comment Number 0012.12 *ODOE*

Comment This EIS does not govern closure of the tanks and tank farms. This is appropriate. Decisions on closure of tanks and tank farms and what to do about leaked tank waste must be the subject of a separate EIS.

Response DOE and Ecology acknowledge the comment and provide a discussion that supports the comment in Volume One, Section 3.3 on pages 3-18 to 3-20 of the Draft EIS. Please also refer to the response to Comment numbers 0005.17, 0019.03, 0072.08, and 0101.06 for a discussion of the relationship between the TWRS EIS scope and closure of the tanks.

L.9.3 SCOPE

Comment Number 0010.01 *GRAY*STAR*

Comment One page B-25 is the following paragraph:
DOE is pursuing alternative uses for the cesium and strontium capsules, however, no acceptable uses have been found. If no future uses for these capsules are found, the capsules eventually would be designated as HLW and managed and disposed of consistent with the TWRS EIS alternative selected for implementation.

As outlined in the attached "Privatization of Isotope Activities: GRAY*STAR, Inc. Expression of Interest, May 28, 1996", we believe that there is an alternative and driving use for the cesium and ultimately the strontium capsules. Further, we believe that there is an immediate need for ALL of the Cesium-137 at ALL of the government laboratories.

If a plan similar to that outlined in the enclosed Expression of Interest is put into effect, there will be several immediate and long range benefits, which include but are not limited to:

1. No need to "bury" the HLW. This would lead to a cost avoidance by the United States taxpayers in the billions of dollars as outlined in the EIS. It would also avoid overall impact to the environment. Or, at worst, allow more room at a repository for other (perhaps civilian) waste.
2. The immediate savings on the WESF building would be approximately $10,000,000 per year with a total cost savings from $112,000,000 to $697,000,000 as outlined in the EIS.
3. The 100 jobs outlined for the WESF building would be reduced and privatized.
4. The tank Remediation would be simplified (thus savings in both costs and environmental impact), because of the simplification of dealing with the wastes after the HLW is removed.

(For example, the HLW could be removed from the tanks prior to full TWRS implementation. This would be similar to the project which produced the existing WESF material.)

5. The process could be sped up which would lead to some cost savings and major savings on environmental damage.
6. There would be no legacy of stored DOE HLW in the future, either in 100 years, 1,000 years or 1,000,000,0000 years.
7. The GRAY*STAR™ will reduce worldwide food borne disease.
8. The GRAY*STAR™ will open up phytosanitary restrictions and allow for greater trade between nations.
9. The GRAY*STAR™ will allow the reduction/elimination of post harvest fumigants which are harmful to both health and the environment.
10. The manufacture of GRAY*STAR™ units will lead to an expansion in heavy steel fabrication orders, helping the economy.

In summary, there is an immediate use for the existing cesium and perhaps strontium capsules now stored in the WESF building. This use will result in major cost savings, both monetary and environmental. This use extends to all of the cesium, and perhaps strontium, which is still in the 177 tanks as well as the MUSTs. Therefore, the impacts as outlined in the EIS could be further significantly reduced.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on cesium and strontium capsules. The TWRS EIS addresses the management and disposal of the capsules. Analysis of potential beneficial users of the capsules is outside of the scope of the EIS. However, the information will support DOE's decision regarding the designation of the capsules to be available for disposal. Please refer to the response to Comment number 0006.01.

Comment Number 0012.11 *ODOE*

Comment Treatment of the Hanford tank wastes was the subject of an extensive Tri-Party public involvement process two years ago associated with a proposal by USDOE called Tank Waste Remediation System Rebaselining. The Tri-Parties also formed the Tank Waste Task Force at that time to discuss these issues. The public overwhelmingly rejected USDOE's plans to place the low-activity waste from tanks in a grout waste form in favor of vitrifying the waste. All of the public comment from that process is directly applicable to this EIS and should be included in this EIS.

Response In Volume One, Section 1.1, DOE and Ecology acknowledged the important role of the Tank Waste Task Force in considering the revised technical strategy for TWRS and the extensive public involvement process associated with the renegotiation of the Tri-Party Agreement in January 1994. The Draft EIS also stated that one of the major developments since the 1988 Hanford Defense Waste EIS ROD was the termination of the planned low-activity grout project in response to public concerns. Grout was considered in the EIS as an available immobilization technology and addressed in Volume Two, Appendix B. However, it is important to note that the current TWRS planning basis, the

Tri-Party Agreement, and the preferred alternative all specify that the LAW, as well as the HLW, will be immobilized with the assumed waste form being a vitrified glass. Please refer to the responses to Comment numbers 0035.04, 0036.13, 0038.01, 0038.05, 0038.10, 0052.01, 0055.03, and 0072.05.

DOE and Ecology considered the values and recommendations of the Tank Waste Task Force in developing the TWRS EIS alternatives. Within the EIS, DOE and Ecology have incorporated the role of the Tank Waste Task Force into the TWRS program and amended Tri-Party Agreement technical strategy and, ultimately into the identification of the preferred alternative. Because the information contained in the Draft EIS is correct, no change to the text was made.

Comment Number 0055.03 *Martin, Todd*

Comment Second, our second bullet is the TWRS EIS is not responsive to public concerns and here primarily we are referring to the Tank Waste Task Force. Two years ago when we finished up the Task Force, we said call this a NEPA equivalent and let us get on with it. Unfortunately, DOE and Ecology decided to do this EIS. We said okay, that is maybe alright, but what you should do is just look at flushing out the impacts of the preferred alternative. That has not happened. What we have got is a behemoth of a document that analyzes every possible alternative.

Response The Tank Waste Task Force identified several "principles" to guide the Tri-Party Agreement negotiations. These principles were defined as "values that should be applied to the overall agreement." During scoping for the TWRS EIS, individual commentors did support the concept that the Tank Waste Task Force and Tri-Party Agreement serve as "NEPA equivalent" activities. However, the Tank Waste Task Force Report specifically states that the Tri-Party Agreement should not be used as a "shield against enforcement of other laws." NEPA and SEPA are both environmental laws that apply to the proposed tank waste action. Neither statute allows the Tank Waste Task Force report to be used as an EIS. Therefore, DOE believes that an EIS was required to support the decisions related to TWRS proposed action, and that the EIS complies with the Task Force value of not using the Tri-Party Agreement to shield enforcement of other laws. Please refer to the response to Comment number 0034.05 for a related discussion.

Prior to initiating the impact analysis in the EIS, DOE and Ecology reviewed the Tank Waste Task Force Report to ensure that the EIS incorporated the issues of concern identified by stakeholders. Ten items were identified in the Tank Waste Task Force Final Report regarding impacts to the environment, including worker and public health safety and protection of the Columbia River. The TWRS EIS incorporates all of the areas of concern identified by the Task Force into its analysis of potential environmental impacts. Please refer to the response to Comment number 0012.11.

The TWRS EIS achieves the value of "getting on with the cleanup" by combining Federal and State environmental impact analyses into one process. DOE and Ecology are co-preparing the EIS to meet NEPA and SEPA requirements, and thereby reducing "paperwork, analytic, and decision-making redundancy."

Finally, in order to comply with NEPA, DOE was required to do more than "flushing out the impacts of the preferred alternative." First, NEPA requires that all EISs compare the impacts of the proposed action to a No Action alternative. Second, NEPA requires that an EIS 1) "rigorously explore and objectively evaluate all reasonable alternatives," 2) "devote substantial treatment to each alternative considered, including the proposed action, so that reviewers may evaluate all comparative merits," and 3) include reasonable alternatives not within the jurisdiction of the lead agency." These requirements can be found in 40 CFR 1502.14.

Comment Number 0063.01 *Donovan, Virgil*

Comment This is kind of the way the government works, and Hanford is not above this. There are contractors down there that even that you see at that time would get in bed with them a little bit, and like to see those contracts continue and get bigger for the community, and one thing or another. We see the same thing happening now with Doc Hastings. He wants to convert the Fast Flux Test Reactor to a tritium production plant. Then he wants to follow that up with a bigger tritium production plant. Tritium was used in the bomb because it was cheaper than diterium, which was a much safer material we used to use in the bomb in the warhead. It didn't bother them a bit to make that change. In fact is was a good place to hide the fact that we produced tritium in any reactor, and so we have a certain amount of it we have to dispose of. Well that gave us a good reason to have a bigger stockpile. We had lots of military contractors out there who'd like that, and I'd hate to see it happen again. I don't want us to produce tritium.

Response The production of tritium and future uses of the FFTF are not within the scope of this EIS; therefore, no modification to the text is warranted.

Comment Number 0063.02 *Donovan, Virgil*

Comment And I think we should be very damn careful about how the politicians get into this, and how much we believe, and how much we believe of the government agencies. Let's keep them at the point, what we're supposed to be looking for here. Clean this plant up. And let's not get into the side issues of building more tritium, which is not needed, or something else to continue operations at Hanford.

Response DOE and Ecology acknowledge the preferences expressed in the comment and share the desire to move forward with remediation at the earliest possible date. Because issues associated with the production of tritium are outside the scope of this EIS, no change to the EIS is warranted.

Comment Number 0067.01 *Browning, Joe*

Comment I think that the public should take into consideration of a new energy system that would bring energy, or nuclear energy to stop radiation leaks into rivers, land, and air would stop.
The energy system is not nuclear power of any sort. It will out produce a nuclear facility, and produce

a new system of energy sources throughout. The DOE has wanted to only take this into consideration for talks and technical review. In other words, nothing will ever happen. They will tell the public, such as tonight through Hanford cleanup, that we don't need any more Hanford cleanup because we don't need any more nuclear waste coming into Hanford. All nuclear facilities will basically consider, through this new energy system, would be stopped. The public is not made aware of a new system that will out-produce a nuclear facility, and put a halt to nuclear problems.

Response The scope of the EIS is to evaluate alternatives for the remediation of the tank waste and cesium and strontium capsules. The topics identified in the comment are not within the scope of the EIS; therefore, no change to the EIS is warranted.

Comment Number 0072.09 *CTUIR*

Comment Both of these critical issues (characterization deficiencies and lack of closure coverage) point to a lack of an overarching programmatic structure, linked to long-term goals, that is framed with a single guiding and truly comprehensive decision document. The current EIS focuses on retrieval as an isolated event that excludes critical assumptions and limiting factors that cannot be separated from preceding, subsequent, successive, incremental, and cumulative actions. The CTUIR SSRP must remain informed about each of these factors which have the potential to result in direct impacts to tribal interests.

Response Please refer to the responses to Comment numbers 0012.14 and 0072.07 for discussions regarding characterization of tank waste. Please refer to the response to Comment number 0072.08 for the reasons for not including closure in this EIS. DOE and Ecology remain committed to open communication and consultation with the CTUIR on all issues potentially affecting Tribal Nation interests. The TWRS EIS addresses the cumulative impacts of past tank waste leaks, the TWRS alternatives, and other related, planned and reasonably foreseeable actions at the Hanford Site in Volume One, Section 5.13. Because the analysis requested in the comment is not within the scope of the EIS, no modification to the document is warranted. Please also refer to the response to Comment numbers 0072.198 and 0072.252.

Comment Number 0072.46 *CTUIR*

Comment Since the Hanford Barrier is an integral part of this EIS, along with the potentially tremendous adverse ecological and cultural impacts of mining the fill and cap materials, will this EIS be used *post hoc* to claim that this aspect of closure was pre-approved? The CTUIR can not endorse the Hanford Barrier as part of closure; nor can the CTUIR endorse closure of tanks as a landfill.

Response The TWRS EIS or the ROD will not be used as an evaluation of closure alternatives, including use of the Hanford Barriers. Closure, use of the Hanford Barrier, and the selection of sites for earthen borrow material will be addressed in a future NEPA analysis. Please refer to the response

to Comment numbers 0019.03, 0019.04, 0072.08, 0089.04, and 0101.06 for discussions of closure and borrow sites.

Comment Number 0072.47 *CTUIR*

Comment Contaminated soil is not included. Making a statement that contaminated soil and groundwater are not included does not excuse DOE from making decision based on the complete source term. The insertion of subsurface and groundwater data has implications that point to closure decisions.

Response Please refer to the response to Comment numbers 0019.03, 0072.07, 0072.08 and 0101.06 for a discussion of the reasons closure, including releases from past practice activities, are not included in this EIS, but will be addressed in future NEPA analysis. Additional NEPA evaluations of the environmental impacts associated with closure, such as potential impacts to habitat cultural resources, human health, and cumulative impacts, would be analyzed. Volume One, Section 5.13 of this EIS discusses the cumulative impacts associated with TWRS and other Hanford Site projects. A discussion of emerging vadose zone contamination data is provided in Volume One, Section 4.2 and Volume Five, Appendix K. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted.

Comment Number 0072.48 *CTUIR*

Comment Contribution of tank waste + soil + gw + all other 200 Area hazardous materials/waste constitute the 200 Area aggregate source term. What apportionment has been considered among these sources relative to the total Hanford long-term and accident risks? The ultimate decision must be based on all sources of risk.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Volume One, Section 5.13 of the EIS, Cumulative Impacts, assesses the cumulative impacts of TWRS and other Hanford projects. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted. However, closure, which includes soil and groundwater contamination from past tank leaks and past-practice sites outside of the tank farms, is beyond the scope of the TWRS EIS. These issues will be addressed in future NEPA analysis for closure, or future CERCLA actions, for past-practice sites in the 200 Areas.

Comment Number 0072.49 *CTUIR*

Comment The risks are estimated due to *new* groundwater contamination and do not include existing groundwater contamination, new contamination as the contaminated soil leaches, nor any other new source of groundwater contamination (from ERDF, US Ecology, other 200 Area materials). This is a

serious flaw in the way that source terms at Hanford are estimated - the Record of Decision must "apportion" the risks among all existing and future sources.

Response Please refer to Volume One, Section 5.13, Cumulative Impacts and Appendix F, which assesses the cumulative impacts of TWRS and other Hanford projects and existing contamination using the best available information. The Environmental Restoration and Disposal Facility (ERDF), US Ecology, other 200 Areas impacts, and TWRS impacts were presented in this section as well. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted. Please refer to the responses to Comment numbers 0012.15, 0030.02, 0040.06, 0072.08, 0072.47, 0091.01, 0098.04, and 0101.05 for related discussions.

Comment Number 0074.02 *Shims, Lynn*

Comment I wanted to formally also offer some kind words to the Department of Energy who have worked very hard on this and working hard to change their image. Because I heard today that to replace the monies lost by the gasoline tax revenues that there had been a proposal again to replace your whole department. And it must be very difficult to work on these gray issues and not get enough respect like that. And I'm also very mad about the fact that here we are smack up against the cold war mortgage legacy to us, given to us by the Department of Defense, who get's more money than they ask for in their budgets, and we're left kind of like the garbage men picking up after them all over the world right here in our own backyards because they have to have enough money to fight a war on two fronts. And I wonder if we're one of the fronts that their fighting against, or that they don't care about our own homeland. And that's a persistent problem.

Response Funding of the DOE and its programs from Congress, the relative merits of funding DOE programs compared to other agencies, or national priorities are not included in the scope of this EIS; therefore, no change to the text of the EIS is warranted. Please refer to the response to Comment 0014.04 for a discussion of funding issues.

Comment Number 0075.02 *Wright, Peter*

Comment And I just want to thank you very much, and I hope you get all the funding you need because we do need, as that woman said, a lot more money to clean it up than we do to continue making the messes.

Response DOE and Ecology support the desire to obtain the necessary funding to complete the project. Funding of the DOE and its programs is not included in the scope of this EIS. The EIS presents data regarding the potential costs of the alternatives analyzed in the EIS to assist the public and decision makers in the consideration of the alternatives. Please refer to the response to Comment numbers 0014.04 and 0074.02.

Comment Number 0076.04 *Blazek, Mary Lou*

Comment Although we support the preferred alternative, it will not resolve all the issues related to the high-level waste at Hanford. We believe there will continue to be a need for ongoing monitoring, characterization, and pumping and treating of groundwater contamination caused by waste, which has leaked and migrated from the tanks. We will continue to support fast, speedy, and cost-effective cleanup at Hanford. We believe the preferred alternative is a step in that direction. Thank you.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The monitoring, characterization, and remediation of the groundwater caused by past practice activities is not within the scope of this EIS, but remains a concern of DOE and Ecology and will be addressed in a future NEPA analysis. The TWRS EIS discusses, to the extent practicable, the relationship between the tank waste remediation alternatives and future Hanford Site cleanup decisions. Please refer to responses to Comment numbers 0040.06, 0072.07, and 0101.05 and the Volume One, Section 5.13 discussion of cumulative impacts.

Comment Number 0078.01 *ODOE (Exhibit)*

Comment A year after this process and negotiations ended USDOE changed course. USDOE began a program to reduce costs and privatize the tank waste program. In the process, they laid off the workers that were key to the program. In the process, they laid off the workers that were key to the program for designing and building the glass plants. The plant was to convince private companies to submit bids for and then build plants to convert the tank waste to glass. That would be cheaper and faster than USDOE could do.

Many stakeholders, including Oregon, expressed reservations about USDOEs ability to succeed at privatization.

Response Privatization is discussed in Volume One, Section 3.3 and is simply a contracting mechanism, which is beyond the scope of this EIS. Under this concept, DOE would competitively bid a portion of the remediation work instead of having the Site Management and Operations contractor perform the work. Equivalent requirements for retrieval, treatment, and disposal of the waste would apply regardless of how DOE contracts to perform the remediation. Please refer to the responses to Comment numbers 0079.06 and 0088.05.

Comment Number 0078.05 *ODOE (Exhibit)*

Comment This EIS makes no decisions about what to do with the tanks or leaked tank waste. This is deferred to a later Environmental Impact Statement. Decisions about the fate of the tanks and leaked waste must be based on a thorough understanding of the fate of this waste. Modeling alone is

insufficient. USDOE must begin now a program to determine the fate of all of the waste leaked from the tanks, cribs, trenches, reverse wells, and other disposal facilities.

Response The remediation of leaks and releases during past practice activities are part of tank farm closure and are not within the scope of this EIS. However, DOE has a program to monitor and characterize these releases and will address remediation of these releases in a future NEPA analysis. Volume One, Section 5.13 and Appendix F contain a description of the potential cumulative impacts of tank waste remediation with other Site activities and past practice releases using the best available data. Please also refer to the responses to Comment numbers 0012.15, 0030.02, 0072.08, 0072.47, 0076.04, 0091.01, and 0098.04.

Comment Number 0078.06 *ODOE (Exhibit)*

Comment The comprehensive impact of disposed and leaked wastes on the groundwater and future health of the environmental and citizens of the Northwest must not be a guessing game. We do not know enough today to decide what to do about these wastes. In depth analysis of the actual fate of the leak tank waste is needed before decisions can be made about what to do with the leaked tank waste and the tanks themselves.

Response There is currently insufficient information to address remediation of past practice activities for the tank farms. The scope of the EIS is the management and disposal of the tank waste and cesium and strontium capsules. Remediation of past practice tank waste leaks is not within the scope of this EIS, but will be addressed in a future NEPA analysis. Please refer to the responses to Comment numbers 0012.15, 0030.02, 0072.08, 0072.47, 0076.04, 0091.01, and 0098.04.

Comment Number 0079.06 *Knight, Paige*

Comment If privatization fails, you must start over. Do it quickly, but you must do it. The DOE must not have the sole authority to determine failure in this process.

Response The Draft EIS addresses regulatory compliance for each alternative in Volume One, Section 6.2. However, the relative authority and responsibilities of the agencies under the Tri-Party Agreement are beyond the scope of the EIS. The 1996 Tri-Party Agreement amendment contains a contingency plan in the event that privatization failed to meet established criteria. Therefore, both Ecology and EPA are part of the decision-making process concerning the success of privatization. Please refer to the responses to Comment numbers 0072.73, 0072.74, 0078.01 and 0088.05.

Comment Number 0087.02 *Tewksbury, Ross*

Comment Now, one of the problem that Hanford has had over the years, which seems to be setting back in here with the problems with the budget and the Congress, is that it's doing things on the cheap,

or only taking halfway measures, and it winds up being far more expensive in the long run. And the whole history of Hanford is one of the worst examples of this type of thing.

Response DOE and Ecology share the desire and expectation that Congress will provide the necessary funding to perform the remediation alternative selected. However, funding issues are not within the scope of this EIS.

Comment Number 0088.04 *Porter, Lynn*

Comment Okay, I would like to see Casey Ruuds' research into the waste migrating through the soil towards the groundwater, I'd like to see that fully funded. As I said earlier, I would be really upset and angry if DOE fires Casey Ruuds, because I think we really need him out there.

Response The emerging information concerning contamination in the soil column from past-practice activities was discussed in Volume One, Section 3.3 of the Draft EIS; and the Final EIS has been modified in Volume One, Section 4.2 and Volume Five, Appendix K to add additional discussion of this information. In Volume One, Section 3.4 and Appendix B, the EIS indicates that characterization and monitoring of the vadose zone and groundwater associated with tank leaks is among the ongoing operations that would continue under all alternatives analyzed in the EIS. DOE has implemented a program to better characterize the leaks from past practice activities. However, closure that would address alternatives for remediating contaminated soil and groundwater, the funding of particular projects and the employment of individuals are beyond the scope of the EIS. Please refer to the responses to Comment numbers 0012.15, 0030.02, 0078.08, 0091.01 and 0098.04.

L.9.4 NEED TO PREPARE THE EIS

Comment Number 0005.07 *Swanson, John L.*

Comment I do not believe that this EIS will be used to aid decision makers, other than to provide for them as much justification as possible for decisions that they have already made. Shouldn't it really have been written before the Tri-Party Agreement was reached?

Response NEPA does not preclude DOE from identifying a preferred course of action before an EIS is prepared. NEPA does require DOE to provide the decision makers and public with information regarding the potential environmental impacts of any proposed action and reasonable alternatives so that when decisions to irretrievably commit the agency to a specific course of action are made, environmental consequences are considered by the decision makers.

Similarly, the TWRS EIS will provide the decision makers and public with information regarding the potential environmental impacts of the proposed action, which includes the current Tri-Party Agreement approach. The ROD for the TWRS EIS will document the decisions made regarding tank waste management and disposal. DOE and Ecology believe that the EIS will provide one more valuable source of information to be used by the decision maker to reach a final decision on tank waste

management and disposal. Please also refer to the response to Comment numbers 0005.09, 0034.05, and 0055.03.

Comment Number 0009.01 *Broderick, John L.*

Comment I attended the May 2 public hearing in Pasco. One comment that came up several times in the testimony and in discussions in the back of the meeting room was: We should not reopen this issue; we have already decided how to deal with these wastes. My answer to that comment is that it is being reopened because Hanford can not seem to complete projects. We try to clean up Hanford without any health effects, with facilities that take too long to construct, and with project that cost too much money.

Response Please refer to the response to Comment number 0034.05, which addresses a similarly worded comment.

Comment Number 0034.05 *Belsey, Richard*

Comment And in January of 1994, the agreement was signed. And we thought okay now they are going to get on with it. And the Tank Waste Task Force said get on with it because it is so expensive and it's so unsafe.

Then we found out that they were not going to start with the preferred alternative and go and look at the impact of that, but that because of the size of the program and such they needed to do this full Environmental Impact Statement.

That was not the sentiment of the people of the Northwest who made up their minds and essentially voted with their feet to come and tell us about that in all these meetings.

Response The EIS was initiated because DOE is required by NEPA to complete an EIS when considering an action that could significantly affect the quality of the human environment (40 CFR 1500). Failure to complete an EIS would pose a legal risk to the implementation of tank waste retrieval, treatment, and disposal actions. Also, State law requires preparation of an environmental analysis under the SEPA to support subsequent State actions, such as granting permits for construction and operation of facilities (WAC 197-11).

As indicated in Volume One, Section 1.1, the TWRS EIS is being prepared in response to several important changes since the 1988 Hanford Defense Waste EIS ROD. These changes, which included substantial changes in the actions identified in the 1988 ROD (e.g., signing of the Tri-Party Agreement and changes to the proposed action), required DOE to prepare an EIS. This requirement is based on CEQ regulations (40 CFR 1508.18) that require an EIS when:

- Adopting official policy, such as ... "formal documents establishing an agency's policies which will result in or substantially alter agency programs."

- A Federal action includes "adoption of formal plans, such as official documents prepared or approved by federal agencies which guide or prescribe alternative uses of federal resources, upon which future agency actions will be based."

In this case, the formal document and plan that would alter DOE policies and require alternative uses of Federal actions was the revised approach to tank waste remediation contained in the 1994 amendments to the Tri-Party Agreement. Therefore, DOE initiated the EIS to comply with NEPA.

In preparing the EIS, DOE was required to evaluate the proposed action, a no action alternative, and reasonable alternatives to the proposed action (40 CFR 1502.14). CEQ regulations (40 CFR 1502.14) require an EIS to:

- "Rigorously explore and objectively evaluate all reasonable alternatives..."
- "Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits."

DOE and Ecology view the TWRS EIS as a necessary step in the continued progress in managing and disposing of the tank waste. This document ensures compliance with NEPA and SEPA and provides the public and decision makers with an analysis of the comparative impacts on human and natural environment and a range of considered alternatives.

In response to these requirements, DOE developed alternatives for evaluation that included the no action alternative, alternatives based on the Tri-Party Agreement approach to tank waste management and disposal, alternatives recommended for consideration during the scoping process, and a range of reasonable alternatives that were representative of the alternatives available on the continuum from no action to full retrieval and disposal of the tank waste. Please refer to the response to Comment numbers 0005.07, 0005.09, 0055.03, and 0072.05 for related discussions.

Comment Number 0055.02 *Martin, Todd*

Comment The first thing I would like to talk about is a HEAL fact sheet which is on the back table over there. First bullet we have on this fact sheet is something that has been said before that the TWRS EIS is essentially a step backwards. It ignores a widely supported body of documentation that led to the current Tri-Party Agreement plans. Essentially the work in this EIS has been done before and it has been done better. We should rely on that and go forward. Continues to debate the issues that have long been resolved. What waste form are we going to use? Dr. Belsey spoke very elegantly about sticking with glass. Let us get on with it.

Response In preparing the EIS, DOE and Ecology incorporated past documentation that led to the current Tri-Party Agreement plans to the extent that the information was relevant and provided the best and most currently available data on which alternatives could be developed and the applicable alternative impact analyzed. In many cases, the data used during the Tri-Party Agreement renegotiations were the best available data. However, new data were used to address the substantial

issues described in the EIS. Please refer to the responses to Comment numbers 0034.05 and 0072.05 for discussion of NEPA requirements relative to analyzing environmental impact of alternatives for management and disposal of tank waste.

Comment Number 0064.02 *Roecker, John H.*

Comment I guess I would just like to close by emphasizing what some of the gentlemen have already said about getting on with it. And I'll just give you a little bit more history. The first defense waste management plan was written in 1972. 1972. The second one was written in 1983. The third one basically was written in 1988 when the Tri-Party Agreement was first signed. The fourth one was written in 1994 when the Tri-Party Agreement was renegotiated. We have gone through this study at least four times, the history that I know. We have come up with basically the same conclusion every single time. There has been one change in all those 25 years. And that is we've abandoned grout as the low-activity waste form, and gone to vitrification. Every thing else has changed -- has stayed the same. Nothing has changed. And I guess I just urge DOE, the Federal government, to let's get on with cleanup at Hanford. It's way past due. Thank you.

Response As indicated in Volume One, Section 1.1, management and disposal of the Hanford Site high-level tank waste has been a long-term issue of concern and study. As new data have become available, the strategy planned for the management, treatment, and disposal of tank waste has changed. One change noted in the comment was the decision to use vitrification rather than grout as the preferred waste form for LAW. Other substantial changes included terminating the Hanford Waste Vitrification Plant because of insufficient capacity and the decision to include SST waste retrieval and treatment in combination with DST waste. These changes, among others, represented substantial changes in the proposed action, which has potentially significant impacts on the human or natural environment. DOE and Ecology concur with the view that it is important to "get on" with the clean up of the Hanford Site and the tank waste. DOE views this EIS as a necessary step in the continued progress toward tank waste removal and treatment. Please refer to the responses to Comment numbers 0034.05 and 0072.05 for related discussion of NEPA requirements associated with the EIS.

Comment Number 0065.01 *Phillips, Thomas*

Comment All I want to say is, in 1988 we had a Tri-Party Agreement that said we would clean up this waste in 30 years. That was 8 years ago. We haven't cleaned up any of the tanks at all at this time. The only change is, as this man pointed out, is we renegotiated it for 40 years. Now we're having discussions about privatization and this Environmental Impact Study, which has taken 2 years, and will take approximately 2½ years before it's done. The privatization, the contracts are going to be awarded some time this year, but no one has said exactly when these plants are going to start cranking out waste, and no one has shown us that there is actually going to be any waste cranked out any time soon. It's projections. I, like all the other people here, feel that we need to get on with it, we need to clean this up, we need to quit studying this to death. It looks like to me that the Environment Impact Study, the privatization plan are just smoke screens to delay doing it so the next administration can come up

and pick up the buck that this administration, Miss O'Leary and Mr. Clinton, are passing on to our next generation. No one is doing anything. We need to get on with it.

Response DOE and Ecology share the desire to proceed with remediation at the earliest possible date. A decision was made in 1988 concerning methods to remediate the waste, but due to the development of additional technical information and concerns raised by many stakeholders, DOE and Ecology changed the proposed approach to remediating the tank waste.

The following changes affected the planned approach for managing the disposal of Hanford Site tank waste.

- B Plant, which was selected in the Hanford Defense Waste ROD as the facility for pretreatment processes to comply with current environmental and safety requirements, was found not to be viable or cost-effective.
- The Tri-Party Agreement was signed by DOE, Ecology, and EPA in 1989, establishing an approach for achieving environmental compliance at the Hanford Site, including specific milestones for the retrieval, treatment, and disposal of tank waste.
- Safety issues were identified for about 50 DSTs and SSTs, which became classified as Watchlist tanks in response to the 1990 enactment of Public Law 101-510.
- The planned grout project was terminated, and a vitrified waste form was adopted as the proposed approach as a result of stakeholders' concerns with the long-term adequacy of near-surface disposal of grouted LAW in vaults.
- The construction of the Hanford Waste Vitrification Plant was delayed because of insufficient capacity to vitrify the HLW fraction of all DST and SST waste in the planned time frame.
- The planning basis for retrieval of the waste from underground storage tanks was changed to include the SSTs and treating the retrieved SST waste in combination with DST waste.

These changes resulted in an extensive reevaluation of the waste treatment and disposal plan that culminated in adopting a revised strategy to manage and dispose of tank waste and encapsulated cesium and strontium. The reevaluation of the waste treatment and disposal plan began following a December 1991 decision by the Secretary of Energy to reconsider the entire tank safety and treatment and disposal program and to accelerate the retrieval and disposal of SST waste. DOE plans to issue a final decision on remediation in the early Fall of 1996 and move rapidly into the design and construction phases of the project.

L.9.5 ADEQUACY OF THE DRAFT EIS

Comment Number 0005.02 *Swanson, John L.*

Comment My overall feelings about this draft are really quite mixed. On a superficial basis, it appears to be quite good-but then I see many statements that I know to be misleading if not inaccurate, which make it appear to be not good. In addition, there are many inconsistencies between sections.

Perhaps it would have been better to spend more time on getting a few things "right" (and properly qualified) and less time on excessive detail in relatively unimportant areas.

Response Without specific comments that identify statements that are "misleading if not inaccurate" or inconsistent, the specific responses cannot be made. In cases where inaccuracies or inconsistencies were specifically identified, DOE and Ecology have acknowledged the correction required and incorporated revisions to the EIS. In other cases, information in the EIS was perceived as inaccurate or inconsistent. However, on closer examination, the text or analysis contained in the Draft EIS was determined by DOE and Ecology to be accurate and consistent. DOE and Ecology recognize that in a document this size that addresses complex issues, errors and omissions sometimes occur. The agencies value the public comment process because comments that identify errors and omissions contribute to a more accurate Final EIS. The comment process provides an opportunity for many stakeholders, interested State and Federal agencies, and Tribal Nations to review the Draft EIS document and provide comments that contribute to making the Final EIS a better document.

Comment Number 0005.04 *Swanson, John L.*

Comment I detect an ambivalence in this draft about the status of assumptions. Sometimes it is said that the assumptions are bounding and/or conservative and other times conclusions are drawn as if the assumptions were known to be true, when different assumptions could lead to different conclusions.

Response The approach in the EIS is to identify assumptions for each alternative and area of impact analysis. When differing assumptions would likely substantially change the analysis presented in the EIS, the EIS identifies and discusses this potential. When feasible, an uncertainty analysis is provided to fully inform the public and decision makers of the potential impact. To better communicate the role of assumptions and uncertainty in the EIS, a new appendix has been added to the Final EIS in Volume Five, Appendix K. Please refer to the responses to Comment numbers 0005.03 and 0012.17.

Comment Number 0005.06 *Swanson, John L.*

Comment Many of my comments, along with most of those made at the May 2 hearing, fall into the "hindsight is better than foresight" category. However, it is also true (I believe) that this EIS effort was not performed very well as far as resource allocation and schedule are concerned. That is water over the dam now, and we'd better get on with the job of cleaning up the waste now that the obligatory EIS is nearing completion.

Response As with any project, cost and schedule enhancements are feasible, especially when viewed after the fact. However, without specific comments regarding how resources could have better utilized or how the schedule could have been optimized, the generalized assertion contained in this comment cannot be addressed.

Comment Number 0014.02 *Bullington, Darryl*

Comment Past events relating to the storage and transfer of these materials combined with over 30 years of inaction and indecision regarding safe storage of radioactive fuel materials followed by the generation of these reports with which the public is asked to choose between alternatives which do not include even preliminary feasibility studies is unconscionable.

Response The analysis contained in the Draft EIS was based on conceptual designs, which are contained in the TWRS Administrative Record and DOE Reading Rooms and Information Repositories and are summarized in Volume One, Section 3.4 and Volume Two, Appendix B. This approach is consistent with CEQ requirements to consider environmental impacts early in the decision making process (40 CFR 1500).

Comment Number 0035.01 *Martin, Todd*

Comment Essentially, the Hanford Education Action League thinks that the TWRS EIS is a step backwards.

We think that this work has been done before and has been done better. It ignores all of the documentation that was developed to support the Tri-Party Agreement over a two-year period, and it also ignores the public process that went into that document development.

Response Please refer to the response to Comment numbers 0005.07, 0005.09, 0034.05, and 0055.03 which address similarly worded comments.

Comment Number 0038.02 *Reeves, Merilyn*

Comment The Tank Waste Treatment and Disposal program has been developed through extensive public involvement, long technical study process that provided a credible and the technical basis for the program.

In essence, many stakeholders believe that the intent of the NEPA process has been met. An if a declaration had been made that NEPA had been satisfied, it would have been made -- it would have been welcomed by the stakeholders.

But stakeholders understood DOE's concern that an EIS must be completed for the purpose of NEPA compliance. And given this, the stakeholders would have supported an expedited EIS that just fleshed out the impacts of the Tri-Party Agreement preferred alternatives, not another whole study of the gamut of options.

Unfortunately this EIS has been a long time in coming and does not analyze the full range of options in detail. This EIS represents to me just another redundant study, and it does not reflect our value of getting on with cleanup.

Response DOE and Ecology view the TWRS EIS as a necessary step in the continued progress in managing and disposing of the tank waste. This document ensures compliance with NEPA and SEPA and provides the public and decision makers with an analysis of the comparative impacts on the human and natural environment and a range of considered alternatives.

During the scoping process for the TWRS EIS, DOE and Ecology approved the following schedule: publish the Draft EIS in August 1995; publish the Final EIS in April 1996; and publish the ROD in May 1996. The agencies stated that by combining these two processes [NEPA and SEPA], the agencies hope as a result to accelerate the TWRS EIS (DOE 1994m). Following the conclusion of the scoping process, DOE and Ecology determined that the accelerated schedule would not be feasible. DOE and Ecology believe that given the technical complexity associated with tank waste remediation, the emergence of new data since January 1994 that needed to be addressed in the EIS, and the need to address a broad range of potential environmental impacts, the EIS has been prepared as expeditiously as could be reasonably expected. Moreover, the EIS has been and will continue to be completed on a schedule that does not adversely affect compliance with Tri-Party Agreement milestones. Please refer to the responses to Comment numbers 0034.05 and 0072.05 for more information.

Comment Number 0038.12 *Reeves, Merilyn*

Comment In spite of vigorous and discipline re-base lining, the Hanford Advisory Board realizes that the Tri-Party Agreement can always be improved upon, and therefore we strongly support critical reviews of the program within the context of the Tri-Party Agreement requirements.

However, a critical pillar in the Hanford Advisory Board's support for the Tri-Party Agreement is a belief that it is time to go forward. And we hope that the intention of the systems review, which is what we were addressing at that point in time, the systems requirement review team -- we hope that the intention of the systems requirements review team is not to spend an inordinate amount of time challenging the decisions laid out in the Tri-Party Agreement at this late date.

In a skeptical and wary stakeholder community, such re-examination would certainly be viewed at best as a DOE delay tactic or at worst an attempt to circumvent the provisions of the Tri-Party Agreement.

This is not the EIS, but it is applicable to it. The Board holds similar concerns in regards to the TWRS EIS. Our concerns are heightened by the inability of the Agencies to complete the EIS on or even nearly near the critical schedule.

And the EIS was supposed to be completed as of June of '95. And now DOE and Ecology will be very fortunate if this June in '96 it can come out.

In summary, the Board finds that the EIS is largely an unnecessary document, goes directly against the get on with it value that citizens wanted in the Northwest.

Response Please refer to the responses to Comment numbers 0034.05 and 0052.02 for discussions regarding the need to complete the analysis required in an EIS and the role of the EIS in regulatory compliance. Please also refer to the response to Comment number 0038.02 regarding the scoping process and the schedule for the EIS.

Comment Number 0072.01 *CTUIR*

Comment In any major federal action, it is critical that assumptions, data, interpretations, conclusions, and uncertainties be clearly identified. Such critical and often limiting factors can have profound ramifications to a comprehensive decision process addressing complex issues, such as the safe and effective retrieval, treatment, and isolation of diverse Hanford tank wastes.

These concepts need more emphasis than what is in the current Tank Waste Remediation System (TWRS)-Environmental Impact Statement (EIS). This EIS deals with the retrieval of radioactive and hazardous waste currently stored at the Hanford Nuclear Reservation in southeastern Washington state. Hanford is located in part on the aboriginal lands of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), where the Tribes retain off-reservation treaty-reserved rights and interests.

Response The assumptions, data, interpretations, conclusions, and uncertainties for each discipline were clearly identified in their respective appendix (inventory - Volume Two, Appendix A; engineering - Volume Two, Appendix B; human health risks - Volume Three, Appendix D; accidents - Volume Four, Appendix E; groundwater - Volume Four, Appendix F; air - Volume Five, Appendix G; and socioeconomics - Volume Five, Appendix H) of the Draft EIS. Key assumptions and conclusions also are identified in the respective sections of Volume One, Section 5.0; Environmental Consequences. A more extensive uncertainty section was added to the Final EIS as Volume Five, Appendix K. Because the information requested in the comment was included in the Draft EIS, no modification to the document is warranted. .Please refer to the responses to Comment numbers 0005.03 and 0012.17.

Comment Number 0081.08 *Pollet, Gerald*

Comment The bottom line is throughout this EIS that the policy makers will view an extremely skewed cost versus risk and benefit analyses in this EIS if they look at it today. And everything in the EIS is driven currently towards saying let's leave it behind. The risks aren't so high. Risk of explosion aren't so high. The risk of fatal cancers aren't so high from leaving it behind. The costs are so much lower than retrieval. When in fact the risks are so much higher from leaving it behind, or any delay, and the costs are actually similar for retrieving, as they are for leaving it behind.

Response Cost and human health risks are presented in the Summary, Section S.7 and Volume One, Sections 3.4, 5.11, and 5.12. The cost and human health risk numbers were developed using the best available information and industry- and government-accepted analytical methods. DOE and Ecology consider this information to be unbiased and the best available information for the public and decision makers to use in evaluating the alternatives. Please refer to the response to Comment 0081.02 for a discussion of how the repository costs were calculated for the Final EIS.

Comment Number 0087.03 *Tewksbury, Ross*

Comment Now, many of the assumptions and the estimates are faulty or erroneous because of the facts that you know nobody knows just exactly what's in the tanks, and nobody knows just how much the tanks have leaked, and nobody knows where the leaks have gone, or how far, and nobody knows where to put the high-level waste once it even comes to some final condition, and where it can be put permanently. And there's apparently there's so much stuff that's leaking, with the tanks, and the cribs, and the power plants, everything, that you don't even know where it's coming from. As you have said tonight. So with all the things that nobody really knows, then it's really hard to come up with exact costs and estimates and assumptions.

So as some of the previous speakers were saying, I really, it really upsets me if you come up with some of these standard things that you know the costs and things are really low, that the danger from them is really low or nonexistent when nobody really knows anyway.

Response The EIS fully identifies the assumptions made in performing the analysis and presents the uncertainties associated with the implementation of each alternative. This information is presented in Volume Five, Appendix K in the Final EIS. Although there are details that are unknown about certain aspects of the alternatives, DOE and Ecology believe that there is adequate information available to analyze the alternatives, select an alternative, and proceed with remediation. The costs of the alternatives are presented in ranges to account for the uncertainties. The Final EIS will present ranges in human health risk to provide information concerning the uncertainties associated with these calculations. It should be noted that contamination beneath the tanks from past practice activities is outside the scope of this EIS. Please refer to the responses to Comment numbers 0005.03, 0012.17, and 0072.08.

L.9.6 RECORD OF DECISION

Comment Number 0009.14 *Broderick, John L.*

Comment There has been a lot of effort by a lot of people to decide on the Preferred Alternative. However, it has the appearance of being selected because that is what has been agreed to before the EIS ROD is available. The usual order of decision is NEPA, then other agreements.

Response The final decision on the selection of an alternative will be made no sooner than 30 days after the publication of the Notice of Availability for the Final EIS is published in the Federal Register

and it will be identified in the ROD. The efforts made concerning the Phased Implementation alternative have been to establish DOE's proposed action. NEPA requires that an EIS evaluate the proposed action and alternatives to it as was done for the TWRS EIS. No modification to the EIS is required because the required procedures were followed. Please refer to the responses to Comment number 0005.07, 0027.01, and 0036.15.

Comment Number 0012.10 *ODOE*

Comment We urge U.S. DOE to analyze the cumulative impacts from previously leaked tank waste, waste disposed to cribs, trenches, reverse wells, drain fields, ponds, burial grounds, and other locations. The record of decision should require the preparation of a peer-reviewed detailed long-term performance and risk assessment, that includes all of the factors above. This risk assessment should be a joint effort of USDOE with the Nuclear Regulatory Commission, EPA and other state, tribal and Federal agencies with regulatory authority or special expertise for resources at Hanford and should be conducted separately from this EIS.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Cumulative impacts of the TWRS alternatives, past leaks, and past-practice sites are addressed in Volume One, Section 5.13 and Appendix F. Although not within the scope of this EIS, DOE will consider the request separately for a peer-reviewed risk assessment. Please refer to the responses to Comment numbers 0005.17, 0012.15, 0040.06, 0072.08, and 0101.05.

Comment Number 0035.03 *Martin, Todd*

Comment Another concern we have had is schedule. We were concerned, and the agencies were concerned that if this EIS did not meet its schedule, it could throw the TWRS program into a death spiral.

What has happened is the original record of decision was to be had by June 1995. Now we are going to be lucky if we have a record of decision by June of 1996.

Response Please refer to the response to Comment numbers 0034.05, 0038.02, and 0055.03 which address similarly worded comments.

Comment Number 0040.07 *Rogers, Gordon J.*

Comment I need to add that these comments are my own as a taxpaying citizen who is concerned with the staggering cost estimates for each of the other treatment alternatives, considering the rather low risk provided we have the common sense and optimism in the capacity of humans to manage and solve problems and threats in the future as has been the case through much of human history. I hope these comments generate some serious thought by DOE and the Regulators in deciding how to proceed.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

Comment Number 0043.03 *Hanford Communities*

Comment We call on the Department of Energy, with the support of regulatory agencies to proceed expeditiously to adopt a record of decision and award a contract with a private firm to begin the design and permitting of a vitrification facility.

Response DOE remains committed to pursuing the earliest possible ROD date and implementing the preferred alternative as soon as possible. The EIS will not delay award of privatization contracts for Phase 1a. DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste.

Comment Number 0072.12 *CTUIR*

Comment This is a retrieval EIS, not a closure EIS, and the ROD should explicitly state that the selection of any of the retrieval options in no way implies that a particular closure method is thereby approved.

Response DOE will incorporate the recommended language into the ROD. Please refer to the responses to Comment numbers 0019.03, 0072.08, 0072.46, and 0101.06.

Comment Number 0072.13 *CTUIR*

Comment Existing soil and groundwater contamination should be included as part of the Tank farms source term, and the entire tank waste inventory should be considered as part of an overall aggregate 200 Area source term.

Response The scope of the TWRS EIS is the remediation of the tank waste and cesium and strontium capsules. Please refer to the response to Comment number 0072.08 for a discussion of the reasons for not including closure of the tank farms, including past practice releases of contaminants to the soil column, in the TWRS EIS. However, existing soil and groundwater contamination was addressed in the cumulative impacts presented in Volume One, Section 5.13 and Appendix F. Closure will be addressed in a future NEPA analysis. Because the analysis requested in the comment is not within the scope of the EIS, no modification to the document is warranted. Please refer to the responses to Comment numbers 0012.15 and 0072.08.

L.9.7 OUT-OF-SCOPE ISSUES (Other Than Closure)

Comment Number 0011.01 *Gilsdorf, Paul D.*

Comment If you have any information that could help me find a job I will be eternally grateful. I am a carpenter with a degree in biochem. What does that mean, well I do not know either but I still need a job. Hope you have a great day.

Response Facilitation of employment for individuals, as well as identification of contractors to perform tasks identified in the EIS, are beyond the scope of the EIS.

Comment Number 0014.05 *Bullington, Darryl C.*

Comment I pray daily that existing governments will find a way to prevent the release of radioactive toxic materials into the air, water, and food by continuing to invent increasingly clever ways to disperse such materials over the planet.

Response The EIS evaluates alternatives to manage and dispose of tank waste and cesium and strontium capsules, in a manner which will protect human health and the environment from the future releases from the tank wastes and capsules.

Comment Number 0014.06 *Bullington, Darryl C.*

Comment I pray, too, that the diversion of sporting events and political elections will not divert the public's attention from demanding solutions to these most critical decisions of our time. Should action be taken I pray that the government does not attempt to absolve itself from responsibility by giving the cleanup to unproven, unmonitored contractors that win cost-plus-fixed-fee contracts by submitting least cost proposals.

Response The qualifications of potential remediation contractors and the contracting strategies associated with implementation of the actions considered in the EIS are outside of the scope of the EIS. However, in both cases, DOE is required by Federal procurement rules to select qualified contractors to perform all work contracted by a Federal agency. All work contracted must be performed in compliance with applicable Federal, State, and local laws and regulations.

Comment Number 0016.01 *J.L. Shepherd and Assoc.*

Comment The purpose of this report is to encourage the U.S. Department of Energy (DOE), the Washington State Department of Ecology and other interested parties to reconsider a proposed program for long-term storage and eventual disposal of the WESF cesium-137 source capsules at Hanford, under the Cesium Legacy Project EM30-ADS-84900-00-SA. In our opinion, the contents of these WESF capsules are a national resource and are vital to U.S. interests. To support this position, included in this report is a brief history of previous USDOE encapsulation programs of the WESF contents. We

believe that the DOE could restart a cost-effective and waste reducing source encapsulation program, perhaps including the cesium-137 retrieved from the waste tank remediation project. The primary focus of this response is on medical and health related uses of cesium-137 sealed sources. A secondary focus is on cesium-137 source user's commitments to environmental concerns, especially non-burial (source recycling) programs and regulatory constraints and regulation by the U.S. Nuclear Regulatory Commission and Agreement States.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The TWRS EIS addresses alternatives for disposal of tank waste and encapsulated cesium and strontium. The encapsulated cesium and strontium are included in the EIS primarily because they were originally extracted from the stored high-level tank waste to reduce the thermal heat generation in the tanks and would be considered HLW for purposes of disposal. DOE and Ecology have identified the No Action alternative as the preferred alternative. The EIS has been modified in the Summary and in Volume One, Section 1.3 to reflect that No Action is the preferred alternative. DOE is actively seeking commercial interest in the beneficial applications for the encapsulated cesium and strontium, and DOE and Ecology remain committed to pursuing any viable commercial or other beneficial uses. However, that analysis is outside the scope of this EIS. These uses would not be without substantial cost for reprocessing and repackaging because the current encapsulation was designed principally for storage purposes. If viable commercial or beneficial uses are not implemented, the capsules would be designated as waste at some point in the future and would be disposed of using methods consistent with the alternatives identified in the EIS. Also, it is unlikely that DOE would pursue any course of action to remove and encapsulate additional amounts of cesium, strontium, or other radionuclides unless viable use is made of the current capsule inventory or there is a clear, viable commercial or beneficial interest in the additional amounts. Please refer to the responses to Comment numbers 0006.01 and 0010.01 for more information on this topic.

Comment Number 0016.02 *J.L. Shepherd and Assoc.*

Comment We have tried to present information which will lead to reconsideration of the burial/disposal proposal for the WESF capsules. The contents of these capsules, besides the cesium in the waste tanks, are the only domestic supply of cesium which can be used in the sources for the many critical and beneficial applications described in this written comment. We have tried to make the point that cesium is a strategic U.S. product, that currently the sole world supplier of this material is Myak, Russia and that the same preliminary techniques used for vitrification can be used in making special form source capsules. We invite anyone reading this comment to contact us with any inquiries, questions, or requests for further information concerning its contents to contact us.

Response Please refer to the responses to Comment numbers 0006.01 and 0010.01 for discussions related to consideration of beneficial uses of cesium and strontium capsules.

Comment Number 0031.01 *Billett, John*

Comment Even though I have a sheaf of paper in my hands, it will only be a few minutes. I just want to summarize some comments, particularly on the issue of the recycling of the cesium which is the subject I want to put some comments on the record about.

The market for cesium-137 has progressively increased worldwide particularly over the past 27 years due to an increase in medical research and our knowledge of medicine as well as the knowledge in the areas of personnel radiation protection.

The only current supplier of large cesium-137 sources is located in Russia. In the interest of public health and safety we are suggesting that the U.S. should consider domestic cesium-137 extraction from the capsules or tank waste as a strategic material viable to national interest.

Response Please refer to the response to Comment numbers 0006.01 and 0010.01 for discussions related to consideration of beneficial uses of cesium and strontium capsules.

Comment Number 0031.02 *Billett, John*

Comment Without the use of these special form cesium-137 sources in medical research we would not have many of the lifesaving technologies we enjoy today.

And there are many potential breakthroughs in cancer research and prevention which will not be possible without large cesium-137 sources.

People from all walks of life are affected, including the nurses and patients in nuclear medicine departments.

And we are talking here about x-rays, mammography, cat scan, MRI, oncology, blood banks, the technicians in a dental office, the emergency response personnel for transportation, reactor or nuclear accidents and incidents, and the public teachers and students at university research laboratories and in the biomedical field.

Response Please refer to the responses to Comment numbers 0006.01 and 0010.01 which address similarly worded comments.

Comment Number 0037.02 *Eldredge, Maureen*

Comment The funding for the entire cleanup program is continually at risk. Last year was a particularly difficult one in the appropriations cycle.

We continually heard and had to deal with allegations of problems, waste, fraud, and abuse in the program. And the fingers kept pointing at Hanford.

We need to start seeing progress. We need to see action. We need to get moving, or we are going to continually face that slideward -- downward trend of funding.

Response The data prepared for each alternative were presented as objectively as possible, including the potential costs (listed in 1995 dollars) associated with implementation. Forecasting Congressional funding is beyond the scope of the EIS and was not included in the implementability discussion sections. DOE is committed to pursuing remediation at the earliest practicable date.

Comment Number 0037.04 *Eldredge, Maureen*

Comment Which also leads me to the old concept of the big picture. The Department of Energy seems to have a problem with it.

The Waste Management Programmatic Environment Impact Statement which the draft was recently released, and quite seriously panned by everyone, was supposed to look at programmatic impacts of all the waste in the Department of Energy's nuclear weapons complex.

I assume that might include waste coming out of Hanford tanks, but it does not. And there is no cross-linkages between all of the EIS actions. That needs to happen. We need to start looking at the high level, low level, mixed waste in the Department of Energy nuclear weapons complex as a comprehensive total, not as piecemeal efforts.

Response The scope of the TWRS EIS includes management and disposal of tank waste and cesium and strontium capsules. The cumulative impact section addresses the impact of TWRS alternatives within the context of related actions at the Hanford Site and within the DOE complex. The TWRS action is being conducted within the framework of DOE's responsibility to manage and dispose of HLW and to comply with applicable local, State, and Federal laws and regulations.

Comment Number 0043.04 *Hanford Communities*

Comment The Department of Energy must make very effort to assure the success of the tank waste vitrification program. Adequate funding must be provided for both the privatization initiative as well as the DOE tasks associated with characterization, tank safety and the steps necessary to deliver liquid waste to the vitrification facility. We are concerned about the proposal to take funds out of the Hanford cleanup budget to finance a liability reserve. The impact of taking this money out of the budget will seriously jeopardize the existing TWRS program as well as other programs. We encourage the Department of Energy to establish a liability reserve fund for this initiative. Funds for this reserve should not come from the Hanford cleanup budget.

Response Privatization and Congressional funding issues are not within the scope of the EIS. The purpose of the privatization reserve funding is not to cover 100 percent of all potential liabilities for the privatization contractor's construction and operation of the immobilization facilities. There are two primary reasons to have the reserve funding pool: 1) to cover the contractor capitalization cost during design and construction in the event of Termination for Convenience on the part of DOE; and 2) to level the DOE budgetary requirements during operation of the contractor facilities.

Before issuance of the RFP, there were a series of conversations with vendors that might be interested in providing immobilization services to DOE. These vendors expressed concern with the potential financial risk associated with project starts and stops. Under privatization, contractors would make a significant capital investment for an extended period of time before receiving any return on the investment. To protect themselves and their stockholders against the possibility of a change in direction and project starts and stops leaving the contractors with a large capital investment, the vendors wanted to ensure that they could be reimbursed for their investment if the change in direction or starts and stops were the responsibility of DOE and not the vendors.

When treatment services are initiated in 2002, the reserve funds would be "drawn-down" to pay for waste treatment services. Rather than being an insurance fund, the reserve is a "bank account" in which funds are saved over a period of time so that DOE can assure private industry that money will be available, when needed, to "pay the bills." Because the analysis requested in the comment is not within the scope of the EIS, no modification to the document is warranted.

Comment Number 0093.01 *Devoy, Tiffany*

Comment I think when you are talking about 200 plus billion dollars a year going to defense, then 200 billion dollars total to take care of what will be with us for hundreds of thousands of years is not that high of a price tag.

Response DOE and Ecology acknowledge the opinion expressed in the comment. Please refer to the response to Comment number 0075.02.

L.9.8 HEARINGS

Comment Number 0022.01 *Shims, Lynn*

Comment Thank you very much for the opportunity to comment. Thank you also for holding a TWRS public meeting in the Portland area. In my opinion meetings such as these are not only useful educational methods but also important for clarification dialog, expansion of perspective for all parties and significant value input.

Response Dialogue with stakeholders at public meetings provides valuable information regarding the proposed action, alternatives to the proposed action, and the potential environmental consequences of the alternatives considered in the EIS. Further, dialogue at meetings is critical to informing the

agencies of the values, concerns, and issues important to the public. NEPA and SEPA were adopted to ensure that information is exchanged between the government and the public. Under NEPA, the government actively incorporates public involvement in government decisions potentially affecting human health and the environment. The government also must provide decision makers and the public with information that would aid in making informed decisions regarding the alternatives and the impact of each alternative. Public meetings are an important aspect of ensuring that NEPA and SEPA are implemented to the maximum extent possible. Please refer to the response to Comment number 0020.01 for more information of TWRS EIS public involvement.

Comment Number 0022.05 *Shims, Lynn*

Comment It is appreciated that an attempt was made at the Portland meeting to change the usual design of the meeting to enhance public participation. I believe that the strong opinions of the public were due to the fact that the subject of tank wastes as related to public health and safety are of great importance to us.

Response DOE and Ecology are committed to continually improving public participation in the decision making process. For the TWRS EIS public hearings, the agencies worked closely with the stakeholders to provide alternative formats for meetings that would improve the opportunity for dialogue between the public and agency representatives.

Comment Number 0046.01 *DiGirolamo, Linda Raye*

Comment With the exception of the speaker for the HEAL group this discussion was far too "technical" for the average citizen.

Response The DOE and Ecology objective was to use to the extent possible in the EIS, language that was appropriate and understandable by the average citizen. One reason for holding a question and answer session at the hearing was to provide an opportunity for the public to present clarifying questions to the agency representatives. Both agencies are committed to continued efforts to improve communication with the public. Your comment will assist the agencies to improve the process, especially where communication was not as effective as preferred.

Comment Number 0062.06 *Longmeyer, Richard*

Comment Just a final comment. The advertisement for this meeting was a little bit more than it had been in the past. I've attended other meetings, and I get information from Hanford all the time, but I'm glad to see that we have a little better representation here in Spokane this time. Unfortunately it was HEAL that did that advertising. I really feel it's the responsibility of the DOE to do that, instead of HEAL. Now whether the DOE needs to hire an advertising agency to help them to put a better face on the meeting, or whatever, I don't know. But I do appreciate HEAL's effort in that regard, but I do feel it's the DOE's responsibility. Thank you.

Response DOE and Ecology acknowledge the role of HEAL and others in making the Spokane-area public aware of the public meeting. The public meeting was coordinated with HEAL and other stakeholders because the outreach efforts of these groups has proven to be helpful. DOE and Ecology worked closely with HEAL representatives to ensure that the location, date, and format of the meeting maximized public participation. Further, DOE advertised the meeting in the local newspaper and distributed four separate mailings to interested area residents on the Tri-Party Agreement mailing list. These efforts, in conjunction with the efforts of HEAL and other Hanford Site stakeholders were instrumental in ensuring that the public was provided with an opportunity to participate in the decision making process, as required by NEPA. Please refer to the responses to Comment numbers 0066.01 and 0087.01 for more information on TWRS EIS public involvement.

Comment Number 0075.01 *Wright, Peter*

Comment My only comment is with respect to DOE, and I guess Ecology. I find that I'm really saddened by the fact that there's not a lot more people here. It's the first time I've gone to a government meeting, which may be characterized more by bureaucrats, than by human beings, and found that it's mostly human beings who recognize that we're all in this together. And I really feel that your average is a sign, at least to me, that there's a recognition that all of our kids are going to suffer from this.

Response Participation at the five public meetings on the TWRS EIS varied substantially; however, in total more than 400 individuals attended the meetings and more than 350 individuals provided oral or written comments on the Draft EIS. DOE and Ecology are committed to the public involvement process and continue to strive to ensure the public has access to the decision making process. Please refer to the responses to Comment numbers 0087.01 and 0066.01 for more information on TWRS EIS public involvement.

Comment Number 0087.01 *Tewksbury, Ross*

Comment And I, first I want to say that it's good that your having a meeting here in Portland, and I want to encourage you to keep having them here regarding each issue as it comes up, and not just in Seattle and Tri-Cities. And I also want to say I hope you don't have any more video meetings. And as I was saying earlier, if you want more people here there's lots of things that you can do, as opposed to doing just the legal bare minimum. You can try and have an article in the paper, rather than just ad's. You can have an ad in the paper every day for two weeks in a row, you know, prior to the meeting. You can have announcements on the radio stations and TV, especially OPB and KBOL. And send letters to everybody on the mailing list to arrive just a few days before the meeting. And there's other stuff too, but that's.

Response Public meetings on the TWRS Draft EIS were held in five cities, including Portland, Oregon. For each issue under consideration at Hanford, the number and location of meetings was

carefully considered by DOE, in consultation with the Hanford Advisory Board, Ecology, EPA, and the stakeholders.

DOE and Ecology exceeded the legal requirements for public participation in the public meetings held for the Draft EIS. For example, for the Portland, Oregon meeting, two advertisements were published in the largest daily newspaper in the Portland area; two press releases were distributed to area newspaper, radio, and television stations; and the meeting location was provided in a mailing distributed to more than 4,500 interested parties and in two other mailings to 1,500 interested parties. Oregon Department of Energy mailed a letter to community leaders and stakeholders announcing the meeting and information on the meeting was provided on the Hanford Site Home Page. DOE and Ecology will continue to implement more effective means to communicate to the public and to inform the public of opportunities to participate in meetings on important issues relative to the Hanford Site. However, the TWRS public participation program met or exceeded all requirements under State and Federal regulations and used many innovate methods designed to enhance public involvement.

DOE will consider suggestions regarding publicizing meetings when planning future public participation opportunities. Regarding video meetings, DOE believes that such a format may occasionally be an effective method to expand public participation opportunities, particularly when lack of resources might otherwise preclude them. DOE welcomes any additional suggestions.
Please refer to the response to Comment number 0066.01 for more information on TWRS EIS public involvement.

Comment Number 0088.02 *Porter, Lynn*

Comment I have a lot of questions that I wish we could have gotten into tonight, I felt like there wasn't enough time for discussion.

Response An inherent limitation to the public hearing format is the time available for interaction between the agencies and the public. To address this concern, DOE and Ecology scheduled a one-hour informal session at the beginning of this hearings. During this time, DOE and Ecology representatives were available to interact one-on-one with the public. Further, once the meeting began, the public was encouraged to ask questions during the discussion of the EIS. This portion of the meeting lasted approximately two hours. The meeting concluded with a one-hour session during which a forum was provided for the public to submit additional formal comments on the EIS. Before the meeting ended, the moderator asked the attendees for additional comments. When no one responded, the meeting was adjourned. After the meeting was adjourned, several agency representatives remained in the meeting room to meet informally with the attendees. The information packets distributed at the meeting contained the names and phone numbers for agency contacts. The public was encouraged to contact the listed individuals for more information or to submit additional comments.

L.9.9 COMMENT PERIOD

Comment Number 0002.01 *Roecker, John H.*

Comment You are making a mockery out of the public comment period for the TWRS EIS. Forty-five days is entirely too short a period for public review of such a lengthy and important document. If you are truly interested in receiving public input the comment period should be extended to at least 90 days. I know this does not fit with your political agenda of announcing the selection of the privatization contractors before the November election, but the EIS process should be driven by what is technically right not by politics. This is just another example of DOE being driven by political agendas rather than technically sound programs.

Response After consultation with relevant Federal and State agencies, affected Tribal Nations, and stakeholders, DOE and Ecology determined that an extension of the comment period for the Draft EIS would not materially facilitate improved public participation in decision making regarding the proposed action. Please refer to the responses to Comment numbers 0020.01 and 0036.07 for related information.

Comment Number 0003.01 *CTUIR*

Comment Technical staff of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Special Sciences and Resources Program (SSRP) are currently reviewing the TWRS Draft EIS (DOE/EIS-0189D). We have already developed numerous draft comments on Volume One, and anticipate that we will identify additional issues in the remaining volumes. As a result, the CTUIR-SSRP requests a 45 day extension to the public comment period in order to be able to address this EIS in a manner that truly reflects the time and effort the U.S. Department of Energy (DOE) and Washington Department of Ecology (Ecology) have put into producing it.

Response Subsequent to the receipt of this request for an extension of the comment period, the CTUIR formally withdrew their request for an extension of the comment period. Please refer to the response to Comment number 0013.01.

Comment Number 0005.01 *Swanson, John L.*

Comment I have the feeling that many of my comments might be dismissed as being "unimportant" because they might not impact the gross comparison of the alternatives. My response to that might be along the lines of (a) if only gross comparisons are desired/needed, why present all the detail, and (b) if the information is important enough to present, it should be presented as accurately and unambiguously as possible.

Response No comment has been dismissed as "unimportant." DOE and Ecology believe that the comments submitted on all issues, including those not involving the "gross comparison of the alternatives," contributed to improving the TWRS EIS and all comments were included in preparing the

Final EIS. NEPA and SEPA require the agencies to consider all comments provided during the public comment period, to give equal weight to oral and written comments, and to consider all comments prior to completing the Final EIS. All comments have been reproduced verbatim and responded to individually in this appendix. Copies of the documents from which comments were extracted are provided in DOE Reading Rooms and Information Repositories to permit each comment provider to easily understand how the agency addressed the comment and to ensure that all comments submitted were considered by the agencies.

Comment Number 0007.01 *EPA*

Comment Pursuant to its responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the Environmental Protection Agency (EPA) is mandated to review environmental impact statements (EIS's).

Unfortunately, our office did not receive copies of the Hanford Tank Remediation Draft EIS until yesterday. As you noted, a copy was sent to another staff member, but he does not have responsibility for NEPA review. We are therefore requesting an extension of the comment period from May 28 to June 28. This gives us adequate time to assemble a review team from other offices within EPA and perform a quality review for this very important EIS.

Response DOE submitted five copies of the Draft EIS to EPA on April 5, 1996. These copies were provided to the EPA headquarters in Washington, D.C. Subsequently, copies were requested by the Region X EPA and an additional five copies were provided. After the EIS had been received, DOE and Ecology met with EPA staff to facilitate the EIS review. EPA subsequently withdrew their request for an extension of the comment period and decided not to conduct a detailed review the EIS. Please refer to the responses to Comment numbers 0044.01 and 0042.02, which address related comments.

Comment Number 0013.01 *CTUIR*

Comment Since making our original extension request, CTUIR SSRP staff have become aware of critical timing considerations for the TWRS project which provide us with significant reasons why the review of the TWRS project should not be delayed, even though the lack of an extension may reduce the quality and quantity of public scrutiny that the text of the Draft EIS receives. As a result, CTUIR SSRP hereby retract our previous request for an extension of the public comment period for the TWRS Draft EIS.

Response DOE and Ecology acknowledge the withdrawal of the request for an extension of the comment period. Please refer to the responses to Comment numbers 0003.01 and 0013.02, which address related comments.

Comment Number 0013.02 *CTUIR*

Comment Finally, as a sovereign, the CTUIR enjoys a government-to-government relationship with federal and state governments, including their departments, such as DOE and Ecology. This relationship means that our consultation with the DOE is not limited to the comment periods designated for the public under National Environmental Policy Act and the State Environmental Policy Act. While we are retracting our request for an extension of the public comment period for this Draft EIS, CTUIR staff will be availing ourselves of our right to submit comments outside of the public comment period. While our review of the TWRS Draft EIS will not take the forty-five additional days we had originally requested, CTUIR staff are planning to submit our comments on Friday, May 31, 1996--three days after the close of the public comment period. We expect that Ecology and DOE will give full consideration to our comments despite their delivery outside the bounds of the public comment period.

Response DOE and Ecology are committed to ongoing consultation with affected Tribal Nations throughout the NEPA and SEPA process for the TWRS EIS. This commitment has resulted in numerous meetings with Tribal Nations and the TWRS EIS project team, as well as formal and informal consultations regarding the EIS. The formal comments on the EIS were received by the Agencies and have been given full consideration. Several issues identified in the comments have resulted in subsequent meeting and communication between the CTUIR and the Agencies to address methods by which issues could be resolved. DOE and Ecology value this consultation process and believe it has enhanced the quality of the EIS and the NEPA process. Please refer to the responses to Comment numbers 0013.01, 0072.149, and 0036.07, which address related comments.

Comment Number 0018.01 *Mannion, Don*

Comment This document is very long and complex. The conduct of proper review seems to be requiring a lot more time than I initially anticipated.

I respectfully request that the review period be extended in order to assure an adequate review by such concerned citizens as myself. Thank you, in advance, for any consideration that you can give this request.

Response After consultation with relevant Federal and State agencies, affected Tribal Nations, and stakeholders, DOE and Ecology determined that an extension of the comment period for the Draft EIS would not materially facilitate public participation in decision making regarding the proposed action. Please refer to the response to Comment number 0020.01, which address related comments.

Comment Number 0020.01 *Waite, Corey N.*

Comment In my opinion the public comment period for the Tank Waste Remediation System Environmental Impact Statement is far too short. While I am sure that someone from the scientific community could review and comprehend this long, complex report in a short amount of time, this is a

difficult task for the average reader. From my college studies in environmental science, I know that it is my right as a citizen to express my concerns, reservations, and questions regarding the actions proposed in this document as they could affect me, my family, my livelihood, and my community. For these reasons, I believe that the public should be given more time and more opportunity to review and disseminate the information contained in this very long, complex, technical report.

Response Dialogue with stakeholders at public meetings provides valuable information to the stakeholders regarding the proposed action and alternatives to the proposed action, as well as the potential environmental consequences of the alternatives considered in the EIS. Further, dialogue at meetings is critical to exchanging information with the agencies regarding values, concerns, and issues that are important to the public. NEPA and SEPA contain provisions that require public involvement in government decisions that potentially affect the quality of the natural and human environment. These regulations also require that information be provided to decision makers and the public so that decisions that potentially impact environmental quality can be made in as open a manner as possible. Public meetings are an important aspect in ensuring that NEPA and SEPA are useful decision making tools for the public and decision makers.

After consultation with relevant Federal and State agencies, affected Tribal Nations, and stakeholders, DOE and Ecology determined that an extension of the comment period for the Draft EIS would not materially facilitate improved public participation in decision making regarding the proposed action. Please refer to the response to Comment number 0036.07, which addresses a related comment.

Comment Number 0024.01 *Jordan, James*

Comment

1. The Draft EIS for the Hanford Site TWRS was received this date at about 2 p.m. Washington D.C. time. The transmittal letter states that written comments should be postmarked no later than this date, May 28, 1996. Obviously, there is insufficient time to review this report and make responsible comments. Therefore, we respectfully request that the Public Comment Period be extended to the end of June.
2. JJA, a Science and Technology Consulting firm, is in the process of forming a consortium of qualified contractors to develop, fabricate and install a vitrification technology that is much safer and more technically reliable than any of the alternatives discussed to date. It is the consortium's intention to license this technology invented by Drs. James Powell, Morris Reich, and Robert Barletta to Brookhaven National Lab for development and manufacture.
3. Our analysis of the health, safety and environmental risks and our analysis of the costs of conducting the TWRS campaign show that the BNL concept is substantially superior to the other concepts for removing HLW from the Hanford reservation. Accordingly, we would appreciate additional time and your assistance in including the BNL concept in your consideration of alternatives for Hanford. Specifically, we would appreciate your assistance in running our factors in the same model that you used for the other alternatives.

Response After consultation with relevant Federal and State agencies, affected Tribal Nations, and stakeholders, DOE and Ecology determined that an extension of the comment period for the Draft EIS would not necessarily increase public participation in decision making regarding the proposed action. Please refer to the response to Comment number 0020.01.

The plan to form a consortium to develop the proposed vitrification technology was not included in the scope of this EIS, and therefore is not a factor in determining whether the comment period should be extended. The Draft EIS does not address the agency procurement strategy nor does the EIS limit the agency from considering technology options that may emerge following the completion of the NEPA process. During the procurement process following the publication of the ROD, DOE would be able to consider any available technology bounded by the EIS analysis. For options not bounded by the EIS analysis, in terms of potential impacts to the environment, DOE would be required to complete a supplemental NEPA analysis of the TWRS EIS.

Because of the conceptual nature of all technologies considered in the EIS, DOE adopted a bounding approach when developing the EIS alternatives. Therefore, if during the procurement process, a technology is proposed that demonstrates lower costs and impacts to the environment than those presented in the EIS, DOE would be able to procure and implement the proposed technology. Because of this approach, and because the process described in this comment does not represent a new alternative, DOE and Ecology do not view the delay in the EIS that would be required to develop and evaluate an alternative based on this technology as necessary to improve the decision making process under NEPA.

Comment Number 0036.07 *HEAL (Exhibit)*

Comment The TWRS EIS has been in development for years. DOE has delayed the release of the EIS. The difficulties the agencies have had in producing the EIS are evidenced by how long it has taken to release the Draft EIS. However, the public is expected to review and comment in only 45 days -- on a document that is over 2,000 pages long.

Because HEAL has consistently held that moving the program forward is paramount, we will not protest what is an insufficient amount of time to substantively comment on the document.

Response DOE and Ecology co-prepared the Draft EIS and concurred on the scope, areas of analysis, and schedule for the EIS following consideration of public comments received during the scoping period for the EIS from January 28, 1994 through March 15, 1994. The time required to prepare the EIS was a function of the complexity of the issues addressed in the EIS.

During the past eight years, DOE has facilitated extensive public participation relative to tank waste in the following policy areas:

- Public participation in the Hanford Defense Waste EIS (1987 to 1988);
- Tank Waste Task Force (1993);

- Public comment on the renegotiation of the Tri-Party Agreement to include the revised approach to tank waste management (1993 to 1994);
- Scoping for the TWRS EIS (1994);
- Public comment on the SIS EIS (1994 to 1995);
- Privatization and related public involvement on the proposed amendments to the Tri-Party Agreement (1995 to 1996); and
- Interaction with the Hanford Advisory Board and its committees (1994 to 1996).

This public involvement has provided DOE with a strong understanding of the values and perspectives of Northwestern stakeholders regarding tank waste management and disposal. Moreover, HEAL, among others, provided comments during the scoping and comment period on the Draft EIS that encouraged DOE and Ecology to expedite the completion of the EIS, whenever feasible.

In response to comments requesting expedited completion of the EIS and in recognition of the extensive past public involvement associated with tank waste, DOE and Ecology concurred on the 45-day comment period. A 45-day comment period is the minimum time that an agency must schedule for receipt of public comments on an EIS. DOE and Ecology also recognized that public review would be limited by the 45-day comment period. To assist the public review, DOE and Ecology held five public meetings during the comment period. For these meetings, the agencies worked closely with stakeholders to provide meeting formats that would maximize interaction with the public. The EIS also was widely distributed to reading rooms and information repositories, as well as made available on the Hanford Home Page on the World Wide Web.

Finally, DOE and Ecology carefully considered all requests to extend the length of the comment period. Of the six requests for extensions received by the Agencies, two were formally withdrawn, two submitted written and/or oral comments during the 45-day period, and the remaining two requests represented general requests for more time on behalf of the public and not the individual commentor. Given that more than 1,400 interested parties received direct mailings, more than 850 copies of all or part of the EIS were distributed to interested parties, and more than 350 individuals submitted oral or written comments, the agencies concluded that sufficient time had been given and no extension of comment period was warranted. Please refer to the response to Comment number 0066.01, which provides more information regarding TWRS EIS public involvement.

Comment Number 0036.08 *HEAL (Exhibit)*

Comment However, we do want to state for the record the difficulties encountered in obtaining the supporting information on the EIS.

First and foremost is the difficulty in reviewing the EIS's references and supporting information. Many are missing from the information repositories. The most important references are the data packages

that support the various alternatives in the EIS. Some of these data packages were approved for public release in July of 1995 -- nine months is ample time to deliver documents to the information repositories.

Response DOE and Ecology acknowledge the concern expressed in the comment. The agencies remain firmly committed to executing the public involvement requirement mandated by NEPA. This process includes providing all referenced documents in a readable format and timely manner. All references and supporting documents cited in the Draft EIS were available through the following sources:

- Publicly (e.g., regulations and laws)
- In DOE reading rooms or information repositories in Richland, Spokane, Seattle, and Portland
- By contacting the Hanford Site Tri-Party Agreement information repository.

These documents were available throughout the public comment period to support the public review of the Draft EIS. Due to the volume of the documents supporting the Draft EIS, microfilm was used to save space and resources. One reading room was not familiar with the indexing system used for the microfilm and was provided copies of the paper documents. In several isolated incidences, individuals requesting supporting documents were mistakenly told that certain documents were unavailable in the reading room. To correct this situation, several supporting documents that were used as the data basis for the Draft EIS were provided in hard copy to the reading room and directly to the individuals requesting copies.

Comment Number 0044.01 *EPA*

Comment We are hereby withdrawing our request for an extension of the comment period.

Response DOE and Ecology acknowledge the withdrawal of the request by EPA for an extension of the comment period. Please refer to the responses to Comment numbers 0007.01 and 0042.02.

Comment Number 0055.01 *Martin, Todd*

Comment But my first point has to do with problems with the informational repositories. I spent yesterday morning hammering my head against a brick wall out at the informational repository trying to get the data packages that support the EIS. Some of them are there and some of them are not. I get paid to do this although not nearly enough but I can not imagine an interested citizen actually being able to find any of that information if they were so motivated. It was particularly troubling in that there is a very competent and professional staff at this informational repository where at the others it is difficult to find a staff person who actually knows where the Hanford documents are. So that was somewhat troubling to me and I understand that DOE and Ecology and Jacobs are working to fix that problem and I hope it is fixed by now. Given to that I had those problems I want to thank DOE, and Ecology, and Jacobs for facilitating my getting a hold of these packages yesterday. That was very helpful.

Response Please refer to the response to Comment number 0036.08 for a related discussion.

L.9.10 MISCELLANEOUS

Comment Number 0005.03 *Swanson, John L.*

Comment At the May 2 hearing in Pasco, I did a poor job of expressing myself regarding the fact that "The assumptions drive the conclusions." This draft is based on MANY assumptions, which is all you could do at this point in time, but I think you could do a better job of making that clear. There generally seems to be places where the proper qualifying statements regarding assumptions are made, but those qualifying statements do not generally follow throughout the text (what is properly qualified early on, or in an appendix, is often stated as an absolute fact later in the text). Yes, it would take more words to do it right, but that should not prevent it from happening. I wonder if some of the writers do not in fact believe that some of the assumptions are really facts.

Response For each area of environmental impacts analysis in the EIS (e.g., groundwater, health, accidents) assumptions were clearly identified in the relevant appendix. Where uncertainties associated with an assumption would potentially result in significant variations in the data or conclusions presented in the EIS, an uncertainties discussion or analysis was included in the appendix. For each area of impact analysis, the assumptions and uncertainties were summarized in the relevant portions of Volume One, Section 5.0.

For the description and comparison of the alternatives, a similar process was used to inform the decision maker and public regarding assumptions and uncertainties. For the alternatives, the detailed analysis was presented in Volume Two, Appendix B, and the summary information in Volume One, Section 3.0. To enhance the decision maker and public understanding, all assumptions and uncertainties addressed in the EIS, as well as the associated calculated relative uncertainties, are now presented in Volume Five, Appendix K. This new format for addressing these issues should improve accessibility to the information and clearly communicate important interrelationships between assumptions and uncertainties. A general review of the EIS was completed to ensure that all assumptions are clearly identified and communicated to the extent practical. Please refer to the response to Comment number 0012.17 for a related discussion.

Comment Number 0027.01 *Roecker, John H.*

Comment TWRS Alternative Decision Making Process
DOE makes the following statement right up front in the EIS (page 1-3 to be exact), "NEPA and SEPA provide decision makers with an analysis of environmental impacts (both positive and negative) of proposed actions for consideration in decision making." Anyone following the TWRS program during the last couple of years fully realizes that the alternative selection decision has already been made. Before the ink was dry on the January 1994 re-negotiated Tri-Party Agreement, DOE was already canceling engineering and technology development work to support any alternative except the privatization effort (i.e., the Phased Implementation alternative). If DOE had truly not made a defect

and unilateral (without State or Public involvement) alternative selection decision, funding for all alternatives would have been continued at an equal level. DOE has just received proposals for Phase 1 of the Phased Implementation alternative and is due award contracts before September. How can DOE possibly say the decision hasn't been made? How can DOE expect to gain public confidence and credibility when it continues to function in such a misleading manner. This EIS is nothing more than an attempt to backfit and justify a decision that has already been made on a political rather than technical basis. That kind of action continues to result in poor DOE credibility. DOE would do much better in the public confidence and credibility arena if it would simply state the truthful facts as they are and let the public judge on that basis rather than continuing to manipulate the information.

Response DOE and Ecology have presented the facts concerning the alternatives for remediation in this EIS and have solicited public comments concerning the EIS. The renegotiation of the Tri-Party Agreement and the planning for the Phased Implementation alternative has been an effort to develop the DOE and Ecology proposed plan. It is frequently the case that agencies have a proposed action developed prior to initiating the preparation of an EIS. The EIS provides an analysis of the environmental impacts of the proposed action and alternatives to it. The EIS is not prepared to justify the selection of any alternative but rather, as required by NEPA, is prepared to provide the public and the decision makers an assessment of the proposed action and its alternatives so they may take environmental issues into account where decisions are made. Because the information contained in the Draft EIS is correct, no change to the text was made. Please refer to the response to Comment number 0005.07.

Comment Number 0066.01 *Stilger, Bob*

Comment My main comments are about the lack of citizen participation over the past 2½ years. From what, from the answer I got to my question earlier, it sounds like the last major participation that was conducted on this was in late 1970, excuse me 1994, which came at the direction of the Nuclear Waste Advisory Council before it was disbanded. So we've gone through as 2-year period, in which what I regard as substantial changes have been made in the current plans. When I hear that the amount of waste that's due to be cleaned up by 2010 is now at 16 percent, rather than 30 percent. Almost a 50 percent reduction. I regard that as a major change. I regard the plans for privatization as a major change. The fact that these plans have been developed primarily in private, behind closed doors, once again gives me great concern. When I come to a meeting like this and have, what, maybe a 2-hour period to examine what's going on, and have contrary information, or contradictory information presented by on the one hand DOE and Ecology, and on the other hand by HEAL and Heart of American Northwest. I must say, based on past experience, my inclination is to believe HEAL and Heart of American Northwest. Jerry may have long figures, but they're frequently more accurate, and more accessible than the others that are presented. My concern is that over the past 2 years work that was done in the late 80's, and early 1990's to begin to develop more of a relationship between the public and DOE, between the public and Department of Ecology, seem to have been substantially eroded. I don't believe that people know what's going on right now. I think these changes need to be discussed more publicly, in a more accessible manner. Frankly, I can't tell from the limited amount of

information that's been available tonight, whether the new plans really are the best plans since sliced bread, or are another example of backsliding and more paper work. Whichever the case is, we're not going to know until there is a more active, and more aggressive, and more thoughtful citizen participation process. Thanks.

Response Since 1994, there have been extensive opportunities for public involvement in the decision making regarding the TWRS program. The public has participated in the TWRS decision making process on the following occasions:

- Scoping for the TWRS EIS in early 1994 (five public meetings), consultation with Tribal Nations, and briefings of the Hanford Advisory Board.
- A public comment period on the SIS EIS and the Final EIS in late 1995 (five public meetings) and briefings for Tribal Nations, the Hanford Advisory Board, and the Natural Resources Trustee Council.
- Privatization and related public involvement on the proposed amendments to the Tri-Party Agreement from late 1995 through early 1996.
- Interaction with the Hanford Advisory Board and its committees from 1994 to the present on a variety of issues associated with the TWRS program. The EIS was discussed during public forums held in Richland, Washington, in Fall 1995.
- Extensive mailings and public notifications have been provided by the Agencies to encourage public involvement in the NEPA process and to provide the public with information regarding the alternatives and analysis in the EIS.

Substantial changes have occurred in the TWRS program during the past two years. However, these changes have been subject to extensive public participation and have all been undertaken within the context of the Tri-Party Agreement. Because of these changes and changes that preceded the signing of the amended Tri-Party Agreement in 1994, DOE was required by NEPA to prepare this EIS. NEPA requires public participation in the decision making process for actions by an agency that could have significant impacts on the human and natural environment. The NEPA process for the TWRS program provides the public with an opportunity to comment on the proposed action and alternatives to the proposed action.

To facilitate public participation in the NEPA process, DOE and Ecology widely advertised the opening of the comment period and the availability of the Draft EIS for review and comment.

- In newspapers throughout the region.
- In mailings to more than 4,500 individuals on Hanford Site mailing lists.
- Two separate press releases were distributed to media outlets in the regions.
- Indirect mailings to more than 1,400 interested parties.
- In distribution of more than 600 copies of the EIS.

Additionally, the EIS and supporting documents were available at four public reading rooms or information repositories in the Northwest. The entire EIS was available on the Hanford Internet Homepage (http:\www.Hanford.gov.). DOE and Ecology have taken all steps possible to ensure that

the complete information was provided, information was provided in as many locations as possible, and that the public had access to the level of information they needed to effectively participate in the decision making process. While more active, aggressive, or thoughtful public participation is an important goal to which both Agencies are committed, the TWRS public participation program met or exceeded all requirements and expectations under Federal and State regulations. The TWRS public participation program implemented many innovative techniques that were designed to improve public involvement.

Comment Number 0081.10 *Pollet, Gerald*

Comment Secondly, lastly, we are concerned that the joint state U.S. DOE EIS effort was a noble effort at saving costs and streamlining. And we feel that DOE, U.S. DOE, excuse me, has jeopardized the success of this experiment. Jeopardized it by failing to provide all relevant access, all data, excuse, me, data access for all relevant data to its partner in this EIS. The Department of Energy has been sitting on data about tank leaks. It has been sitting on data and has known that it has evidence about additional types of wastes, radionuclides, not just cesium that have moved from tanks. It hasn't shared that data, and seems to be sitting on that data in such a manner as to try to prevent it from coming out during the public hearing and comment period on this EIS. That would be extremely bad faith. It has to release that data, and maybe even do a supplemental mailing to the public, and share it immediately with its partner if it expects to ever be able to go ahead and do a joint EIS again. And we're very concerned that Ecology can't be a full partner in an EIS when its co-partner has control over all the data, and attempts to sit on it and evade public disclosure. Thank you.

Response All data used in the development of the EIS are available to the public by accessing the TWRS EIS Administrative Record. The emerging data concerning tank leaks and the depth into the soil column the contaminants have moved were identified in Volume One, Section 3.3 on page 3-4 of the Draft EIS. The mechanism for how this contamination may have moved into the soil column at a greater depth than previously believed has not yet been determined. It may have leaked down unsealed bore holes, caused by hydraulic pressure of large leaks, caused by chemical reactions that could change the rate at which the contaminants might move in the soil column, or a combination of these and other factors. Additional information analysis has been performed since the publication of the Draft EIS and the last available information was included in Volume One, Section 4.2 and Volume Five, Appendix K of the Final EIS. DOE and Ecology know of no information that has been withheld from the public.

Comment Number 0085.06 *Klein, Robin*

Comment It is important that a plan be implemented immediately to retrieve the tank wastes. Oh, and on behalf of a number of individuals here, we'd also like to know what your going to do with these comments, and what the response mechanisms will be. How will you be responding to our comments?

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating

the TWRS waste. DOE and Ecology agree with the need to move forward with remediation of the waste at the earliest possible date.

All oral and written comments have been entered into the public record for the EIS. Transcripts of meetings and written comments have been placed in the Administrative Record for the EIS and made available for public review at DOE Reading Rooms and Information Repositories. Each comment received was also logged, categorized by topic, and responded to individually. A copy of the comment and response has been published in this comment/response document (Volume Six, Appendix L). Based on the response to the comment, appropriate changes have been incorporated into the text. The Final EIS will be provided to the decision makers to support the Agency decision.

Comment Number 0098.07 *Pollet, Gerald*

Comment Everyone has to get together to fight to get first of all full disclosure, secondly, to make sure that tanks are not left behind, and thirdly, that no decision makers are lulled into thinking it is safe to leave wastes behind because of this EIS and because the Department of Energy does not give its partner, the State of Washington, the data. I think this was a failed experiment in terms of the state collaborating with the Department of Energy. The U.S. Department of Energy blew it and we will oppose joint EISs in the future unless the state really puts down its foot and insists on some truth and changes here.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. The DOE and State of Washington were jointly involved throughout all aspects of the preparation and approval of the Draft EIS and they concur in its results. Co-preparing this EIS instead of preparing two, one by DOE and one by the State of Washington, allowed the overall approval process to be accelerated and saved taxpayers money. All information concerning the EIS was shared between the State and DOE. Please refer to the response to Comment number 0081.10 for a related discussion.

L.10.0 POLICY ISSUES

L.10.1 MISSION

No comments were submitted for this topic.

L.10.2 AUTHORITY AND RESPONSIBILITY

No comments were submitted for this topic.

L.10.3 CREDIBILITY

Comment Number 0053.01 *Carpenter, Tom*

Comment Workers were often heavily criticized or publicly ridiculed in the press for being wrong. Hazards that today are publicly accepted and even embraced enthusiastically by regulators and it is

hard to come here and listen and read the documents and have a whole lot of trust in the same set of folks who created the situation to now go out and propose scenarios for cleaning it up. I have a real problem with the same group of people who denied that there was ever a problem about ten years and five years and even three years ago now telling us that the risks for such and such a scenario was so much that explaining to us this alternative means this much money or that alternative means this many lives and I guess what I am trying to get to is I think the problem at the Hanford Site is not one of science, I think it is one of management.

Response An independent contractor was selected to assist DOE and Ecology in preparing this EIS and several independent assessments of the EIS have been performed to validate its results. The scope of the EIS is the remediation of the tank waste and cesium and strontium capsules, and the items mentioned in the comment are outside of this scope of the EIS; therefore, no change in the text of the document is warranted.

Comment Number 0053.04 *Carpenter, Tom*

Comment Why did it take over a month and a half for folks to be informed about these findings (regarding cesium on nearing toward the groundwater). So, again we have whistle blowers bringing information out about problems in the tank farms, about problems in management and I guess my bottom line is that I would like to see some meaningful management reform, some ethical folks with integrity in charge of doing whatever it is you're going to do out there, with whatever scenario you choose because the best laid plans can not be effectively implemented by incompetent folks. You can have a great plan but it won't work if your not honest, if your not accountable. So that is my concern and that is my comment for tonight.

Response DOE and Ecology know of no delay in informing the public of verified information concerning the cesium in the soil column. DOE and Ecology are continuously working to improve methods used to distribute information to the public.

Comment Number 0057.01 *Garfield, John*

Comment I would like to express appreciation for Ecology's involvement in this process over the last several years. Also, the other stakeholders for their influence. For the last 3 to 4 years, there has been an unfortunate headquarters involvement that skewed this process and made it much more complex than it needs to be.

Response DOE and Ecology acknowledge the comment. The extensive involvement of Ecology and the stakeholders helped provide a higher quality document that addresses the concerns of the stakeholders.

Comment Number 0095.01 *Stock, Sidney*

Comment May be possible and so I would urge again those who work there to remember that your first responsibility is as a human being to yourself, to your families, to all of humanity and secondly to your job and so when it comes to making a judgement on my part with limited information I will continue, hopefully not forever, to trust what part of American and Physicians for Social Responsibility and the other public interest groups say in criticism of what goes on rather than the information that I am receiving from the government.

Response DOE and Ecology believe that the TWRS EIS was prepared using the best available data and methods of analysis. An important part of the NEPA process is the review of the Draft EIS by stakeholders, agencies, and Tribal Nations during the comment period. This review period provided interested parties with the opportunity to examine the assumptions, analyses, and conclusions in the draft document and the opportunity to provide input on how these issues and other concerns should be addressed in the Final EIS. This process improves the quality of the Final EIS and is crucial to the NEPA decision-making process.

Comment Number 0096.01 *Zepetta, Barbara*

Comment And for people in this room, not to have the actual documents, not to have the actual data in and, I mean, in an objective way, not a subjective way, it should not be a different consultant every time you do not get the right answer you get a different consultant. This is not a PR game and until we stop doing this as a PR game we are not going to reach any ... we are not going to get the facts to begin to get the solutions on them.

Response The purpose of the public comment period is to provide the public, agencies, and Tribal Nations with the documents and data. The Draft EIS and its supporting documents were released for public review and comment on April 12, 1996. During the 45-day public comment period which ended on May 28, 1996, these documents were available in the DOE Reading Rooms and Repositories in five cities in the Northwest. Among the documents available were the raw data and calculations used to describe the alternatives and assess impacts. This information was provided to allow any interested party with the documents necessary to assess the quality of the information that served as the basis of the EIS. Individuals requesting the EIS and supporting appendices were provided a copy.
The document also was available on the Hanford Internet Homepage.

Volume One, Section 8.0 contains the names and qualifications of each individual author who was responsible for analysis presented in the EIS.

L.10.4 GOVERNMENT POLICY

No comments were submitted for this topic.

L.10.5 MISCELLANEOUS

Comment Number 0008.07 *Evett, Donald E.*

Comment In closing, you have prepared an excellent impact statement. It pleases me to know that progress is in the making to begin resolving the Tank Waste Remediation System at Hanford. I believe it is ever so important to place high value program actions on this system without unnecessary delays. I wish everyone in the Department of Energy success in this difficult venture.

Response DOE and Ecology acknowledge the preference expressed in the comment and will take this preference and other public comments into consideration when making a final decision on remediating the TWRS waste. Please refer to the response to Comment number 0040.01 for a discussion of factors influencing the evaluation of alternatives.

Comment Number 0015.01 *NRC*

Comment The Nuclear Regulatory Commission currently does not have budgeted resources to do a proper review of the EIS at this time. Because incomplete EIS comments from NRC could set an improper precedence for any future licensing of the solidification operations, NRC will not issue comments on the TWRS EIS. NRC will, however, use the EIS, as appropriate, to support future reviews of TWRS solidification operations.

Response DOE and Ecology acknowledge the receipt of the comment.

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Distribution List

DISTRIBUTION OF THE FINAL EIS

U.S. Government, State and local agencies and officials, Tribal Nations, interest groups, stakeholders, and others to whom the Draft EIS was distributed or who commented on the Draft EIS.

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