3.2 State Agency Comments and Responses

3.2.1 Washington State Department of Ecology

Statement of

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Washington Department of Ecology
Nuclear Waste Program

Draft Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement

August 14, 2002

1 Everyone here is concerned about how the Draft EIS fits into the overall picture of Hanford cleanup, and the long-term effects on the Columbia Basin and the region. The Department of Ecology wants to be confident that Hanford's own legacy of waste and contamination is and will be managed safely. Only then can we consider adding to the burden. We need the same confidence that any additional wastes brought to Hanford will also be managed safely, both day-to-day and for the long term. Unfortunately, this EIS falls short on all counts.

On several fronts, we have increasing confidence in how Hanford's existing wastes and contamination are being managed:

- USDOE has started Construction on a large plant to treat Hanford's tank wastes, after a decade of false starts;
- Cleanup of contaminated soils and buildings all along the Columbia River corridor is progressing well, including spent nuclear fuel being removed from water basins near the river;
- Recent discussions between USDOE and its regulators have led to support in Washington, D.C., for increased funding to accelerate retrieval of tank wastes and buried transuranic wastes, and for increased focus on groundwater protection.

2 Washington State recognizes that the legacy of nuclear weapons production is a national, indeed an international, problem. We expect to send high-level and transuranic wastes *from* Hanford *to* other states for disposal. We have borne, and will continue to bear, the responsibility to dispose of wastes *at* Hanford. But we need to understand the consequences of all of these actions in a comprehensive way.

3 We had hoped that the Hanford Solid Waste EIS would contribute to our confidence both in how Hanford's waste is managed and in the safety and importance of Hanford's role in the overall cleanup of nuclear sites in the country. We are very disappointed, therefore, that the Draft EIS falls far short of the mark. It does not provide adequate information, clearly presented, to help us or the public address major issues. For example:

4 • What is the net benefit or harm of importing additional wastes for storage, treatment or disposal at Hanford?
5 • Are there much better alternatives to burying minimally-treated waste in shallow, unlined trenches?
6 • What are the long-term costs and requirements for monitoring, maintaining, and preventing failures at, and radioactive releases from, waste sites, and how can we be confident that these activities will be effectively and accountably managed?
7 • What is the rationale for continuing self-regulation by USDOE when the issue is not national defense but environmental protection?

Here are some areas where we find the Draft EIS so deficient as to warrant a major revision, followed by another round of public review.

Scope is too narrow

The Draft EIS essentially evaluates a limited range of near-term, alternative means to add some treatment capability and to dig waste-disposal trenches.

8 • The Draft EIS assumes that the 1997 Waste Management Programmatic EIS adequately compared the effects of treatment and disposal facilities at various sites, but it did not. The Programmatic EIS relied on data now several years old and did not have available even the limited information about Hanford contained in the Draft Hanford Solid Waste EIS.
9 • The Draft EIS assumes continued or increased off-site low-level waste and mixed low-level waste disposal at Hanford. It does not separately assess needs for disposing Hanford waste, in spite of widespread requests for such analysis during the scoping comment period.
10 • The Draft EIS evaluates only the management of wastes owned by or coming to the existing Waste Management Program, touching only lightly on previously buried wastes, environmental restoration wastes, naval reactors, and other wastes disposed near the surface at Hanford.
11 • The Draft EIS does not evaluate other options currently under active discussion, such as the lined, RCRA-compliant mega-trench for disposing of low-level waste, expanded use of the Environmental Restoration Disposal Facility (ERDF), or storing and treating transuranic wastes from other sites.

Impact analysis is too limited

12 The Draft EIS reaches conclusions without adequate data and analysis. It often fails to disclose what information is not known in arriving at conclusions.

- 13 The Draft EIS does not include sufficient data about groundwater contamination and movement at Hanford.
- 14 The Draft EIS does not include sufficient data about the extent and characteristics of wastes and contamination already in the ground at Hanford.
- 15 The analysis of cumulative impacts from the proposed treatment and disposal activities, in conjunction with other reasonably foreseeable actions at Hanford, is extremely limited and not credible based on the material presented.
- 16 The Draft EIS does not include data about the effects on the full range of plant and animal species, *nor* does it recognize USDOE's obligation to protect and restore priority habitat, even if it has been degraded by fire or pesticides.

Regulatory analysis is insufficient

17 The Draft EIS tends to ignore a number of regulatory issues.

- 18 The Draft EIS does not adequately address the challenges USDOE presently faces in complying with RCRA and state dangerous-waste regulations. The Tri-Party Agreement is designed to bring USDOE into compliance, but there is still a long way to go. The Department of Ecology does not support compounding compliance problems that already exist at Hanford.
- 19 The Draft EIS assumes a point-of-compliance/impact assessment that has no basis in regulations (1 km down gradient from burial ground).
- 20 The Draft EIS does not adequately address the requirement under Washington and federal laws that mixed waste be treated to the maximum reasonable extent.
- 21 The Draft EIS assumes continuation of USDOE's self-regulation for radioactive wastes without any discussion of alternatives or implications.
- 22 The Draft EIS reflects insufficient attention to consultation requirements under the Endangered Species Act.

Consideration of closure, long-term care and costs is very limited

23 The Draft EIS does not deal with such long-term activities as site closure, corrective action, monitoring, maintenance, and post-closure institutional controls. It also does not assess nor compare disposal alternatives or low and high volumes according to the long-term care requirements imposed by each, and the costs of meeting the requirements.

Responses to Letter L089

Comments	Responses
1	This revised draft *Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement* (HWS EIS) has been revised to address many comments regarding its scope and content. It is hoped that the information presented in this revised draft HSW EIS will address these concerns. Information responsive to the specific comments of this statement and the Washington State Department of Ecology (Ecology) comment letter (L095 in this document) are included in the individual responses.
2	This revised draft HSW EIS includes a more comprehensive discussion of the relationship of Hanford's waste management activities to those across the U.S. Department of Energy (DOE) complex. It also provides an expanded discussion of the consequences of alternatives considered in the HSW EIS as well as cumulative impacts of the alternatives in relation to other activities at Hanford. The consequences of HSW EIS alternative actions are presented in Sections 3.4 and 5 of the document.
3	This HSW EIS has a revised purpose and need based on stakeholder comments. Other major revisions are the inclusion of the immobilized low-activity waste product from the waste treatment program, evaluations of new and reconfigured alternatives, and additional information about the alternatives and their impacts.
4	This HSW EIS has been revised to evaluate a Hanford Only waste volume so that the incremental impacts of the receipt of offsite waste can be ascertained. The major benefit of importing offsite wastes to Hanford is that it may enable other generator sites that do not have the capability to treat these wastes, to be cleaned up sooner, thereby freeing up resources that can then be employed to accelerate cleanup at Hanford.
5	Additional alternatives for the disposal of waste in deeper lined trenches have been added to this HSW EIS.
6	DOE has developed and analyzed the costs for each alternative considered in this HSW EIS. The scope of the cleanup activity is expected to include maintenance of the leachate collection system, monitoring of the cap performance, and maintenance of passive administrative controls (signs/postings). Groundwater monitoring is conducted according to DOE Orders, the Resource Conservation and Recovery Act (RCRA) permit, and Tri-Party Agreement (TPA) requirements for the disposal areas, and will be expanded as necessary according to agreements between DOE and regulatory agencies to support future waste management operations. DOE is committed to meeting environmental regulations and standards now and in the future. The U.S. Environmental Protection Agency (EPA) and Ecology (under the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] and RCRA) require monitoring, reporting, and record keeping. Thus, there is a legal requirement that DOE, or its successor entities, meet these requirements.

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Comments	Responses
7	As noted in Section 6 of this HSW EIS, a number of DOE radioactive and radioactive mixed waste activities are subject to external regulation or oversight. The specific authorities of DOE under the Atomic Energy Act (AEA) of 1954, and the application of other external requirements to DOE activities, are established by Congress rather than by DOE. DOE is subject to external oversight through the application of many regulations, including the applicable requirements of CERCLA, RCRA, and State of Washington Dangerous Waste Regulations. It is not clear that external regulation of facility safety and worker protection at DOE sites would result in greater public or worker safety. For example, the Occupational Safety and Health Act (OSHA) has identified a number of safety and health hazards for which DOE currently enforces more protective safety and health standards than OSHA. Also, it is not clear whether safety practices would materially change. For example, DOE worker protection requirements currently incorporate many OSHA occupational safety standards. One of the conclusions in a 1999 NRC report (*External Regulation of Department of Energy Nuclear Facilities: A Pilot Program*, NUREG-1708) covering three pilot external regulation efforts of DOE facilities was that "few, if any changes in facilities, procedures, drawings, calculations, administrative process controls, safety programs, and safety documentation (including safety analysis reports) would be necessary. DOE initiatives such as WorkSmart Standards and Integrated Safety Management Systems could continue to be used under an NRC regulatory framework." A change to external regulation of facility safety and worker protection at DOE sites would require Congressional action including amendment of the AEA and OSHA. DOE has added alternatives that include disposal of LLW in lined trenches with leachate collection systems that meet RCRA and State substantive requirements.
8	The WM PEIS was a comprehensive evaluation of DOE nationwide waste management, and DOE determined there was sufficient information to make decisions regarding the sites that were suitable for long-term waste management missions. The WM PEIS was widely distributed, and documents cited in the WM PEIS were made available at numerous libraries and reading rooms in Washington and Oregon. Likewise, documents cited in this HSW EIS are available in public reading rooms listed in published notices and this document.
9	This HSW EIS has been revised to evaluate a Hanford Only waste volume

Responses to Letter L089

Comments	Responses
10	The scope of this HSW EIS has been revised to evaluate disposal of the immobilized low-activity waste generated by the Hanford Waste Treatment Plant (WTP). Other past buried wastes at Hanford are addressed as part of the cumulative impact analysis.
11	Disposal of waste in lined mega-trenches and use of the Environmental Restoration and Disposal Facility (ERDF) have been added as alternatives.
12	Additional discussion of limitations, uncertainties, and assumptions has been provided throughout this revised HSW EIS.
13	The text has been revised throughout the EIS to provide additional information about characteristics of disposed waste (e.g., Section 2.0, Appendix F, etc.) and groundwater movement (e.g., Sections 4.0, 5.3, etc.) to support conclusions.
14	Please see Response 13.
15	The evaluation of cumulative impacts has been substantially expanded (see Section 5.14 and Appendix L in Volumes I and II of this EIS).
16	Biological and ecological resources (vegetation, wildlife, aquatic ecology, and threatened and endangered species) potentially impacted by the proposed actions are assessed in Appendix I and summarized in Section 4.6 of this HSW EIS. Wildlife species evaluated and ecological resource impacts are summarized in Section 5.5 of this EIS. The natural vegetation is expected to be reestablished after closure of the disposal facilities and the borrow area. Potential mitigation measures for addressing ecological impacts are described in the Biological Resources Management Plan (BRMaP) and the Biological Resources Mitigation Strategy (BRMiS), which are discussed in Section 5.18 of this HSW EIS.
17	This HSW EIS was prepared for the purposes of National Environmental Policy Act (NEPA) analysis and decision-making. Basic descriptive information about regulatory programs is provided in a number of locations throughout this EIS, including Section 1.5.1 (TPA, RCRA, CERCLA), Sections 1.5.2 and 1.5.3 (NEPA), Section 1.5.4 (State Environmental Policy Act), and Section 2.1.2 (RCRA). Section 6 contains an extensive discussion of applicable regulatory requirements and permits.
18	DOE recognizes that the cleanup of Hanford is a complex effort and is committed to it through the TPA process. As of February 1, 2003, DOE had met 99% of its TPA milestones on or ahead of schedule.

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Comments	Responses
19	The maximum point of impact from multiple and widely dispersed sources is not necessarily directly underneath the Low Level Burial Grounds (LLBGs) or at the LLBG boundary. To model the groundwater impacts from multiple and widely dispersed disposal units over long periods of time, a 1-km "point of analysis" location was deemed to be more appropriate and representative than a regulatory "point of compliance" well location. Current results from the RCRA-compliant groundwater monitoring have not identified any groundwater impacts from the LLBGs. The point of analysis approach is considered more technically appropriate for a NEPA evaluation of groundwater impacts. More specific clarification about the differences between the "point of assessment" used in the HSW EIS groundwater impact analysis and the RCRA "point of compliance" for land disposal unit groundwater monitoring wells is provided in Section 5.3 and Appendix G.
20	DOE agrees that mixed waste must be treated to applicable requirements of RCRA and the Washington State Dangerous Waste Regulations before land disposal at Hanford. The treatment of mixed low-level waste at Hanford is discussed in Section 2.1.2 of this HSW EIS.
21	Please see Response 7.
22	Presence alone of threatened or endangered species or critical habitat does not necessitate formal consultation under the Endangered Species Act. The U.S Fish and Wildlife Service (FWS) letter of April 23, 2002, (see Appendix I) states that "...if a listed species is likely to be affected by the project, the involved Federal agency should request Section 7 consultation.…" According to the FWS Endangered Species Consultation Handbook, formal consultation is necessary 1) after the action agency determines that the proposed action may affect listed species or critical habitat, or 2) National Marine Fisheries Service (NMFS) or FWS does not concur with the action agency's finding that the proposed action is not likely to adversely affect the listed species or critical habitat. There are no threatened or endangered species or critical habitat in any of the terrestrial habitats to be disturbed under any of the alternatives in this HSW EIS (see Appendix I). Thus, because no threatened or endangered species or critical habitat are likely to be adversely affected, there is no basis for initiating formal consultation with either NMFS or FWS. Regarding documentation for State-listed species of concern we assume the comment meant the Washington State Department of Fish and Wildlife not the U.S. Fish and Wildlife Service. Table 4.12 in this EIS identifies the Washington State-listed animal species of concern. This information was obtained from the website: www.wa.gov/wdfw/. Based on information provided subsequently from the Washington State Department of Fish and Wildlife (letter dated August 20, 2002), this EIS has been updated. Also, please refer to the responses to the comments of the Washington

Responses to Letter L089

Comments	Responses
	Department of Fish and Wildlife (L096).
23	This HSW EIS has been expanded to address long-term stewardship. It expands upon the range and depth of alternatives analyzed, provides information describing accelerated cleanup plans and how they affect they affect the HSW EIS. The analysis also distinguishes between Hanford Only waste volumes and those projected to originate offsite. This HSW EIS considers post-closure institutional controls (see Section 2.0) and costs (see Section 3.5) in its analysis beyond 2046.

3.2.1 Washington State Department of Ecology
August 21, 2002

FC#	Section/Page Ref.	Category	Comment
1	Section 1.0, Page 1.1, Lines 4-7 Section 1.3, Page 1.3,Lines 18-20 Section S.2, Page S.1, Lines 23-25	Scope and Analysis	The Purpose and Need statement appears to support USDOE's complex-wide programmatic need to "enhance and expand management of its existing and anticipated volumes of . . . " While the Purpose and Need statement may reflect USDOE's need, it does not reflect the Washington State Department of Ecology's need. So that the Purpose and Need statement may reflect USDOE's and Ecology's needs, the following Purpose and Need statement is recommended: "USDOE needs to provide safe, protective, and RCRA-compliant waste management capabilities for existing and anticipated volumes of solid LLW, MLLW, post-1970 TRU, pre-1970 containing TRU, commingled-TSCA waste at the Hanford Site." (§ 1502.13)
2	Section S.3, Page S.2	Scope and Analysis	40 CFR Part 1502.12 requires the summary "to stress . . . areas of controversy (including issues raised by agencies and the public), and the issues to be resolved (including the choice among alternatives)." The section describes the scoping process followed for development of this environmental impact statement. The section indicates that USDOE "considered all of the comments received in its development of this Draft HSW-EIS." Ecology has commented on other associated NEPA documents such as the draft environmental assessment (EA) for trench construction and operation in the 218-E-12B and 218-W-5 Low- Level Burial Grounds (LLBG) (DOE/EA-1373) and the EA for the transuranic (TRU) waste retrieval in the 218-W-4B and 218-W-4C LLBG (DOE/EA-1405). Either in this section or somewhere else in the Draft HSW-EIS, it should be indicated whether USDOE considered Ecology's previous comments on related issues of environmental impact analysis. (§ 1502.12)
3	Section S.3, Page S.3, Lines 9-14 Section S.3, Page S.3, Lines 10-11 Section S.8.1, Page S.18, Line 13 S.3, Page S.3	Scope and Analysis	The Draft HSW-EIS states that the environmental analysis in the document was conducted through the year 2046, which represented the end of most waste management operations at the site. This resulted in a number of scope and boundary concerns including: ➢ The post-closure requirements for waste disposal facilities may extend beyond the end of active waste management (2046). ➢ Long-term impacts to groundwater and the Columbia River were evaluated for 10,000 years. How do these ranges compare to the half-lives of the radiological contaminants in question? How long before decay renders these contaminants non-radioactive?
4	Section S.3, Page S.3, Lines 10-11 Section 2.2.3.2, Page 2.26, Lines 13-20 Figure 2.15, Page 2.27	Scope and Analysis	It appears that closure actions and impacts have only been partially included and analyzed in the Draft HSW-EIS. While the Draft HSW-EIS evaluates and bounds consideration of managing wastes in the LLBG, the evaluation is not complete as it does not include a bounding evaluation/analysis of impacts and/or costs of closure (i.e., disposal). The LLBG are permitted as disposal units. As such, disposal is a function of waste management. Similarly, closure is a function of waste management at the LLBG. Therefore, to omit an impact analysis of closure actions and/or costs renders the analysis incomplete and does not provide decision-makers the needed information to make decisions regarding the Draft HSW-EIS at Hanford. Specifically,

			the Hanford Barrier (an aboveground, multi-component barrier that prevents the entry of rainfall, plant roots, or burrowing animals into the area covered by the barrier) design was assumed a bounding design for analysis purposes. Likewise, the use of the Hanford Barrier was assumed a bounding action (i.e., in-place closure) for analysis purposes. To even partially omit closure action impact and/or cost analysis in the Draft HSW-EIS for disposal units for which protective barriers are regulatory requirements renders the analysis deficient, incomplete, and non-bounding. (§ 1502.14,1502.15, and 1502.16)
5	Section S.3, Page S.3, Lines 39-41	Scope and Analysis	Clarify if the maximum forecast receipts represents existing Hanford (i.e., on-site) TRU wastes or if the forecast includes receipt of off-site TRU wastes. If the forecast includes receipt of off-site TRU wastes, it is recommended that either the reader be referred to the location in the Draft HSW-EIS where a description/explanation of "maximum forecast receipts" may be found or that the text be clarified. (§ 1502.7)
6	Section S.4, Pages S.4 -S.6 Section S.4, Page S.4 Figure S.2 Table S.1, Page S.11 Section 1.0, Page 1.1, Lines 18-20 Section 1.2, Page 1.3, Lines 5-6	Scope and Analysis (TSCA)	The *Hanford Site Solid Waste Management Environmental Impact Statement Technical Information Document* (HNF-4755) indicates that waste types covered in the Draft HSW-EIS include TSCA regulated waste (i.e., waste containing polychlorinated biphenyls [PCB], asbestos, or other such regulated components). A number of sections of the Draft HSW-EIS do not appear to identify this waste type. The Draft HSW-EIS and the supporting basis (technical information document) must agree on scope. The text should explain this difference between the Draft HSW-EIS and the supporting information document and explain how the difference was addressed in the Draft HSW-EIS. Due to the use of waste streams for which definitions are not included, the reader cannot discern what waste types are included in the Draft HSW-EIS. (§ 1502.7,1502.14)
7	Section S.5.2, Page S.9, Lines 3-12	Scope and Analysis	It is indicated that USDOE does not currently have facilities for treating several significant waste streams. It is also indicated that "proposed new facilities are included in the Draft HSW-EIS to provide capabilities for waste treatment and processing." From the indications, it is unclear whether the Draft HSW-EIS EIS bounding analysis includes potential impacts and costs associated with the proposed new facilities. If the reader is not provided information regarding conceptual plans, design phases, funding profiles, etc. associated with the proposed new facilities, the reader cannot ascertain whether the analysis is bounding. In other words, it is difficult for the reader to determine if the "proposed new facilities" are included in the scope of the Draft HSW-EIS. Clarify, by identification, if the analysis is bounding by the inclusion of impacts and costs associated with the "proposed new facilities". Clarification may be provided by referring the reader to the appropriate location in the document where the information may be reviewed. (§ 1502.7)
8	Section S.6.1, Page S.10	Scope and Analysis	It is indicated that USDOE "needs to determine which . . . disposal activities are required for properly managing on-site and off-site solid LLW that currently exists, or that may be received at Hanford in the future." It is also indicated that USDOE "needs to evaluate options for permanent disposal of LLW at Hanford, including expansion and possible reconfiguration of disposal facilities to accommodate anticipated waste receipts." With so many decisions yet to be made, the wording

			does not instill confidence that the impact analysis and/or cost estimates included in the Draft HSW-EIS are either comprehensive or bounding. To clarify, include wording identifying/describing how the impact analysis associated with the LLW waste type is bounding. Also, for clarification, include a description of how the decisions will be made in the future (i.e., applicable authorities). (§ 1502.7)
9	Section S.6.1.2, Page S.10 Table S.1, Page S.11	Scope and Analysis	The *Hanford Site Solid Waste Management Environmental Impact Statement Technical Information Document* (HNF-4755) indicates that "DOE would treat Hanford's non-conforming LLW using off-site commercial facilities and dispose of this treated waste in the LLBG. The Draft HSW-EIS states: "Non-conforming waste would be treated to comply with the HSSWAC using existing on-site capabilities, or if on-site treatment capacity does not exist, it would be treated at an off-site commercial facility." Ecology acknowledges the financial status of the intended off-site commercial treatment facility. Due to the supporting technical information document's described alternative 1 off-site treatment, the Draft HSW-EIS should identify where the analysis of "enhancement" of on-site treatment facilities or construction of new on-site treatment facilities is included in the Draft HSW-EIS. The analysis should include environmental and cost impacts. (§ 1502.14, 1502.15, and 1502.16)
10	Section 1.4.5.1, Pages 1.11 – 1.12 Section S.6.1.3, Page S.12	Scope and Analysis	Section 1.4.5.1, Pages 1.11 – 1.12. The section describes the three alternatives analyzed for LLW management at Hanford. The No Action alternative appears to contain "action" as indicated by the following: "DOE would construct new disposal capacity using a trench design similar to that previously employed for disposal of LLW at Hanford. Disposal would take place within the boundaries of currently defined LLBG." Similarly, the receipt of the disposal volumes identified and the construction of new trenches could be argued to constitute "action." The reader can neither determine if an environmental impact analysis has been performed for the "currently defined LLBG" nor discern why a No Action alternative would appear to contain "action." Therefore, provide an explanation and the basis for inclusion of additional waste receipt and trench construction in the No Action alternative. (§ 1502.7, 1502.14)
11	Section 5.1, Pages 5.3 – 5.5 General Comment	Scope and Analysis	The land use section does not include sufficient explanation to allow the reader/decision-maker to understand the supporting technical basis/analysis associated with the various scenarios/alternatives. To explain, Table 5.1 lists upper and lower bounds for alternatives 1 and 2. If the land use areas are compared between "area designated for LLBG," "area currently occupied," and upper and lower waste volume bounds there is no explanation for why the numbers are significantly different. For example, for 218-W-3A, the number of 20.4 is the same for all alternatives which may indicate that the entire LLBG which is currently being used in full capacity will be capped as a disposal site. However, for 218-W-3AE, the number of design area (20) is different from current occupation area (12) which is different from upper and lower bound numbers (12.2). The section lacks explanation for the reader/decision-maker to understand what the land use numbers mean under the various scenarios and alternatives. (§1502.7)
12	Appendix D	Scope and Analysis	LLBG unit 218-W-5 contingency expansion has been omitted from the appendix.

Letter: L095

	General Comment		Similarly, the analysis of borrow pit resources does not include the resources needed in relation to LLBG unit 218-W-5. Similarly, the *Hanford Site Solid Waste Management Environmental Impact Statement Technical Information Document* (HNF-4755) appears to have omitted analysis for LLBG unit 218-W-5. Therefore, the analysis is incomplete and non-bounding. The analysis should either be included in the Draft HSW-EIS or the Draft HSW-EIS should clearly identify that it is not included and should the contingency expansion be necessary in the future, an additional NEPA evaluation will be performed. (§1502.7, 1502.14, 1502.15, 1502.16)
13	General	Scope and Analysis	CWC and WRAP have large amounts of data stored in SWITS, etc. Where LLBG and T-plant have large data gaps. These data groups, as TSDs, should be described separately and their impacts calculated separately due to the available data.
14		Scope and Analysis	In Section 5.3 and Appendix E, compliance with the ambient air quality standards was shown through the following method: The pollution generated by each project was calculated, then based on the timeline of the projects, the year of maximum pollution generated was determined and the pollution generated calculated. The concern with this approach is the assumption that the projects will occur in the year stated; the possibility that projects may be delayed or start early is not addressed in this calculation. This same method was used to compare the alternatives to each other. The total pollution generation over the life of the alternative should be calculated and these total values should be used to compare the alternatives to each other, not the pollution generated in one year, the assumed maximum year.
15	Sec 1.4, Page. 1-5 Section S.3, Page S.3, Lines 37-39	Scope and Analysis	On February 16, 1996, Ecology provided comments to USDOE on the WM PEIS. A major conclusion was that the Draft PEIS failed to provide the whole picture and, as a result, Ecology requested an analysis of cumulative impacts on a site-by-site basis. On January 30, 1998, Ecology provided comments on the scope of the Draft HSW-EIS that identified the need to establish a baseline for solid waste at Hanford. The Draft HSW-EIS, Sec 1.4, alternatives, states that public comments received on the Draft HSW-EIS NOI also encouraged USDOE to focus on Hanford wastes and to understand the impacts from management of those wastes separately from the impacts of accepting additional off-site waste. However, USDOE states that, "The structure of the alternatives . . . did not lend itself to conducting such an analysis. Ultimately, USDOE considered alternatives by waste type." Ecology requests that USDOE analyze cumulative impacts on a site-by-site basis and assess the impact of waste already at Hanford separately from the impacts of waste being received. (Cumulative impacts)
16	S.1 Table S.1, Page S.11 Section S.3, Page S.3, Lines 18-24 Section S.4, Page S.6, Lines 11-33 Section S.4, Page S.6 Section S.5, Page S.6 Section S.5.3, Page S.9, Lines 33-35 Section S.6, Page S.6 Section S.6, Page S.10 Section 1.0, Page 1.1, Lines 18-20	Scope and Analysis	The exclusion of pre-1970 TRU waste from this analysis is inappropriate. USDOE has less certainty of the characterization and ultimate environmental impacts of the wastes that were directly buried in the LLBG unlined trenches decades ago. The uncertainties with regard to characterization of these older waste streams should be predominantly considered in the overall analysis of the proposed action. (Scope, uncertainty, cumulative impacts, long-term stewardship)

	Section 1.2, Page 1.3, Lines 5-6		
17	S.4, Figure S-2	Scope and Analysis	Was TRUM (transuranic-mixed waste) considered and analyzed in the scope of this Draft HSW-EIS? If so, Ecology requests that USDOE indicate under which category those waste streams were considered. If not, USDOE needs to reconsider given the management and impact of TRUM wastes. (Scope)
18	S.4, Figure S.2	Scope and Analysis	Under the Low-Level Waste box is a category entitled "Previously Buried Waste in the LLBG." From the perspective of applying a regulatory definition, the designation of this waste as "low-level" is correct. However, as the Draft HSW-EIS states on page S.5, "Until 1987, MLLW was managed in the same manner as LLW." In other words, even though dangerous waste constituents were likely to have been present to some unknown extent in this waste stream, USDOE was not obligated to manage the waste as dangerous waste because RCRA was not yet applicable to mixed waste. The importance of this distinction from an environmental perspective is that the waste defined as "low-level waste previously buried in the LLBG" should be significantly considered with regard to the existence and impact of dangerous waste constituents in the LLBG. (Scope, cumulative impacts)
19	S.8, Page S.17	Scope and Analysis	Ecology disagrees with the statement that "For most resources, little or no impact would occur as a result of implementing any of the alternatives." Given the fact that the current situation at Hanford is ill-defined with regard to what has been placed in the ground (i.e., lack of characterization for tank waste, burial grounds, cribs/ponds/ditches) and the current behavior of the waste (i.e., leaking, leaching, moving), it is irresponsible to assume that the addition of more than 30 million cubic feet of waste at Hanford will have little or no impact on the environment. (Ecological analysis, uncertainty analysis, groundwater analysis)
20	S.8.2, Page S.18	Scope and Analysis	Transportation considerations were not made for shipment of low-level waste or TRU waste to Hanford. However, USDOE stated that in the WM PEIS, they considered that, "Under MLLW Alternative 1, some MLLW would be shipped from Hanford to an off-site treatment facility and returned to Hanford for disposal. As a bounding case, a treatment facility in Oak Ridge, Tennessee, was assumed for purposes of this transportation analysis. Transportation of waste was determined to result in up to four fatalities." Why would USDOE choose an alternative that was determined to result in up to four fatalities? (Ecological analysis)
21	S.8.3, Page. S.18	Scope and Analysis	USDOE states that health impacts were estimated from radionuclides and chemicals that could eventually leach from waste disposed at Hanford and reach groundwater and ultimately the Columbia River. However, uncertainties exist as to the characteristics and volumes of waste that have already been placed (or released) into the ground at Hanford, particularly in the early years to unlined trenches, cribs, ditches, and then via leaky underground storage tanks. Again, there is a need to understand the existing impacts of Hanford's situation separate from the impacts of additional waste from throughout the USDOE complex. (Scope, long-term stewardship)
22	Sec. 5.3.2, pp. 5.13 ff	Scope and Analysis	Please explain: (1) The exclusion of pre-1962 buried wastes from the calculation of long-term impacts; and (2) The means/sources by which 1962-1988 wastes were characterized, particularly with regard to hazardous chemical constituents.
23	Appendix A pp. A.4-A.5	Scope and Analysis	The first comment under A.1.2 is barely acknowledged, and certainly not "dispositioned" by the response on p. A.5. The WM-PEIS did not compare

			environmental impacts of disposal of specific volumes and streams of LLW and MLLW at specific sites. Yet the Draft HSW-EIS assumes that the decision has been made and, therefore, provides no basis to compare impacts of disposal at Hanford with disposal at other specific sites.
24	p. A.8	Scope and Analysis	There is an apparent contradiction in lines 6-12. Please explain why "[s]ome waste that may be generated at Hanford and other USDOE facilities would not be suitable for disposal at commercial facilities under existing permits and regulations," but "regulations governing disposal of USDOE waste have historically been similar to those for commercial facilities."
25	p. A.8	Scope and Analysis	Please clarify the parenthetical statement in lines 9-10 to acknowledge that pre-1970 wastes disposed within designated Solid Waste Management Units pursuant to ____ will be subject to closure and corrective action provisions of ____. Further, please acknowledge that retrieval actions that include transuranic wastes will result in additional wastes to be stored, treated, characterized, packaged and shipped to WIPP for disposal.
26	p. A.9	Scope and Analysis	Please explain the claim that impacts of disposal of wastes in canyon facilities would be bounded by assessment of impacts of disposal in burial grounds. Are packaging, migration pathways, interaction with adjacent wastes and contamination, emissions during construction and operation, etc., all the same as or less than burial ground disposal?
27	pp. A.12-A.13	Scope and Analysis	The lower bound estimates based on the SWIFT forecast are not responsive to the commenters' requests for a Hanford baseline, because they assume continued disposal of off-site waste.
28	pp. B.19-B.23	Scope and Analysis	All options for contact-handled TRU waste (CH-TRU) assume that retrievable waste will be characterized in-trench and that 50% will be determined to be LLW and left in the trenches. Please explain (a) how in-trench non-destructive characterization will meet regulatory requirements for waste analysis and acceptance; and (b) the basis for the 50 % estimate.
29	Table C.1, pp. C.3-C.4-C.5-C.6	Scope and Analysis	1. It appears that the Hanford volume includes wastes already disposed from off-site and on-site generators. Please clarify that this is the case. 2. Please explain the selection of smaller volume (78,883 m^3) of waste for Oak Ridge as the upper bound for the USDOE comparison, as the potential volume appears much larger in Table C.1. Please explain the origin of the estimates, as Oak Ridge was apparently not consulted (not listed as off-site forecasted waste generator or potential off-site generator, per p. C.5-C.6.) 3. Please explain the basis for estimating isotopic and chemical content of speculative volumes included in upper bound estimates in Table C.1.
30	Sec. C.4, p. C.8	Scope and Analysis	The discussion of TRU waste volumes should be expanded to deal with the following: • Distinguish between CH and RH TRU. The management, storage, packaging, transport and disposal requirements for the two categories are different, and the analysis requires distinguishing the two inventories. • Relationship of these volume estimates to (a) WIPP capacity, given that the National TRU Waste Management Plan (Rev. 2) anticipates less than 15,000 m^3 combined of TRU from Hanford, and (b) the Hanford TRU Disposition Map (IPABS-IS (8/28/01) which projects a WIPP disposal volume of 24,731 m^3.

31	Table C.2, p. C.4	Scope and Analysis	Please explain the discrepancy between the "previously disposed" figure for LLW (283,067 m^3) and the estimate contained on p.13 of the Information Package on Pending Low-Level Waste and Mixed Low-Level Waste Disposal Decisions under the PEIS and derived from the 1996 Integrated Database (640,000m^3).
32	Appendix H	Scope and Analysis	As USDOE is actively considering use of rail transport for inter-site shipments, please include an analysis of the potential impacts of rail shipment and/or inter-modal transfer of TRU, MLLW and LLW on-site.
33	Section 1.5.3., Page 1.23, Lines 26-38	Scope and Analysis	Reference is made to the June 2000 Environmental Assessment for Disposition of Surplus Hanford Site Uranium. The draft refers to 825 MTU which is to be stored in the 200 area pending final decision about its disposition. Assuming it is USDOE's intent to dispose of the material in the LLBG, is this material included in the inventory of wastes to be disposed? Is it included in the source term for assessment of long-term impacts? If so, how does it affect the finding in the WM-PEIS that for larger volumes of disposal of LLW at Hanford, groundwater standards for U-238 would be exceeded (WM-PEIS, p. 11-34)?
34			On page 1.5, under **Operational Period**, in line 12, LLBG closure is to take place after 2046. Will any type of interim cover be placed on top of the LLBG? Why can't USDOE use a close-as-you-go approach for the LLW trenches that apparently will be used for the MLLW trenches? This close-as-you-go approach may be performed on individual trenches or on a group of trenches.
35	Chapter 4; Section 4.4.	Scope and Analysis	Some mention should be made of the depth distribution of earthquakes. Most in and around the Hanford Site are shallow (i.e., < 15 km--including the swarm events), but there are a few deeper events in the Horse Heaven Hills (and elsewhere).
36	Chapter 4; Page. 4.34, Paragraph 1.	Scope and Analysis	Additional information would be helpful, such as the date of installation of the strong motion accelerometers, the trigger levels, and whether any of these facility accelerometers have ever triggered because of an earthquake.
37	Page. S.20	Scope and Analysis	Reference should be made as to the basis of these costs and how and where they are presented in detail.
38		Scope and Analysis	Reference is made to a Design Basis Earthquake. Section 4.5 does not contain any recurrence curves or indicate the manner in which the Design Basis Earthquake was selected and the free-field ground motion likely to occur at the LLBG sites as a result of this earthquake. Please correct.
39	Chapter 4; Page. 4.37, Sect. 4.5.2, Paragraph 3	Scope and Analysis	Leaking raw water lines have provided significant artificial recharge to the ground in the 200 Areas. Some of these unneeded raw water lines are being cut and capped and others are being pressure tested to assure integrity. However, until this process is accomplished throughout the 200 Areas, these old raw water lines that have exceeded their design life will continue to provide artificial recharge to the soil, and this can be a problem in the vicinity of waste management facilities. Please address.
40		Scope and Analysis	On page 1.8, line 19, "other solid waste" is mentioned. Please give examples of solid wastes that are outside the scope of this Draft HSW-EIS.
41		Scope and Analysis	On page 1.11, line 36, the Draft HSW-EIS mentions "other suitable locations," but does not provide any criteria for such a location.
42	Section 1.4.4.1, Page 1.9 Section 1.4.4.2, Page 1.10, Lines 24-25 Section 1.4.4.2, Page 1.10, Line 34 Section 1.5.1.2, Page 1.15	Inadequate Regulation	Throughout the Draft HSW-EIS, the text is incomplete or silent on RCRA regulatory authorities for waste management facilities in particular with regard to the LLBG, but also to other facilities such as T-Plant, CWC, WRAP, LERF, ETF, etc. Waste management, permitting, closure and post-closure requirements for RCRA TSDs

	Section S.4, Page S.6, Lines 25-26 Section S.5.2, Page S.8, Lines 21-22 Section S.5.2, Page S.8, Lines 31-32 Section S.6.1, Page S.10 Section S.6.1.1, Page S.10, Lines 29-31 Section S.6.1.2, Page S.10, Lines 41-42 Table S.1, Page S.11		and waste management units are not identified. Corrective action authority to address releases from regulated facilities is unclear. Extensive revision of a number of sections within the document are needed to accurately reflect the regulatory environment. Without clarity on RCRA applicability and extent, bounding conditions cannot be properly established and thus alternatives cannot be adequately evaluated.
43	Section S.6.1.3, Page S.12 Section S.6.2.3, Page S.13 Section S.6.3.3, Page S.15	Inadequate Regulation	The section does not identify that the No Action Alternative would not enable USDOE to comply with the waste management and land disposal restrictions of the State Dangerous Waste Regulations including RCRA requirements. Similarly, the section does not identify that the No Action Alternative may not enable USDOE to comply with their own policy for disposal of LLW wastes. Either in this summary section or in another summary section, the affects of non-compliance should be disclosed. Note: the *Final Environmental Impact Statement for the Tank Waste Remediation System Summary* (DOE/EIS-0189F) includes such a disclosure for the No Action Alternative (see page S-38). (§ 1502.7)
44	Section 1.5.1.1, Page 1.15, Lines 14-16 Section 1.5.1.2, Page 1.15 Section 1.5.1.2, Page 1.16, Lines 1-12 Section 6.3, Page 6.2	Inadequate Regulation	The Draft HSW-EIS describes coordination between RCRA and CERCLA regarding cleanup of past Hanford disposal sites giving a generic description of the HFFACO. While such coordination is desirable, it is not always achieved. To explain, the LLBG units are RCRA TSDs. As such, ongoing waste management, closure, post-closure, and corrective action will be decided upon via RCRA decision processes. In addition, the CERCLA cleanup schedule for the CERCLA-designated source operable units in which LLBG units reside, is scheduled to occur in or around 2024. However, LLBG units are currently planned to continue to be managed as active TSD units for at least two decades after 2024. The text should identify that the LLBG units are RCRA TSDs via which waste management, closure, post-closure, and corrective action will be permitted by the Washington State Department of Ecology via the state's RCRA authorization basis. (§ 1502.14(c))
45	Section 6.2, Page 6.2, Lines 7-8	Inadequate Regulation	Page 6.2, Section 6.2, Lines 7-8. Include an identification of other relevant HFFACO milestones. For example, identify that HFFACO Milestone M-20 includes a milestone for the submittal of LLBG unit final status permit applications. Similarly, identify that Milestone M-24 constitutes the HFFACO schedule for installation of RCRA groundwater monitoring wells. (§1502.7)
46	S.5.2.	Inadequate Regulation	The Draft HSW-EIS does not provide enough information regarding the evaluation of commercial treatment facilities. The Draft HSW-EIS also does not provide enough information as to the alternative of shipping wastes directly from their current location to the commercial treatment facilities, rather than routing the complex-wide wastes to Hanford for storage then again off-site for treatment. (Regulatory analysis)
47	S.5.3, Page S.9	Inadequate Regulation	Throughout the Draft HSW-EIS, USDOE builds on the assumption that the LLBG would "ultimately be closed by applying a cap consisting of soil, sand, gravel, and asphalt to reduce water infiltration and the potential for intrusion." Although capping the LLBG may be one viable alternative for consideration, it is certainly not the only one. Closure and post-closure decisions will be made, in part, based on the events

			that occur during operation of the unit, including any releases. Also, depending on releases or threats to human health and the environment during operation, corrective action may dictate closure and post-closure scenarios. Further, the final RCRA closure plan for the LLBG dangerous waste permit has not yet been completed, and final closure decisions have not yet been defined. Also, post-closure alternatives and their impacts were not presented in the Draft HSW-EIS. (Regulatory analysis)
48	S.6, Page S.10	Inadequate Regulation	On February 16, 1996, Ecology provided comments to USDOE on the WM PEIS. A major conclusion was that the Draft PEIS was not adequate to select sites within a conceptual alternative. Likewise, on January 30, 1998, Ecology provided comments on the scope of the Draft HSW-EIS that included the need to perform a systematic comparison of candidate sites. However, the Draft HSW-EIS, Sec S.6, Description of Alternatives, describes a very limited focus of alternatives, all of which consider only management of USDOE complex waste at Hanford. USDOE is encouraged to perform the comparisons as requested by Ecology, and then present the results and rationale to the public for review and consideration. (Regulatory analysis)
49	S.6, Page S.10	Inadequate Regulation	The LLBG is a RCRA TSD unit, with various problems associated with it, including characterization (or the lack thereof) of existing wastes that are buried and/or stored in the unit, the current and/or potential impact to the vadose zone and groundwater, and the associated ability (or lack thereof) to monitor these impacts. Compliance with RCRA requirements is required for management of wastes within this TSD. The proposed alternatives, limited as they are (see comment #10 above), need to consider the impacts on the LLBG from a RCRA TSD perspective, since the proposed addition of waste is within the boundary of a TSD unit with questionable integrity, e.g., USDOE needs to consider the alternative of creating a new space(s) for treatment, storage, and disposal of complex-wide waste so that the integrity and management of the waste stream(s) can be properly managed from the start, thus enhancing the ability and confidence for safe and compliant management. Ecology is not interested in compounding the problems for the LLBG, e.g., alternatives other than expanding an already questionable TSD should be considered. (Regulatory analysis)
50	Section S.6.3, Page S.14	Inadequate Regulation	USDOE states that "additional processing and certification capabilities must be developed and implemented at the Hanford Site" for meeting WIPP acceptance criteria. Please specifically identify what additional processing and certification capabilities need to be developed and implemented for wastes considered by this Draft HSW-EIS and identified for eventual disposal at WIPP. (Regulatory analysis)
51	Section S.6.3.1, Page S.14	Inadequate Regulation	Like LLBG, the T Plant Complex is a RCRA TSD unit. Compliance with RCRA requirements is required for management of mixed waste within this unit. Specifically, what modifications to the T Plant Complex are anticipated? How does this work fit in with the priorities already established and funded for processing Hanford wastes?
52	3.3.1, Page 3.6	Inadequate Regulation	USDOE states, "For purposes of analysis, this Draft HSW-EIS assumes that WIPP would have the necessary administrative and permitting authority to accept these wastes." This is an unfounded assumption given the fact that the current waste acceptance criteria for WIPP does not allow PCB's. Should the state of New Mexico decide at some point to modify the WIPP Permit and allow for the disposal of PCB waste, then that decision could be factored in at that time. However, for the

			purposes of this Draft HSW-EIS, analysis should be revisited with respect to and reflection of the current permitting requirements for WIPP.
53	p. A.12	Inadequate Regulation	Pre-1970 buried transuranic wastes that may be retrieved from burial grounds under CERCLA are outside the scope. Yet they may directly impact the need for facilities described in Sec. 3.3, and CERCLA decision schedules may not match schedules assumed in this Draft HSW-EIS.
54		Inadequate Regulation	On page 2.5, line 23, "cover and caps" are used. Are these equivalent terms? Caps are mentioned in the glossary, but covers are not.
55		Inadequate Regulation	The Nuclear Regulatory Commission (NRC) requires solidification/encapsulation media to be supported by a Topical Report (TR) approved by a governmental body. These TRs provide the technical information and testing necessary to ensure solidification media (e.g., certain types of concrete) and encapsulation techniques will be effective in the disposal environment. In the text box on page 2.6, cement and thermoplastics are mentioned, but not footnoted to show a TR (or equivalent document) documenting the materials' adequacy in the Hanford LLBG. Is there such a document showing the adequacy of cement and thermoplastics in the Hanford climate?
56		Inadequate Regulation	On page 2.23, the Draft HSW-EIS discusses the use of in-trench grouting and encapsulating the waste in concrete. Commercially, most of the nuclides that make up the Class A and B/C waste tables have limits based upon volume (and alpha emitters are based upon specific activity). The in-trench grouting volume is rather large by commercial standards. Does USDOE have an outside peer-reviewed performance assessment that indicates that radionuclide migration from the grouted structure will not exceed a regulatory dose limit (e.g., 25 mrem) over the next 10,000 years?
57		Inadequate Regulation	On page 6.11, line 12, the Draft HSW-EIS implies that USDOE will not always comply with USDOT regulations (i.e., Title 49 CFR) on roads to which the public does not have access. Is this correct? In the early 1990s at the annual LLRW convention in Las Vegas, a USDOE contractor representative committed to adhering to USDOT regulations for all shipments both on and off the Hanford Reservation. For shipments of radioactive (only) waste off-site, will the NRC's Uniform Manifest (e.g., NRC Form 540, 540A, 541, 541A, 542, and 542A) be utilized?
58	Section S.6.1, Page S.10	Inadequate Regulation	It is indicated that USDOE "needs to determine which . . .activities are required for properly managing on-site and off-site solid LLW that currently exists, or that may be received at Hanford in the future." It is also indicated that USDOE "needs to evaluate options for permanent disposal of LLW at Hanford, including expansion and possible reconfiguration of disposal facilities to accommodate anticipated waste receipts." The LLBG are solid waste management units (SWMUs). The Washington State Department of Ecology is authorized to implement RCRA corrective action for releases from SWMUs. To date, there are inadequate means for detecting releases from the LLBG (more detailed comments on this issue will follow) and there has been little to no characterization for potential releases from the LLBG. The Draft HSW-EIS does not reflect that RCRA corrective action decisions, if necessary, will be made by Ecology. Due to the lack of detection capabilities and contaminant release characterization information, for the Draft HSW-EIS to omit an acknowledgment of the uncertainties as well as the potential shared authorities

			associated with determining which activities are required for properly managing wastes renders the document incomplete. (§ 1502.14, 1502.15, and 1502.16)
59	Section 4.5.1.4, Page 4.36, Paragraph 4	Inadequate Regulation	Groundwater monitoring for the LERF, a RCRA TSD unit, is currently not occurring. So, the construction of the facility may be compliant, but it is not a totally compliant facility, as your statement implies.
60	Section 4.5.1.4, Page 4.37 Paragraph 1	Inadequate Regulation	Suggest changing the second sentence to read, "It is a Washington State permitted facility containing drain fields where tritium-bearing wastewater discharge is authorized in the permit.."
61	Chapter 4; Page. 4.37, Sect. 4.5.1.5, Sentence 2	Inadequate Regulation	Suggest inserting the word "historic" between "no" and "flood events." The 200 Areas Central Plateau is a flood bar deposited during Quaternary cataclysmic floods.
62		Inadequate Regulation	The text box on page 2.12 mentions that the floors will be sealed with impervious epoxy resins. Commercial industry experience indicates that this sealant is not permanent and requires repairs. Will the floors in these new buildings be inspected to find any "holes" in the sealant?
63	Specific	Ecological Assessment	*Page 3.13, Table 3.5, Comparison of Impacts Among the Alternatives*, In the Environmental Consequence Category under Ecological Resources, why was only the temporary Shrub-Steppe Habitat looked at? Besides vegetation/fauna there are biological aspects that need to be factored in. An encompassing vertebrate such as the Great Basin Pocket Mouse could be evaluated as well.
64	Specific	Ecological Assessment	*Page 5.22, Lines 13-16,* beginning with "To avoid impacts . . ." The planning in this scenario to avoid impacts is great. It benefits the reader of this Draft HSW-EIS to know that not everything is a detrimental effect to the complete ecosystem.
65	Section S.7, Page S.17, Lines 21-25	Ecological Assessment	Page S.17, Section S.7, Lines 21-25. Include an identification that shrub-steppe is considered a priority habitat by Washington State because of its importance to sensitive wildlife. (§ 1502.7)
66	Appendix I, Page I.1 Lines 15-18	Ecological Assessment	The document states that environmental impacts to the Columbia River would happen in the long term "up to 10,000 years post closure." The document does not provide a minimum time until impact would be seen on the river. Please provide the lower bound time frame for impacts of waste handing operation on the river.
67	Appendix I, Section I.2 , Page I.2	Ecological Assessment	The argument is made that due to the application of herbicide or effects of fires no priority habitats would be affected by any of the alternatives. The fact that a potential priority habitat was destroyed by fire or herbicide application is not justification for excluding that habitat from consideration of potential damages caused by construction of LLBG facilities. Not only must the current occurrence or state designated priority habitats be protected, but historic occurrence of priority habitats must be allowed to reestablish. Expansion of the facilities would necessitate expansion of the areas where spraying occurs and result in increased destruction of habitat. This impact is not assessed in the Draft HSW-EIS. The impact of an enlarged spray area should be assessed.
68	Appendix I, Section I.2, Page I.2	Ecological Assessment	The impact of blasting of bedrock as part of surface cover mining operations in the 300 Area on wildlife in the 300 Area as well as in the ALE is not assessed. The impact of the use of high explosives to excavate cover materials needs to be assessed.

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69	Appendix 1, Section I.2, Page 1.2	Ecological Assessment	No mention is made of surface microbiotic crust including algae, fungi, lichens, and mosses. The 1999 Nature Conservancy report *Biodiversity Inventory and Analysis of the Hanford Site*) states: "Although the ecological role of the macrobiotic crust within the shrub-steppe is not well understood, it clearly plays an important role in ecosystem functioning by reducing erosion, contributing nitrogen and organic carbon to the soil, and increasing infiltration of precipitation into the soil. Intact crusts can also enhance native seedling establishment in arid ecosystems (St. Clair et al. 1984), and may discourage invasion by non-native species such as cheatgrass." Therefore, the impact on this segment of the terrestrial ecosystem needs to be evaluated.
70	Appendix I, Section I.2 Page I.2, Line 22	Ecological Assessment	Several sections mention that due to fire or herbicide "priority habitats" would not be disturbed. The "priority habitat" moniker denotes the most important habitat to protect. Even if priority habitats are not affected, that does not mean that unmitigated destruction of habitats other than "priority habitats" can occur. The impact of actions to all habitats should be evaluated and documented.
71	Appendix I, Section I.2.1, Page I.8, Line 37-39	Ecological Assessment	This section states that a more comprehensive ecological survey of Area C will be conducted in the spring of 2002. The progress of that study should be updated and the results should be incorporated in this document. Without this information it is Impossible to make a determination on action proposed in this area.
72	Appendix I, Section I.3	Ecological Assessment	The criteria for selection of species used in the Ecological Contaminant (ECEM) model should be provided. The model allows for selection of many different food web components; the rationale for selection of these particular species should be provided.
73	Appendix I, Section I.3, Page I.9, Line 6	Ecological Assessment	The document references ECEM as the risk assessment model for ecological receptors. The model inputs and outputs should be provided so that the modeling process can be evaluated. Additionally the source and nature of the model should be provided. his model should be made available for evaluation by listing a contact or reference in the references. Upon consulting with USDOE-PNL it was determined that the information relating to the model parameters and algorithms is contained in the Columbia River Comprehensive Impact Assessment part 1 (DOE/RL-96-16, Rev 1, Final, U.S. Department of Energy, Richland, WA March 1998) this reference should be cited in the document.
74	Appendix I, Section I.3, Page I.11, Line 8-9	Ecological Assessment	Uranium is the only chemical evaluated for its non-radiological risk. The Groundwater Section 4 Table 4.9 lists chemical contaminates in groundwater including carbon tetrachloride, cyanide, chloroform, tetrachloroethene, and trichloroethene. These chemicals as well as other chemicals originating from the MLLW and TRU, such as PCBs, present a risk to terrestrial and aquatic receptors. The potential risk of toxic (non-rad) components of the MLLW/TRU needs to be evaluated.
75	Appendix I, Section I.3, Page 1.11, Line 15	Ecological Assessment	The statement is made that the risk assessment generally follows EPA ERAGS Guidance. Information should be provided on ways that it differs from EPA guidance.
76	I.3/I12/L,13	Ecological Assessment	This sentence states that "best" estimates were used to derive K_d values for soil and sediment. The scientific basis for the "best" estimates should be provided.
77	I.3/I.12/ L,2-5	Ecological Assessment	This sentence introduces a seep dilution term. There is some confusion about the dilution of groundwater by seeps. Seeps are defined as "Groundwater/Surface

			Water connections caused by river or stream erosion into a near-surface aquifer" (The Facts on File Dictionary of Environmental Science, Stevenson and Wyman 1991). An additional dilution factor for seeps is not appropriate due to the fact that a seep is a connection point between groundwater and surface water. This dilution factor should be removed.
78	I.3/I12/L,7-8	Ecological Assessment	This sentence states that soil concentrations are derived by multiplying seep concentrations by K_d. The K_d values are not provided in table I.2. K_d values should be provided as well as the basis for their derivation.
79	I.3/I.3/ Table I.3	Ecological Assessment	This table presents the EHQ for various receptors at or around the Hanford Site. The derivation of this data is not presented other than stating that it was developed using the ECEM model. The inputs and modeling assumptions should be presented.
80	I.3/I.13/I, 23	Ecological Assessment	A modifying factor of 15 was selected to convert acute mortality to a Lowest Observed Effect level. What is the rationale for the selection of 15 as a modifying factor? A commonly accepted modifying factor for acute to chronic is 10, but another factor of 10 would be assessed to go from chronic mortality to a chronic response other than mortality. Additionally, another factor of 10 would be assessed to extrapolate from Gambusia to species that inhabit the Columbia River and another factor of 10 might be added to account for interspecific variability. This would result in a modifying/uncertainty factor of 1,000 to 10,000. While this might be overly conservative, the data to support a MF/UF of 15, a conservative value, is needed. Even if the MF/UF was 100 the risk of Hanford plus background would exceed acceptable risk levels. This information section needs to be reanalyzed and re-evaluated to account for the degree of uncertainty associated with the toxicological values. Additionally, data sources for toxicological data should be presented.
81	I.4/I.14	Ecological Assessment	The "consultations" presented here are not formal ESA consultations as defined in Section 7 of the Endangered Species Act. They are merely the first step in a ESA section 7 consultation. These letters simply ask for a list of species that may be affected. Due to the fact that endangered species are present on the Hanford Site and in the Hanford Reach of the Columbia River, a formal ESA Section 7 Consultation should be required by NMFS and FWS. The letter enclosed in Appendix I from the US FWS mentions the fact that a Section 7 Consultation is required, but no response to this requirement is included in the Draft HSW-EIS. The method for conducting this process for NMFS is detailed in "Procedures for Conducting Consultation and Conference Activities Under section 7 of the Endangered Species Act (March, 1998)." Additionally the USFWS produced a document http://endangered.fws.gov/consultations/s7hndbk/s7hndbk.htm) that details their requirements for a Section 7 consultation. The listing of potentially affected species is only the first step in the consultation, if any threatened or endangered species are present and MAY be affected, then a formal consultation would be required. The evidence provided in the Draft HSW-EIS does not support a claim that there is not potential adverse affects to T&E species therefore a Formal Section 7 consultation should be required. Additionally there is no documentation of any efforts to contact the USFWS for a determination of state listed species of concern.
82	Specific	Health Impacts	*Page 2.22, Lines 16-19*, beginning with, "The concrete used . . ." Which certain radionuclides does this pertain to and can there be specific examples noted in other

			parts of the Draft HSW-EIS? The following sentence goes on to state water affecting solubility of some waste elements. It would be nice to see these effects correlated in the risk assessment and know the outcomes of specific K_d coefficients for these "certain radionuclides."
83	General	Health Impacts	There are a variety of definitions used for cumulative risk across the USDOE complex. Ecology should use the definition as defined from EPA's (2002) Framework for Cumulative Risk Assessment. "Cumulative risk: The combined risks from aggregate exposures to multiple agents or stressors."
84	App F page 38 Line 27-28.	Health Impacts	Mercury can be present in the environment in many chemical forms (divalent, methylated, etc.) and with different transfer mechanisms. There needs to be an explanation on why the K_d value for lead is sufficient for mercury.
85	Section 4.8.2. Page 4.77 Appendix F, Section F.1.4.5, Page F.36	Health Impacts	Environmental Justice – This section briefly reviews some of the Executive Orders and census tract information associated with minority populations in the Hanford area. Relevant to this discussion would be citations that are associated with potential disproportionate risks assumed by minority populations, specifically Native American populations, because of cultural based behaviors. The Columbia River Inter-tribal Fish Commission (CRITFC) has numerous technical publications and surveys that should be recognized and used in the Draft HSW-EIS.
86	Appendix F, Section F.1.4, Page F.29 – F.36	Health Impacts	Two exposure scenarios are used by the Draft HSW-EIS for human health evaluations, the industrial scenario (F.1.4.1) and resident gardener scenario (F.1.4.2). Exposure parameters are provided in Tables F.35, F.36, F.37, and F.38. These two exposure scenarios are insufficient to account for the potential human exposure patterns that might occur. Neither of these exposure scenarios recognizes nor account for minority populations (Native Americans) that may be placed at a disproportionate risk. The Draft HSW-EIS dismisses the Model Toxics Control Act (MTCA, pp F.29) stating that the exposure parameters are not always used and by not attempting to identify relevant direct exposure patterns for children and to protect children. Major differences exist in the exposure parameters – note the 3 tables below that identify relevant risk information and direct exposure parameters for surface water, groundwater and soil in MTCA. Concurrent exposures, dermal + ingestion, are considered and evaluated in MTCA but are not considered or evaluated in this Draft HSW-EIS. Sauna or Sweat Lodge Air Inhalation. Imbedded within this exposure pathway is the implicit, not explicit, recognition of Native American cultural based habits (sweat lodge) that may account for environmental justice related concerns. As noted above, readily available documentation exists that more clearly documents cultural based behaviors with resulting exposure patterns that may place Native Americans at a disproportionate risk compared to the general population. This documentation should be recognized and used in the Draft HSW-EIS.
87		Health Impacts	Table of pollutant and ambient quality standard for short-term, workday and long-term exposures should be provided at the beginning of the discussion.
88	Sections 5-11 Appendix F	Health Impacts	Generally, it was difficult to follow the details of the health assessments, even for a person with training in radiological dose assessment. It was not always clear as to which exposure scenarios and assumptions were used for a given dose result. The information necessary to understand the details was often found scattered throughout the main document, the appendices, and outside documents. It was

			difficult to follow section 5.11 without having to frequently consult Appendix F or the HSRAM document. Section 5.11 should be more self-contained.
89	Sections 5-11 Appendix F	Health Impacts	What is the basis for choosing a point of assessment for groundwater at a distance of 1 km down gradient from the 200 West and 200 East Area LLBG? A distance of 1 km appears to be arbitrary. Why were groundwater concentrations not also estimated at the point of maximum impact, which is directly underneath the LLBG, or at the LLBG boundary?
90	Sections 5-11 Appendix F	Health Impacts	Clarify whether or not a RCRA cover was assumed for any given set of groundwater concentration results.
91	Sections 5-11 Appendix F	Health Impacts	Clarify the values that were used for the infiltration rate parameter. Values of 0.5 and 0.05 cm/y were cited throughout the document, however it is confusing as to which value was used for any given groundwater concentration result.
92	Section 5.3.3, pp 5.19-20, Tables 5.9 and 5.10	Health Impacts	Tables 5.9 and 5.10 would be enhanced if the Tc-99 and I-129 concentration values were given in addition to their percentage of Drinking Water Standard values. Otherwise, there is the possibility that the Tc-99 and I-129 values in the table may be confused with concentration values, instead of percentage of DWS.
93	Section 5.3.3, pp 5.19-20, Tables 5.9 and 5.10	Health Impacts	An additional table, similar to Table 5.9 and 5.10, should present groundwater concentrations at the LLBG boundary (see comment 1 above). As an example, Table 5.23, in section 5.11.1.3, presents health impacts to a resident gardener at the 1-km well (1 km down gradient from the 200 Area) from radionuclides in groundwater. The first point of confusion is that the resident gardener, as specified in Appendix F, is located 20.6 km from the 200 Area, but the table indicates that the assessment point is evaluated at 1 km from the LLBG. The second point of confusion is that the text does not make clear which exposure pathways are used in the dose calculations. The table caption leads one to think it is only groundwater pathways, but Appendix F indicates that other pathways, such as external radiation exposure from soil, are evaluated. If the table is indeed only for groundwater pathways, then where are the results for the other pathways discussed in Appendix F? For each dose result, it should be clear which exposure scenarios in Tables F.35 and F.37 are being used. The third point of confusion is that the reader must go back and forth between the main document, the appendices, and outside documents to find the details of the results given in the tables, and even then, it is still not clear as to which exposure scenarios are used, and as to what model parameter values are assumed. Each dose result should be clear as to what pathways and parameter values were used.
94	Section 5.11, p 5.42, Line 42	Health Impacts	What is the basis for choosing a distance of 100 m from the release point to assess the industrial scenario? The value of 100 m appears to be arbitrary.
95	Section 5.11, p 5.42, Line 43	Health Impacts	Specify the location of the resident gardener in the resident gardener scenario. The location of a worker in the industrial scenario is specified here, so the location of the resident gardener should also be specified here, even though it is specified in Appendix F. Appendix F specifies that the resident gardener resides 20.6 km ESE of the 200 Area. Specify a familiar landmark near this location, for example LIGO.
96	Section 5.11.1.2.1, pp 5.45-47, Tables 5.18 and 5.19	Health Impacts	Footnote (b) in the tables should specify that the LCFs are calculated as described in Appendix section F.1.7.
97	Section 5.11.1.2.1, p 5.45, Lines 17-18	Health Impacts	Rather than simply stating that the dose estimates are small, summarize the results from Tables 5.18 and 5.19 by comparing the maximum lifetime dose from those

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			tables to any regulatory limits. For example, the maximum annual dose for the off-site MEI can be compared to the Washington State Air Emissions Regulations limit of 10 mrem/year.
988	Section 5.11.4.1.1, p 5.97, Table 5.58	Health Impacts	The text in section 5.11 and Appendix F states that the LCF estimates for the public are based on a conversion factor of 0.0005 LCFs per person-rem. The values for LCF in this table are not consistent with this value. For the 100 y and 500-y assessment time, the conversion factor appears to be 0.0004 - that for radiation workers, while for the 300 y assessment time, the factor appears to be 0.0007.
99	Section 5.11.4.1.2, p 5.97, Line 11	Health Impacts	Clarify what is meant by the dose being accumulated over a 50 year time period. Is this the 50-year period assumed for committed dose from inhalation and ingestion, or is it the lifetime exposure duration? If the latter, this is inconsistent with an assumed exposure duration period of 30 years used elsewhere in the health impact section.
100	Page. S.18, Sect. S.8.3, Paragraph 1	Health Impacts	Health effects appear to be limited to potential uptake of drinking water by citizens obtaining water from the Columbia River. One of the Hanford Site's remedial objectives is to restore groundwater to its "maximal beneficial use"; i.e., to make it potable. This analysis should also address impacts on groundwater within the Hanford Site before it discharges to the Columbia River.
101	Page. S.18, Lines 43 – 46	Health Impacts	Where is the analysis that supports the conclusion that 28 latent cancer fatalities could result from consequences arising from the occurrence of a design basis earthquake?
102	Table S.1, Page S.11	Groundwater	The disposal alternatives identified for Low-Level and Mixed Low Level Waste Alternatives 1 and 2 and No Action do not indicate that groundwater monitoring will occur for the low-level waste trenches via RCRA groundwater monitoring networks designed to detect releases from the LLBG TSD and solid waste management units. The *Hanford Site Solid Waste Management Environmental Impact Statement Technical Information Document* (HNF-4755) appears to have omitted analysis associated with the construction/installation of groundwater monitoring wells, as well as monitoring costs. Considering the significant deficiencies associated with the existing RCRA groundwater monitoring networks as well as the size of the LLBG, the capital expenditure associated with installation and operation of a groundwater monitoring network capable of detecting releases from the low-level waste trenches could be significant. The networks will be designed (with installation of additional wells) via the RCRA final status permit issuance process. Groundwater monitoring will occur during operations of the LLBG units. Therefore, the Low-Level Waste Alternatives 1 and 2 should include indications that additional groundwater monitoring wells will be installed and groundwater monitoring will be performed throughout operations of the LLBG. The lack of analysis to consider installation of additional groundwater monitoring wells and groundwater monitoring renders the Draft HSW-EIS analysis incomplete and non-bounding. (§ 1502.14, 1502.15, and 1502.16)
103	Section S.8.4 Page S.20	Groundwater	The section's total numbers/ranges omit added potential (and estimated) costs associated with groundwater monitoring, *which could be significant, based on the deficiencies of the system.*.
104	Section S.8.5 Page S.20	Ground-water	The statement that "impacts for all resources considered in the Draft HSW-EIS are relatively small . . ." in relation to groundwater is included without a technical basis. For purposes of inclusion of a bounding RCRA groundwater monitoring needs

			analysis, Ecology's analysis indicates that a significant number of additional RCRA groundwater monitoring wells could be required for the LLBG groundwater monitoring networks to be compliant (i.e., for the groundwater monitoring system to consist of a sufficient number of wells, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that . . ."represent the quality of groundwater passing the point of compliance"). Therefore, either the statement must be deleted or a disclosure must be inserted. If a disclosure is inserted, it must identify that the RCRA groundwater monitoring networks associated with the LLBG are significantly deficient. It must also be disclosed that the RCRA groundwater monitoring networks are so deficient that no technically based conclusion of current or future impact in relation to groundwater can be made for the units at this time. (§ 1502.7, 1502.14, 1502.15, and 1502.16)
105	Section 3.0 General Comment	Groundwater	Section 3.0. The section does not appear to include groundwater monitoring in any of the alternatives. Similarly, the section does not appear to include cost evaluations for groundwater monitoring well installation needs. It is recommended that a description of LLBG RCRA groundwater monitoring requirements be included in Sections 3.1, 3.2, and 3.3 and that cost estimates for these actions be included in Section 3.7 and in Table 3.6. It should be noted that groundwater monitoring requirements are applicable to all alternatives. Considering the logic applied to the No Action alternative whereby "currently defined LLBG" are analyzed to manage waste, then the No Action alternative should also include groundwater monitoring costs. (§ 1502.23)
106	Section 3.7 And Table 3.6	Groundwater	The section does not include groundwater monitoring in the comparison of costs of alternatives. Washington Administrative Code (WAC) 173-303-645 requires groundwater monitoring at RCRA land-based TSDs. WAC 173-303-645 requires groundwater monitoring at the point of compliance for detection of contaminants. Furthermore, the same regulation requires "the groundwater monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that . . .represent the quality of groundwater passing the point of compliance." It is recommended that costs be estimated for data evaluation (including statistical analysis between up-gradient and down-gradient wells) and reporting over a 74 year groundwater monitoring period. (§1502.14, 1502.15, 1502.16 and 1502.23)
107	p. A.14	Groundwater	The response to comments concerning groundwater does not appear to address the commenters' issue of the adequacy of data about existing vadose zone contamination. Please explain how the SAC and related activities provide adequate data.
108	Table S.3, Page S.19	Groundwater	The Draft HSW-EIS groundwater quality impact analysis assumed an infiltration rate modeling input parameter that is an order of magnitude less conservative than the same infiltration rate modeling input parameter used to support USDOE's LLBG disposal authorization basis. The use of the less conservative modeling input parameter is not supported by a technical basis as no such technical basis exists. Of regulatory concern to Ecology, the Draft HSW-EIS groundwater quality impact

			analysis selects "points of assessment" to describe groundwater quality impacts. None of the "points of assessment" selected meet RCRA regulatory requirements for monitoring groundwater quality at the LLBG "point of compliance." While RCRA defines the groundwater point of compliance to be at the unit boundary, the Draft HSW-EIS's nearest "point of assessment" is located 1 km away from the LLBG unit boundaries. The affect of selecting such a "point of assessment" away from the LLBG unit boundaries is to greatly reduce groundwater quality impacts. This methodology is inconsistent with RCRA regulatory requirements and could be considered to be misleading (i.e., the approach masks and/or reduces groundwater quality impacts). Detailed comments regarding the above issues are attached. In summary, the Draft HSW-EIS groundwater quality impact analysis is deficient and is neither conservative nor consistent.
109	Section S.8, Page S.17, Lines 43-44	Groundwater	The analysis provided in the Draft HSW-EIS is neither conservative nor consistent with similar analyses performed to support the USDOE's LLBG disposal authorization basis. Furthermore, the basis for the Draft HSW-EIS groundwater evaluations of groundwater quality is inadequate and does not support an assumption of no current impact from the LLBG.
110	Section 1.5.1.3, Page 1.16	Groundwater	The Draft HSW-EIS does not adequately and/or accurately reflect groundwater and/or corrective action regulatory requirements applicable to an evaluation of reasonable alternatives or mitigation measures. Deficiencies in the current groundwater monitoring networks should be addressed, including an estimation of the number and cost of needed wells, or acceptable alternative monitoring where wells cannot be constructed because of a declining water table. Without this information, the cost analysis is incomplete.
111		Groundwater	Ecology has concluded that the Draft HSW-EIS groundwater quality impact analysis does not provide an evaluation of reasonable alternatives or mitigation measures to reduce or minimize adverse impacts to groundwater. This conclusion is primarily based on the following: 1) the insufficiency of existing groundwater quality information, 2) a lack of groundwater impact modeling conservatism (in light of the lack of LLBG-specific data), 3) an inadequate consideration of applicable regulatory requirements, and 4) inconsistencies associated with the groundwater impact analysis methodology. Ecology has concluded that the groundwater quality impact analysis provides neither the basis for the alternatives evaluated nor the basis for the omission of mitigation measures.
112	Section S.6.1, Page S.10 Section S.6.2, Page S.12	Groundwater	The section is silent on RCRA groundwater monitoring requirements. The section should identify that RCRA groundwater monitoring requirements will be imposed via the RCRA final status permit. In addition, it should be identified that groundwater monitoring provisions will address the entire LLBG unit boundaries (as defined by RCRA Part A permit). (§ 1502.14, 1502.15, and 1502.16)
113	Table S.1, Page S.11	Groundwater	The disposal alternatives identified for Low-Level and Mixed Low Level Waste Alternatives 1 and 2 and No Action do not indicate that groundwater monitoring will occur for the low-level waste trenches via RCRA groundwater monitoring networks designed to detect releases from the LLBG TSD and solid waste management units. The *Hanford Site Solid Waste Management Environmental Impact Statement Technical Information Document* (HNF-4755) appears to have omitted analysis

			associated with the construction/installation of groundwater monitoring wells as well as monitoring costs. Considering the significant deficiencies associated with the existing RCRA groundwater monitoring networks as well as the size of the LLBG, the capital expenditure associated with installation and operation of a groundwater monitoring network capable of detecting releases from the low-level waste trenches could be significant. The networks will be designed (with installation of additional wells) via the RCRA final status permit issuance process. Groundwater monitoring will occur during operations of the LLBG units. Therefore, the Low-Level Waste Alternatives 1 and 2 should include indications that additional groundwater monitoring wells will be installed and groundwater monitoring will be performed throughout operations of the LLBG. The lack of analysis to consider installation of additional groundwater monitoring wells and groundwater monitoring renders the EIS analysis incomplete and non-bounding. (§ 1502.14, 1502.15, and 1502.16)
114	Appendix G; Page. G.4, Line 27	Groundwater	What is "an appropriate release model?"
115	Chapter 4; Page. 4.38, Paragraph 1	Groundwater	Old, abandoned and/or poorly sealed vadose zone and groundwater wells are also potential preferential pathways and should be mentioned here.
116	Chapter 4; Page. 4.36, Sect. 4.5.1.4, Paragraph 1	Groundwater	Assuming that groundwater recharges West Lake and that groundwater is or has flowed from the 200 East Area toward West Lake, the salts deposited from evaporation could potentially contain some Hanford contaminants. Runoff could also carry contaminated material to West Lake. This possibility should at least be mentioned.
117	Chapter 4; Page. 4.42, Fig. 4.16	Groundwater	Water table contours north and east of the Columbia River indicate significant differences in the elevation of the water table. However, north and east of the Columbia, there are no well locations shown, so it is difficult to determine how these elevations were obtained. What is the source of these elevation/head data?
118	Chapter 4 Page. 4.43, Fig. 4.17	Groundwater	Two meter contours do not convey a clear picture of water table elevation. Supplemental contour lines at 0.5m intervals should be added to this map.
119	Chapter 4; Page. 4.47, Table 4.9	Groundwater	Is the value for Cr for total Cr, hexavalent Cr? Please clarify.
120	Chapter 4; Page. 4.49, Sect. 4.5.3.3, Paragraph 1, Lines 36 – 39	Groundwater	The communication between the unconfined and confined aquifers is grossly understated. With the Elephant Mountain member of Columbia River basalt absent in at least two boreholes north of the 200 East Area, the unconfined and confined aquifers (Rattlesnake Ridge member) are in direct contact in a window of unspecified dimensions. Correct this understatement.
121	Chapter 4; Page. 4.50, Paragraph 3	Groundwater	Artificial recharge to the unconfined aquifer continues in the form of discharge of sanitary waste liquids and water from leaking raw water distribution lines. These sources should be added.
122	Chapter 4; Page. 4.50, Paragraph 4	Groundwater	A supporting basis needs to be added for the following statement, ". . . no indication is shown of aquifer interconnection." How do the piezometric heads in the unconfined and confined aquifer systems compare across the site? It also needs to be made clear whether reference to deeper aquifers is to the basalt confined aquifer system or to the semi-confined aquifers beneath the Ringold Lower Mud.
123	Appendix G; Page. G.6, Line 25	Groundwater	The statement is made that there are more than 100 radioactive and non-radioactive constituents that could potential impact groundwater. Thereafter, the entire analysis is based on various categories of radionuclides which may simulate the behavior of

			non-rad constituents in flow and transport, but which present different hazards to humans if they get to groundwater and are consumed. Only Pb and Hg are evaluated (pg. G.9) and dismissed. Justify these exclusions.
124	Appendix G Page. G.21, Lines 14 – 16, 19 – 20	Groundwater	Earlier, the statement was made that a one dimensional model was used because of insufficient characterization. Yet, here you state that one-dimensional models are inadequate to represent preferential pathways (unsealed boreholes, clastic dikes) and indicate that they are too small and discontinuous to be of any real significance as a preferential pathway. Without adequate characterization data, how can you make this assumption?
125	Appendix G; Page. G.24, Fig. G-2 and Lines 12 – 13	Groundwater	If this is purported to be a conservative analysis, justify the decision to determine a release date when 50% of unit mass has reached groundwater. This is even less conservative given that releases are assumed to begin in 2046.
126	Appendix G; Page. G.33	Groundwater	Has any consideration been given to showing the cumulative releases to the Columbia River from all isotopes/constituents for different projected dates (e.g., 1,000, 5,000, 10,000 yrs.)?
127	Table 5.1, Page 5.4	Conclusions Not Supported	Land use commitments are listed on Table 5.1. In an effort to confirm bounding scenarios, the referenced *Technical Information Document* (FH 2002) was reviewed for a cursory accuracy check. To explain, on page 5.3, lines 9-11, it is indicated that "except where otherwise specified, all construction and operations engineering data that form the basis for environmental impact analysis of the alternatives are provided in the *Technical Information Document* prepared by Fluor Hanford (FH 2002)." When the land use commitments of Table 5.1 for "218-W-5 Exp" were checked in the referenced document, it was found that there are no impact analysis numbers included for this "contingency expansion" (see Appendix D, pages D-13 and D-14, Section D5.1 of *Technical Information Document* [FH 2002]). It should be noted that the "contingency expansion" of 202 hectares represents just less than half of the LLBG sub-total (425 hectares). The omission and the lack of an accompanying explanation are significant. Considering the zeros listed for upper and lower bounds, it is concluded that no impact analysis has been done for this 202 hectare "contingency expansion." If such an expansion were deemed necessary in the future, an additional NEPA review would be appropriate. Currently, such an omission renders the analysis incomplete and non-bounding. In addition, such an omission reduces confidence of the analysis referenced as being complete without an explanation for omission of numbers. Therefore, either remove the "218-W-5 Exp" from the scope of the Draft HSW-EIS or include the supporting bounding analysis. (§1502.7, 1502.14, 1502.15, 1502.16 and 1502.23)
128	Table 5.1, Page 5.4	Conclusions Not Supported	The land use commitment for 218-W-6 is identified as zero in several alternatives. No lettered note is indicated for the burial ground. The zeros could mean that this unit is currently unoccupied and that there is no intention of using the burial ground. Or, the zeros could mean that this unit is currently unoccupied and that there will be no disposal in the future, merely interim storage. Or, the zeros could mean that this unit is currently unoccupied and that the Draft HSW-EIS impact analysis was omitted. In an attempt to understand what the zeros mean, the referenced *Technical Information Document* (FH 2002) was reviewed. On pages D-13 through D-17, it is indicated on Tables D5-2 through D5-D10 that the total area of the burial ground is 16 but that the area to be capped under all scenarios is zero. From a third document

			(*Performance Assessment Monitoring Plan for the Hanford Site Low-Level Burial Grounds* [DOE/RL-2000-72, Rev. 0]) it is indicated that the 218-W-6 burial ground has not yet received any waste and is reserved for future mixed waste disposal. If the 218-W-6 burial ground is to be used for mixed waste, all alternatives should analyze land use commitments for the unit (16 hectares). In summary, from Section 5.1, there is inadequate explanation or even reference to a document where it may be understood for the reader/decision-maker to understand what the land use numbers mean under the various scenarios and alternatives. (§1502.7, 1502.14, 1502.15, 1502.16 and 1502.23)
129	Page E.1, Line 25	Conclusions Not Supported	The reference 4.2.3 could not be found
130	Page E.3, Line 17	Conclusions Not Supported	All modeling assumptions should be listed.
131	2.1.3.1, Page 2.9	Conclusions Not Supported	USDOE states that, for the post-1970 TRU waste, "observations and monitoring of the area around the drums within the trenches has not detected the release of any alpha emitters, such as plutonium." It is Ecology's position that the current monitoring system is inadequate for detecting releases into the soil and/or groundwater from these trenches. USDOE does not state if the monitoring that was done detected releases from sources other than alpha emitters. (Supporting data)
132	Sec. S.3, pp. S.2-S.3	Conclusions Not Supported	The scope of this Draft HSW-EIS was narrowed, based on the issuance of the Record of Decision under the WM-PEIS. However, the WM-PEIS did not provide adequate information for decision-makers to select among specific sites, based on a comparison of site-specific impacts. In response to numerous comments about the inadequacy of site-specific environmental information in the Draft WM-PEIS, USDOE repeatedly referred commenters to the "Technical Report on Affected Environments." That document is apparently not available to reviewers of the Draft HSW-EIS, meaning that USDOE has still not provided the public an adequate basis for assessing impacts of treatment or disposal at alternate sites.
133		Conclusions Not Supported	The Draft HSW-EIS is a very complex document. Numbered sections in Volume I refer the reader for details to the lettered sections in Volume II. However, in Volume II, the equations, their derivations, and a range of values are not consistently presented for the reader to use in an independent verification of the calculations. For example, the equations used by RADTRAN 4 (Appendix H) are missing, but the basic air emission equation is shown in Appendix E (Equation E.1 on page E.9).
134	Chapter 5; Page. 5.12, Sect. 5.3.1, Lines 33 – 36	Conclusions Not Supported	Provide a basis for this expectation.
135	Chapter 5; Page. 5.12, Sect. 5.3.1, Lines 37 – 42	Conclusions Not Supported	Provide a basis for this expectation. Specify where in the vadose zone (i.e., how deep in relation to the water table and/or below trench bottoms) LLBG contaminants have infiltrated and at what rate are they infiltrating toward groundwater.
136	Chapter 5; Page. 5.13, Lines 9, 10	Conclusions Not Supported	Provide a basis for this expectation.
137	Chapter 5; Page. 5.14, Lines 10, 11	Conclusions Not Supported	Until such time as retrievably stored TRU wastes are retrieved, processed and shipped off-site, they are part of the vadose zone inventory attributable to the LLBG and should be included. Previous Hanford plans have gone awry (e.g., Grout), so until these TRU wastes are removed, or there is a firm schedule commitment and

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			budget to accomplish the removal, they should be included as part of the inventory.
138	Chapter 5; Page. 5.16, Lines 16 – 34	Conclusions Not Supported	Recent investigations at SST WMA S-SX indicate that sorption (i.e., distribution) coefficients may be variable because of waste and soil characteristics. Is it appropriate to use single values for all these contaminants throughout the entire vadose zone? Cobalt is indicated as belonging to Group 5; i.e., strongly sorbing. However, Co-60 will complex with organics and other constituents and become much more mobile. Are there any co-contaminants present in the waste or soil that would result in changed mobility for any other of the Group 5 constituents?
139	Chapter 5; Page. 5.12, Sect. 5.3, Lines 16, 17	Conclusions Not Supported	Provide a basis for the statement, "None of these contaminants are thought to have originated from the LLBG."
140	Chapter 5; Page. 5.12, Sect. 5.3, Lines 19 – 23	Conclusions Not Supported	How many of the listed contaminants were discharged in any form to any of the LLBG?
141	Section S.8	Editorial	General statements and assertions are made here. As this is a summary, the appropriate part of the document that addresses these specific issues (e.g., Land Use, Human Health) should be cited to allow the reader to verify that the supporting analyses provide the analytical basis for the assertions made in this section.
142	Page S.19, Table S.3	Editorial	Reference (here) should be made to the source and/or analyses that support the various quantities and conclusions listed in this table under various categories.
143	Page. S.18, Line 10	Editorial	Define and locate the "200 Area Industrial-Exclusive zone," preferably on a map.
144	Chapter 4; Page. 4.25, Figure 4.9	Editorial	This is taken from a BWIP document and shows a location labeled "Candidate Site." This is most likely the Reference Repository Location (RRL), the candidate for a basalt high-level nuclear waste repository at Hanford. This location is irrelevant to this Draft HSW-EIS and should be removed.
145	Chapter 4; Page. 4.31, Line 9	Editorial	Delete the word "all." These are the known earthquakes, but others may have occurred, so the map is likely incomplete.
146	Chapter 4; Page. 4.32, Line 10	Editorial	Insert word "known" between "all" and "earthquakes." Same reason as previous comment.
147	Chapter 4 Page. 4.45, Lines 1 through 5	Editorial	These two sentences are not clear. Rewrite for clarity. The USDOE's DCG is somewhat self-serving and not nearly as protective of human health and the environment as the DWS/MCL.
158	Chapter 5; Page. 5.16, Lines 36, 37		Provide a justification as to why analyses of chemical constituents were not performed.
149	Section 6.3, Page 6.2, Lines 23-25	Editorial	The paragraph includes several statements that are out of date. Update and clarify the description of the Hanford Site RCRA permit. Recommended wording for the sentence in lines 26-27 is: "The Hanford Site's RCRA permit was originally issued in two portions, one portion was issued by EPA Region X and the other portion was issued by Ecology." Similarly, recommended wording for the sentence in lines 27-28 is: "The EPA-issued portion of the RCRA permit covered the Hazardous and Solid Waste Amendments portion of the RCRA permit for the U.S. Ecology Site located on the Hanford Site (EPA 1994)." Similarly, recommended wording for the sentence in lines 28-30 is: "The second portion of the Hanford Site RCRA permit covered the dangerous waste provisions and was issued by Ecology (Ecology 1994)." Similarly, recommended wording for the sentence in lines 29-30 is: "The Hanford Site RCRA

			permit was recently modified for Ecology to cover Hazardous and Solid Waste Amendments (i.e. via Ecology's RCRA Corrective Action authorization) previously not included in the permit." Similarly, recommended wording for the sentence in lines 30-33 is: "The Ecology portion of the RCRA permit includes standard conditions, general facility conditions, and specific conditions for individual operating treatment, TSD units and SWMUs undergoing corrective action, and TSD units undergoing closure. (§1502.7)
150	Sec. 3.7, p. 3.15		Please explain how the costs reflected in Table 3.6 are consistent with those presented in USDOE's Report to Congress on the Cost of Waste Disposal (July 2002). Note the following statement on p. A-39 of the latter report: "Hanford does not have cost estimates for long-term stewardship."
151	Appendix G; Page. G.4, Line 28		Use of a 1-D model for vadose zone transport is rather simplistic. Justify this choice.
152	Page. S.18, Sect. S.8.3, Paragraph 1		Health effects appear to be limited to potential uptake of drinking water by citizens obtaining water from the Columbia River. One of the Hanford Site's remedial objectives is to restore groundwater to its "maximal beneficial use"; i.e., to make it potable. This analysis should also address impacts on groundwater within the Hanford Site before it discharges to the Columbia River.
153	Page. S.18, Lines 43 – 46		Where is the analysis that supports the conclusion that 28 latent cancer fatalities could result from consequences arising from the occurrence of a design basis earthquake?
154	Chapter 4; Page. 4.42, Fig. 4.16		Water table contours north and east of the Columbia River indicate significant differences in the elevation of the water table. However, north and east of the Columbia, there are no well locations shown, so it is difficult to determine how these elevations were obtained. What is the source of these elevation/head data?

Draft Hanford Site Solid Waste Program Environmental Impact Statement (DOE/EIS-0286D) August 21, 2002

General Comments Washington State Department of Ecology

Summary of the Draft HSW-EIS

The Draft HSW-EIS addresses the management of low-level waste (LLW), mixed low-level waste (MLLW), and post-1970 transuranic (TRU) waste at the Hanford Site. Management of these wastes would involve treatment, storage, and disposal. Treatment, if it occurs, would be at either the Hanford Site, or an off-site commercial facility. Storage would occur at the Hanford Site, and disposal would occur at the Hanford Site for LLW and MLLW, and at the Waste Isolation Pilot Plant (WIPP) for post-1970 TRU.

Three alternatives, for each waste type, are evaluated in the HSW-EIS.

The first alternative, the preferred alternative, generally consists of utilizing existing facilities for storage, commercially treating and/or modifying existing facilities for waste treatment, and filling existing trenches and constructing deeper, wider, trenches and capping them at closure. Post-1970 TRU would be sent to WIPP for disposal.

The second alternative proposes using current capabilities for storage and constructing new treatment facilities. Waste would be disposed in existing trenches and new trenches would be constructed using the current design. All trenches would be capped and closed. Post-1970 TRU would be sent to WIPP for disposal.

The third alternative, the no action alternative, would utilize existing treatment and storage capabilities. No new trenches would be constructed. Once the existing trenches are filled the remaining waste would be placed into indefinite storage. Existing storage facilities would be expanded to manage increased volumes of waste. Commercial facilities would be utilized on a limited basis. MLLW trenches would be capped at closure. Most post-TRU would be sent to WIPP, however, some would remain untreated.

Each alternative was evaluated for a range of waste volumes:

- LLW ranges from 432,582m^3 to 631,427m^3 and includes LLW generated at the Hanford Site and waste imported from other United States Department of Energy (USDOE) Facilities.
- This also includes 283,067m^3 of waste which is already disposed in the Low Level Burial Grounds (LLBG) and
- MLLW ranges from 65,334m^3 to 205,678m^3, which includes waste that is generated at the Hanford Site and imported from other USDOE and commercial facilities.
- Only one volume is used for post-1970 TRU Waste: 45,806m^3, the maximum Hanford Site forecast.

The Draft HSW-EIS assumes implementation of the February 25, 2000, Record of Decision (ROD) for MLLW and LLW from the Waste Management Programmatic Environmental Impact Statement (WM-PEIS) (DOE/EIS-0200, May, 1997). That ROD determined that Hanford would continue to dispose of LLW and MLLW generated on-site. The ROD also identified Hanford and the Nevada Test Site as "regional" disposal facilities for LLW and MLLW from other USDOE sites.

Issues Concerning Scope and Analysis

155 The Draft HSW-EIS essentially evaluates a limited range of near-term alternative means to install treatment capability and to dig waste disposal trenches. It evaluates the effects of doing so for a limited range of waste volumes.

156
- The Draft HSW-EIS assumes that the WM PEIS adequately compared the impacts of treatment and disposal facilities at various sites, but it did not. At a minimum, the WM PEIS did not have available even the limited information contained in the Draft HSW-EIS. The information used to compare Hanford to other disposal sites in the WM PEIS was never widely available for public review and is not available for comparison with the Draft HSW-EIS.

157
- The Draft HSW-EIS evaluates only the management of wastes owned by, or coming to, the existing Waste Management Program, touching only lightly on previously buried wastes, environmental restoration wastes, naval reactors, and other wastes disposed near surface at Hanford.

158
- The Draft HSW-EIS does not evaluate other options currently under active discussion, such as the lined mega-trench or expanded use of the Environmental Restoration Disposal Facility (ERDF).

159
- The Draft HSW-EIS does not fully evaluate the potential for additional required management of pre-1970 TRU wastes, or corrective action for releases of chemically hazardous wastes from burial grounds filled before 1988.

160
- The Draft HSW-EIS does not evaluate treatment and storage of significant quantities of TRU waste from other sites.

161
- The Draft HSW-EIS does not evaluate the impact of permanent disposal of incidental low activity tank wastes in shallow land burial as proposed in the Supplemental Tank Waste Remediation System EIS.

162 According to NEPA requirements, 40 CFR Part 1500.2(e) the NEPA process should be used to identify and assess reasonable alternatives for the proposed action "that will avoid or minimize adverse effects of these actions." The state of Washington requests that the range of alternatives analyzed be broadened to include "no import of out of state waste" and the "worst case" import scenario based on the WM-PEIS. In addition,

163 40 CFR Part 1506.2(d) requires Federal agencies to integrate environmental impact statements with the State and local planning process. When there are "inconsistencies of a proposed action with any approved State or local plan and laws (whether or not federally sanctioned)" it should be discussed in the EIS. The Draft HSW-EIS does not

164 acknowledge or discuss the state of Washington's policies about accepting out of state waste, nor hashave any reconciliation or mitigationmitigative measures been presented.

165 The Draft HSW-EIS states that the environmental analysis in the document was conducted through the year 2046, which represents the end of most waste management operations at the site. This resulted in the following scope and bounding concerns:

- The post-closure requirements for waste disposal facilities may extend beyond the end of active waste management, which is not indicated by the 2046 date.
- 166 Long term impacts to groundwater and the Columbia River were evaluated for 10,000 years. There is no examination of impacts in the intervening period nor any indication of the extent to which the 10,000 year results are a function of radionuclide decay.

Conclusions Not Supported

167 The Draft HSW-EIS reaches conclusions without adequate data and analysis. It often fails to disclose what information is *not* known in arriving at conclusions.

- 168 The Draft HSW-EIS does not include sufficient data about either characteristics of disposed waste, or groundwater movement at Hanford.
- 169 The Draft HSW-EIS does not include data about impacts to certain ecological receptors, or about potential harm to restoration of priority habitat that may have been degraded by fire or pesticides.
- 170 The impact assessments underlying the Draft HSW-EIS are not accompanied by uncertainty analyses that would provide some indication of the reliability of estimates and predictions.
- 171 The treatment of cumulative impacts from the proposed treatment and disposal activities, in conjunction with other reasonably foreseeable actions at Hanford, is extremely limited and not credible based on the material presented.

172 According to the requirements of Title 40 of the Code of Federal Regulations (CFR) Part 1502.22 the foreseeable significant adverse effect on the human environment should be evaluated. Reasonably foreseeable impacts include "catastrophic consequences, even if their probability of occurrence is low." Based on the USDOEs continued difficulties implementing and maintaining thorough waste characterization, groundwater monitoring at waste disposal sites, and corrective actions, it would not be unreasonable to consider groundwater contamination reaching the Columbia River. Therefore, this environmental impact should be considered. If information is incomplete or unavailable the Draft HSW-EIS is supposed to acknowledge the lack of information. Mitigative measures should be proposed and described as appropriate.

Inadequacies of the Regulatory Analysis

Based on 10 CFR Part 1021.103, in which the USDOE adopts the regulations for implementation of the National Environmental Policy Act (NEPA), 40 CFR Parts 1500

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through 1508, the Washington State Department of Ecology has identified several regulatory inadequacies/omissions in the Draft HSW-EIS. The Draft HSW-EIS does not adequately consider the current regulatory challenges already facing Hanford with regard to dangerous and mixed waste management. The Hanford Federal Facility Agreement and Consent Order (HFFACO) is a compliance agreement for bringing USDOE into conformity with the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Restoration, Compensation and Liability Act (CERCLA), and the Hazardous Waste Management Act (HWMA) requirements for the waste at Hanford. In addition, the Hanford RCRA Permit details requirements for managing dangerous and mixed waste in accordance with state and federal regulations, including corrective action at solid waste management units, and integration of RCRA and CERCLA activities. USDOE continues to struggle to achieve and maintain overall compliance with mixed waste management at Hanford, particularly with regard to characterization, storage, and treatment of mixed waste. Prior to accepting more waste from across the nation, the state of Washington must be assured that current waste management activities at Hanford are protective of human health and the environment and compliant with state and federal regulations, and the Tri-Party Agreement (TPA).

Throughout the Draft HSW-EIS the text is incomplete or silent on RCRA regulatory authorities for waste management facilities, in particular with regard to the LLBG, but also to other facilities such as T-Plant, CWC, WRAP, LERF, ETF, etc. Waste management, permitting, closure, and post-closure requirements for RCRA treatment, storage, and disposal (TSDs) and waste management units are not identified. Corrective action authority to address releases from regulated facilities is unclear. Extensive revision of a number of sections within the document is needed to accurately reflect the regulatory environment. Without clarity on RCRA applicability and extent, bounding conditions can not be properly established and thus alternatives can not be adequately evaluated. Here are specific examples of such omissions:

174

- The Draft HSW-EIS does not adequately address the limitations imposed by the present Part A designation for the LLBG, and by the requirements that will accompany inclusion of Hanford LLBG in the Hanford Sitewide Permit.
- The Draft HSW-EIS does not adequately address the regulatory requirements for modification of the Part B permits for the Central Waste Complex (CWC), 200 Area Effluent Treatment Facility (ETF), Liquid Effluent Retention Facility (LERF), LLBG, T Plant Complex (T Plant), and the Waste Receiving and Processing (WRAP) Facility.
- The Draft HSW-EIS does not adequately address the regulatory requirements associated with mixed waste and mixed transuranic waste storage and treatment at CWC, WRAP and T Plant.
- The Draft HSW-EIS does not address the treatment requirements associated with mixed waste under Washington law. **(RCW 70.105.050)**
- The Draft HSW-EIS reflects insufficient attention to consultation requirements under the Endangered Species Act.
- The Draft HSW-EIS does not recognize and adhere to the state of Washington's water antidegradation policies **(WAC 173-201A-070)** and the state of Washington's maintenance and protected waters designated as outstanding resource waters **(WAC 173-201A-080)**.

- The Draft HSW-EIS does not adequately and/or accurately reflect corrective action regulatory requirements applicable to an evaluation of reasonable alternatives or mitigation measures.

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Several regulatory requirements specified in 40 CFR Part 1502 have not been adequately addressed. The purpose and need statement does not adequately specify the underlying purpose and need for the proposed action. The alternatives should include a rigorous exploration and evaluation of "all reasonable alternatives' or an explanation of why they were eliminated. Alternatives not within the jurisdiction of the lead Agency should also be included. The Draft HSW-EIS does not include an adequate description of the affected environment, or the environmental impact. The impacts to the long-term productivity and the irreversible commitment of resources have not been presented to decision makers. The indirect effects of the alternatives and their significance to the Columbia Basin environment have been overlooked. In addition, conflicts between the proposed actions and the objectives of State and local government have not been addressed. The Draft HSW-EIS does not meet the requirements of 40 CFR Part 1508.25(2), addressing the cumulative actions of the recently-approved Hanford Site Accelerated Cleanup with the proposed alternatives, which when viewed together have cumulatively significant impacts and should therefore be discussed in the same impact statement.

Groundwater Impacts and Range of Alternatives to Protect Groundwater

176

The groundwater quality impact analysis (Appendix G of the Draft HSW-EIS) represents the basis for evaluating reasonable alternatives or mitigation measures. The LLBG groundwater quality impact analysis methodology is deficient in several significant ways:

1) the omission of analysis of impacts occurring during operation of the LLBG;
2) releases are not assumed to begin until 2046;
3) the source term and enabling assumptions are incomplete and lacking in sufficient basis;
4) the Point of Compliance for a RCRA TSD facility is the waste site boundary, NOT an arbitrarily chosen point(s);
5) characterization data is inadequate, and
6) assumptions of no release to groundwater from LLBG are based on inadequate data.

177

Deficiencies in the current groundwater monitoring networks to accommodate changes in groundwater flow direction, dropping groundwater levels, and "dry" monitoring well, should be addressed, including an estimation of the number and cost of needed wells, or acceptable alternative monitoring. Without this information, the cost analysis contained in the Draft HSW-EIS is also incomplete. These omissions render the impact and cost evaluations 1) non-bounding and incomplete, and 2) do not allow the reader to understand that the groundwater quality impact analysis is not supported by adequate LLBG-specific data.

Ecological Assessment/Impacts

The purpose of Appendix I is to give additional justification to statements made in the sections on ecological impacts found in volume one. Drawing upon various studies, Appendix I identifies most of the ecological systems at risk, but conspicuously omits several species and guilds such as the microbiotic crust, water foul, and bald eagles that are identified in the *Biodiversity Inventory and Analysis of the Hanford Site* (The Nature Conservancy, 2000).

178 Not only does this assessment fail to identify all potentially impacted species, it fails to adequately address potential impacts to species and habitats identified. Risk from chemical contaminants, such as carbon tetrachloride and PCB, associated with MLLW and TRU waste processing respectively, are not evaluated. The impact of increased land use on flora and fauna is dismissed, citing effects of fire and herbicide use. All impacts that prevent recovery of a "priority habitat" must be assessed in addition to effects on currently present habitats and species. There is no quantification or qualification of uncertainties associated with the assessment of potential ecological impact on the site actions. An uncertainties analysis needs to be part of the assessment.

179 There are conspicuous data gaps that prevent a proper assessment of the potential impacts of the proposed actions on species and habitats. This document does not provide sufficient information on protection of state and federally listed species. Therefore, it is Ecology's opinion that a formal Endangered Species Act Section 7 consultation would be required to ensure protection of Threatened and Endangered Species.

The Draft HSW-EIS tends to ignore a number of ecological assessment/impact issues.

180
- The Draft HSW-EIS does not provide sufficient information to allow competent decisions to be made.
- The Draft HSW-EIS does not provide a comprehensive list of impacted species and habitats.
- The Draft HSW-EIS does not assess the risk from chemical contaminants.
- The Draft HSW-EIS does not quantify the impacts of proposed actions on all present and future potential habitats.

Health Impacts

181 It was difficult to follow the details of the health assessments, even for a person with training in radiological dose assessment. It was not always clear as to which exposure scenarios and assumptions were used for a given dose result. The information necessary to understand the details was often found scattered throughout the main document, the appendices, and outside documents. In accordance with 40 CFR 1502.21 material should be incorporated into the EIS by reference, to reduce bulk, but "without impeding agency and public review of the action." The content of the cited material should be briefly described in enough detail to allow for adequate review of the document and proposed alternatives.

As an example, Table 5.23, in section 5.11.1.3, presents health impacts to a resident gardener at the one (1) kilometer well (one [1] kilometer down gradient from the 200 Area) from radionuclides in groundwater. The first point of confusion is that the resident gardener, as specified in Appendix F, is located 20.6 kilometers from the 200 Area, but

the table indicates that the assessment point is evaluated at one (1) kilometer from the LLBG. The second point of confusion is that the text does not make clear which exposure pathways are used in the dose calculations. The table caption leads one to think it is only the groundwater pathways, but Appendix F indicates other pathways, such as external radiation exposure from soil, are also evaluated. If the table is indeed only for groundwater pathways, then where are the results for the other pathways discussed in Appendix F? For each dose result, it should be clear which exposure scenarios in Tables F.35 and F.37 are being used. The third point of confusion is that the reader must go back and forth between the main document, the appendices, and outside documents, to find the details of the results given in the tables. Even then, it is still not clear as to which exposure scenarios are used, and what model parameter values are assumed.

The Draft HSW-EIS tends to ignore a number of health assessment/impact issues

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- The Draft HSW-EIS does not allow meaningful comparisons with other state and federal programs responsible for the protection of public health and the environment, the USDOE needs to use standards and methodologies consistent with other federal and state programs for assessing and managing the risks of hazardous substances.
- The Draft HSW-EIS does not develop exposure scenarios for sensitive populations, children, and populations that may be at a disproportionate risk, i.e., Native American populations.
- The Draft HSW-EIS does not make valid assumptions for Technetium-99 (Tc-99) contamination for the 200 West Area. Incorrect assumptions are made regarding the grouted vs. non-grouted Tc-99.
- The Draft HSW-EIS does not clearly indicate what pathways and parameter values were used for each dose result.

183

The Draft HSW-EIS does not specify which model was used to evaluate the exposure scenarios. If the computer model RESidual RADioactivity (RESRAD) was used to calculate the doses, it would facilitate the review of impacts to have one example of a RESRAD input and output file as part of Appendix F. Inclusion of these files would clarify which parameters were used, and their values, without having to refer to other documents. In compliance with 40 CFR Part 1502.24, the discussion of analysis in the EIS "shall identify any methodologies used and shall make explicit reference" to the sources used for the conclusions. Several sections of the Draft HSW-EIS did not provide adequate reference for the conclusions provided.

Uncertainty Assessment and Quantification

184

The uncertainty inherent in the Draft HSW-EIS assessment should be analyzed and quantified. A statistical comparison should be made on dominance and significance of individual elements such as inventory, groundwater and vadose zone flow and transport, and the effect of data gaps in calculating factors such as risk and toxicity for various alternatives.

Many studies have shown that several orders of magnitude of differences usually exist due to lack of information, data gaps, and the uncertainty associated with various elements of the analysis. The level of uncertainty that can be tolerated in the study results must be understood by the decision-makers. The assessment of uncertainty

should be used to determine the usefulness of spending additional effort to reduce uncertainty. It should also be recognized that the uncertainty and dominance principles are coupled. Quantification, therefore, is required to determine the individual component's significance in impacts to the receptors. The assessment must not leave out any factors that dominate the results.

Consideration Of Closure, Long-Term Care And Costs Is Very Limited

185 One of the requirements of 40 CFR Parts 1501.2(b) and (c) include the adequate development of alternatives to enable the decision maker to compare economic and technical analysis. The Draft HSW-EIS does not deal in detail, if at all, with such long-term activities as site closure, corrective action, monitoring, maintenance, and post-closure institutional controls. Nor does it assess, or compare, either disposal alternatives or low and high volumes, according to the requirements imposed by each, and the costs of meeting those requirements. A cost-benefit analysis of the proposed alternatives, including factors not related to environmental quality, should be developed in compliance with 40 CFR Part 1508.23. These issues have not been adequately developed to evaluate the impact to the Hanford National Monument, Columbia River, or local populations. The economic impact of compliant closure, corrective action, monitoring, maintenance, and post-closure institutional controls have not been adequately addressed for an informed decision making process.

Transportation Concerns Are Not Addressed

186 The draft EIS addresses only on-site transportation of wastes, relying upon the generic and very dated Waste Management Programmatic EIS to cover how waste is transported to Hanford. Anyone who has driven along I-182 or SR-240 in the Tri-Cities area knows that land use along those routes has changed dramatically since the 1990 census used in the generic assessment of the proposed EIS. The Draft Solid Waste EIS also does not analyze rail transport on or off-site, even though rail transport is under active consideration.

NEPA Intent Not Adequately Met

Although NEPA calls for brevity and directs documents to "concentrate on issues that are truly significant," sufficient evidence needs to be presented to support the conclusions made in this document. NEPA goes on to say that the purpose of the NEPA process is "to help public officials make decisions that are based on the environmental consequences." The Draft HSW-EIS fails to meet NEPA requirements by:

187
- Not identifying significant issues of concern to the public raised both in final comments on the WM PEIS and in scoping of the HSW-EIS
- Not integrating NEPA and TPA requirements for the Hanford Site
- Failing to include an alternative not to import off-site waste to Hanford
- Not including a cost-benefit analysis to support alternatives considered
- Failing to fully describe cumulative actions and impacts
- Does not reference support documentation not available to the reviewer – thorough reviews are impossible when cross references are made without available

documentation that is not in the public domain, or available as technical literature or guidance

- Relying on reference to historical Hanford technical documentation, policy statements, or historical Hanford environmental impact statements to imply sufficient sufficient technical support for the development of exposure scenarios and the conduct of health and environmental evaluations in this Draft HSW- EIS.
- Not addressing its importance as precedent.

Principal Recommended Corrections to the Draft HSW-EIS:

- The Draft HSW-EIS should use the same enabling assumptions and modeling input parameters used in Wood (1995), the authorization basis for the LLBG. **188**
- The source term should include the retrievable TRU waste until there is a firm commitment and budget for its removal, or there should be separate analyses that include the retrievable TRU waste. **189**
- Releases should be modeled during operations, and should NOT begin in 2046. **190**
- The Points of Compliance for each waste site should be at the fenceline of the waste management area. **191**
- The possible need for corrective actions under RCRA should be addressed. **192**
- The chosen presumption for remedial action at closure should be evaluated against other alternatives. **193**
- Post-closure monitoring and long-term stewardship issues should be addressed. **194**
- Alternatives put forward through the Performance Management Plan and other vehicles should be clearly addressed. **195**

196 The purpose of the NEPA process is to provide decision makers with the background data to emphasize real environmental issues and alternatives. This information is to be provided in a full and fair discussion of significant environmental impacts. The environmental issues and alternatives re to be supported with evidence verifying the proposing agency has made the necessary environmental analysis. The Draft HSW-EIS does not identify and evaluate all reasonable alternatives which consider Washington State preferences and plans, the Draft HSW-EIS does not provide mitigative measure to restore the quality of the human environment or to avoid or minimize possible adverse effects of the proposed actions. Therefore, the Washington State Department of Ecology has determined that HSW-EIS is so inadequate that it precludes meaningful analysis; the Washington State Department of Ecology is requesting the USDOE provide responses to the general and specific comments, use comments to revise the Draft HSW-EIS, and prepare and circulate a revised Draft HSW-EIS.

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August 21, 2002

Mr. Michael S. Collins
U.S. Department of Energy
Richland Operations Office
P.O. Box 550 – A6-38
Richland, WA 99352-0550

Dear Mr. Collins:

Re: Draft Hanford Site Solid (Radioactive and Hazardous)Waste Program Environmental Impact Statement (DOE/EIS-0286D), April 2002

This letter transmits the Washington State Department of Ecology (Ecology) comments on the Draft Hanford Site Solid Waste Program Environmental Impact Statement (HSW-EIS) from the United States Department of Energy (USDOE). Our thorough review of the HSW-EIS has identified several omissions and inadequacies which we comment on through this letter and the enclosed *General Summary*. In addition, we have enclosed a very detailed *Table of Specific Comment* in an effort to provide specific ideas and language that would improve the HSW-EIS. **197**

We had hoped that the HSW-EIS would contribute to our confidence both in how Hanford's waste is managed and in the safety and importance of Hanford's role in the overall cleanup of nuclear sites in the country. We are disappointed, therefore, that the Draft HSW-EIS fails to meet this expectation. In short, the Draft HSW-EIS does not provide adequate and much-needed information to help us or the public address major issues. For example: **198**

- What is the net benefit or harm of importing additional wastes for storage, treatment or disposal at Hanford? **199**
- Are there alternatives to burying minimally-treated waste in shallow, unlined trenches? **200**
- What are the long-term costs and requirements for monitoring, maintaining, and preventing failures at, and radioactive releases from, waste sites, and how can we be confident that these activities will be effectively and accountably managed? **201**

More specifically, we find the Draft HSW- EIS deficient in the following areas:

Scope is too narrow.

- The Draft HSW-EIS assumes that the 1997 Waste Management Programmatic Environmental Impact Statement (PEIS) adequately compared the effects of treatment and disposal facilities at various sites, but it did not. The PEIS relied on data now several **202**

202 (cont) years old and did not have available even the limited information about Hanford contained in the Draft HSW-EIS.

203 • The Draft HSW-EIS assumes continued or increased off-site low-level waste and mixed low-level waste disposal at Hanford. It does not separately assess needs for disposing Hanford waste, in spite of widespread requests for such analysis during the scoping comment period.

204 • The Draft HSW-EIS does not evaluate other options currently under active discussion, such as the lined, RCRA-compliant mega-trench for disposing of low-level waste, expanded use of the Environmental Restoration Disposal Facility (ERDF), permanent disposal of low activity wastes from Hanford tanks in a form other than glass, or storing and treating transuranic wastes from other sites.

Impact analysis is too limited.

205 The Draft HSW-EIS reaches conclusions without apparent adequate data and analysis. It fails to disclose what information was not available for use in arriving at conclusions.

206 • The Draft HSW-EIS does not include sufficient data about groundwater contamination and movement at Hanford.

207 • The Draft HSW-EIS does not include sufficient data about the extent and characteristics of wastes and contamination already in the ground at Hanford.

208 • The analysis of cumulative impacts from the proposed treatment and disposal activities, in conjunction with other reasonably foreseeable actions at Hanford, is extremely limited and not credible based on the material presented.

209 • The Draft HSW-EIS does not include data about the effects on the full range of plant and animal species, nor does it recognize USDOE's obligation to protect and restore priority habitat, even if it has been degraded by fire or pesticides.

Regulatory analysis is insufficient.

210 • The Draft HSW-EIS does not adequately address the challenges USDOE presently faces in complying with RCRA and state dangerous-waste regulations.

Consideration of closure, long-term care and costs is very limited.

211 The Draft HSW-EIS does not deal with such long-term activities as site closure, corrective action, monitoring, maintenance, and post-closure institutional controls. It also does not assess nor compare disposal alternatives or low and high volumes according to the long-term care requirements imposed by each, and the costs of meeting the requirements.

Transportation concerns are not addressed.

212 The Draft HSW-EIS addresses only on-site transportation of wastes, relying upon the generic and very dated PEIS to cover how waste is transported to Hanford. Anyone who has driven

212 (cont) along I-182 or SR-240 in the Tri-Cities area knows that land use along those routes has changed dramatically since the 1990 census used in the generic assessment of the PEIS. The Draft HSW-EIS also does not analyze rail transport on or off-site, even though rail transport is under active consideration.

Summary

213 We believe the Draft HSW-EIS represents a missed opportunity for moving the discussion of Hanford and nationwide nuclear cleanup to a more productive level. Ecology encourages USDOE to consider reissuing a second EIS which would provide a comprehensive vision that assures the safe treatment, storage and disposal of Hanford's waste, and evaluates alternatives and options for Hanford's role in supporting cleanup nationally. Based on this draft, neither the public nor the state of Washington can address these issues with any confidence. We are hoping that through a revised and more comprehensive Draft HSW-EIS we would be able to evaluate and if appropriate support decisions regarding import of additional wastes to Hanford, hazardous waste permitting activities related to burial grounds and treatment facilities, and several initiatives arising from the Cleanup Constraints and Challenges Team's work.

Thank you for the opportunity to comment on this important document

Sincerely,

Tom Fitzsimmons
Director

2 Enclosures

cc: Keith Klein, USDOE/RL
Mike Gearheard, USEPA
The Honorable Robert Wahpat, Chairman, Yakama Indian Nation
The Honorable Gary Burke, Chair, Board of Trustees, Confederated Tribes of the Umatilla Indian Reservation
The Honorable Samuel N. Penney, Chairman, Nez Perce Tribal Executive Committee
Stuart Harris, Confederated Tribes of the Umatilla Indian Reservation
Russell Jim, Yakama Indian Nation
Patrick Sobotta, Nez Perce Tribe
Michael Grainey, Oregon Office of Energy
Todd Martin, Hanford Advisory Board

Responses to Letter L095

Comments	Responses
1	The revised draft *Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement* (HWS EIS) includes a revised purpose and need statement that was developed in consultation with U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology (Ecology) staff.
2	During preparation of the draft HSW EIS, the U.S. Department of Energy (DOE) has been cognizant of issues raised during public review of related National Environmental Policy Act (NEPA) documents and other Hanford initiatives that address waste management issues. To the extent those issues or concerns were related to the HSW EIS, they are addressed in the HSW EIS. Specific responses to comments received on related NEPA documents are contained in the published versions of documents that have been finalized. The relationships of those documents to the HSW EIS are discussed in Section 1.5 of this document, and the summary also discusses areas of particular concern raised during review of the first draft HSW EIS.
3	This HSW EIS considers post-closure institutional controls (see Section 2.0) and costs (see Section 3.5) in its analysis beyond 2046. The radionuclides evaluated for groundwater transport are all generally very long-lived. With the exception of carbon-14 with a half-life of 5730 years, the half-lives are greater than 150,000 years. Thus, radioactive decay is negligible over the 10,000 years evaluation period. Ten half-lives is the general rule of thumb to calculate when radioactivity will approach zero. Figures showing key radionculide concentrations in groundwater over time for the 10,000-year period have been added to Section 5.3.
4	The analysis does include closure evaluations. The closure cover analyzed (modified Resource Conservation and Recovery Act [RCRA] Subtitle C cover) is shown in Figure 2.15. The development of borrow pits for closure material is described in Appendix D. As identified in Section 3.7 the costs for alternative groups do include the costs for capping. Details of the costs can be found in Appendix C of the Technical Information Document (FH 2002). The environmental analysis of these actions is contained in Section 5.0.

Responses to Letter L095

Comments	Responses
5	The revised draft HSW EIS evaluates various forecast waste quantities that include only Hanford-generated waste, in addition to varying amounts of offsite waste. This evaluation reflects the uncertainty in waste quantities that Hanford might receive under the Waste Management Programmatic Environmental Impact Statement (WM PEIS) decisions for mixed low-level waste (MLLW), low-level waste (LLW), and transuranic (TRU) waste. The inclusion of a Hanford Only waste volume provides the basis for determining the incremental impacts of offsite waste. See Section 3.2 for a discussion of the different waste volumes addressed in this HSW EIS.
6	Radioactive solid wastes, including those containing polychlorinated biphenyls (PCBs) and other substances regulated under the Toxic Substances Control Act (TSCA), considered within this HSW EIS are shown in Figure 2.1. Brief descriptions of the waste streams are contained in subsequent sections. PCB-comingled waste is discussed in Section 2.1.3.3, and K Basin sludge is discussed in Section 2.1.3.7. Information on the volume of waste associated with each stream is contained in Section 3.4.
7	Sections 2 and 3 discuss new and modified facilities that will be required for each alternative group. These new and modified facilities are then included in the consolidated set of cost estimates discussed in Section 3.7 and in Table 3.6. Major modifications of new facilities are specifically addressed in Table 3.6.
8	Cost estimates were prepared for the continued operation of existing facilities, the modification of existing facilities, construction of new facilities, and operation of the new or modified facilities. Some operations, such as capping the Low Level Burial Grounds (LLBGs) and treatment of leachate from mixed waste trenches, would continue beyond 2046. These operations have been included as a separate category. The cost of each major facility for each alternative group is shown in Table 3.6. The increased costs for the operation of the LLBGs with the increased volume of waste in the Upper Bound waste volume estimates can be seen. Because the additional wastes in the Upper Bound waste volume do not need treatment, the costs for treatment facilities do not change. This revised draft HSW EIS contains updated cost information for all of the alternative groups evaluated. The environmental impacts of the alternative groups are summarized in Section 3.4; detailed environmental impact information can be found in Section 5 and its associated appendixes. The process for making NEPA decisions is discussed in Section 1.6.
9	Offsite treatment of non-conforming LLW is described in Section 3.0 as part of Alternative Group A. Offsite treatment of the non-conforming LLW would not be limited to Allied Technologies Group, Inc. (ATG). As an alternative to offsite treatment, onsite treatment of the non-conforming LLW would be performed in a new waste processing facility. This facility is described in Section 3.0 as part of Alternative Group B.

Responses to Letter L095

Comments	Responses
10	A No Action Alternative under NEPA does not necessarily mean no action at all (see Council on Environmental Quality [CEQ] Forty Most Asked Questions, Question 3, No Action Alternative [46 FR 18026]). Pursuant to the HSW EIS Notice of Intent (65 FR 10061), under the no action alternative, "DOE would continue ongoing waste management activities and implement those actions for which NEPA reviews have been completed and decisions made [the baseline for analytical purposes would be the time of issuance of the first draft HSW EIS]. The no action alternative provides a baseline for comparison of the environmental impacts of the proposed action and its alternatives." Discussion of a "stop action" scenario has been added in Section 3.0.
11	Ecology is reading the table correctly. The 218-W-3A Burial Ground is full. Alternative 1 would use an additional 0.2 hectares of the 218-W-3AE Burial Ground. Alternative 2 would use an additional 8.0 hectares of the 218-W-3AE Burial Ground. This table has been revised to address additional alternatives evaluated in this revised draft HSW EIS.
12	The HSW EIS evaluation did not assume the use of the 218-W-5 contingency expansion area. Additional analysis would be needed if it were to be used in the future.
13	The Central Waste Complex (CWC), Waste Receiving and Processing Facility (WRAP), LLBGs, and T Plant have been analyzed separately using the best available data from the Solid Waste Information Tracking System (SWITS) and other sources.
14	The maximum impact year for each alternative is calculated using conservative assumptions. As a result, several of the alternatives' largest pollutant sources are projected to be active during the maximum impact year. Because of scheduling constraints (e.g., project durations that extend over multiple years, activities that cannot start until a proceeding activity is completed, work force limitations), it is not credible to shift additional major pollutant-generating activities into the maximum impact year without simultaneously shifting other major pollutant-generating activities out of the maximum impact year. A change in the schedule of activities for the maximum impact year would typically do one of the following: • Shift the year of the maximum air quality impact to a new year. The magnitude of the maximum air quality impacts to the public would remain the same or decrease. • Maintain the same year of maximum air quality impact. The magnitude of the maximum air quality impacts to the public would remain the same or decrease.

Comments **Responses**

Given the technical and work constraints outlined in planning for the Hanford Solid Waste Program, we do not foresee a credible scenario in which a scheduling change could significantly increase estimates of maximum air quality impacts beyond what is presented in this EIS.

Estimates of the cumulative amount of a pollutant emitted over the life of each alternative were not used in this EIS to characterize air quality impacts to the public. For a project as complex as the HSW program, the correlation is quite poor between the cumulative pollutant emissions over multiple years and air quality impacts to the public. This is owing to the large variation in pollutant emissions that may occur from year to year, the large number of widely dispersed pollutant emission sites, and the wide variation in distances between the pollutant emission sites and publicly accessible locations.

To illustrate this point, let's consider a scenario in which we would have a certain amount of carbon monoxide that would be uniformly emitted from Area C over the duration of the program. Let's assume that under a different alternative ten times this amount of carbon monoxide would be emitted from the 200 East Area. Because Area C is so much closer to publicly accessible locations than is the 200 East Area, Area C's unit dispersion factor for a maximum 1-hour impact is 40 times larger than the factor for the 200 East Area (see Tables 5.2 and 5.3). As a result, the maximum 1-hour air quality impact from the Area C emissions would be substantially greater than the impact from the much larger 200 East Area source. This example illustrates that the use of cumulative pollutant emissions would in many cases poorly correlate with air quality impacts.

15 The WM PEIS was a comprehensive evaluation of DOE nationwide waste management, and DOE determined there was sufficient information to make decisions regarding the sites that were suitable for long-term waste management missions. The WM PEIS evaluated a broad suite of alternatives for waste management across the DOE complex, including leaving most waste at generator facilities, or consolidating waste management at fewer sites that have existing facilities suitable to accept waste from other facilities. DOE decided that the environmental and programmatic benefits of consolidated waste management at sites with extensive waste management experience, including Hanford, were preferable to other alternatives evaluated. A more comprehensive discussion of the WM PEIS and its relationship to the HSW EIS can be found in Section 1.5.

The HSW EIS was never intended to be a nationwide analysis, but to evaluate the consequences of various site-specific alternatives consistent with the WM PEIS decisions at Hanford. The first draft HSW EIS evaluated a range of waste receipts at Hanford to encompass the uncertainties regarding quantities of waste that would ultimately be managed at the site. The waste volumes evaluated in the first draft included a Lower Bound waste volume consisting mainly of Hanford waste, and an Upper Bound volume that included additional quantities of offsite waste Hanford might receive consistent with WM PEIS decisions. The revised draft HSW EIS includes an evaluation of Hanford Only

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	waste, in addition to the waste volumes that were included in the first draft. The Hanford waste evaluation provides a basis with which to determine the impacts of varying quantities of offsite waste at Hanford.
16	In general, waste disposed of prior to 1970 will be addressed through Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response activities or other NEPA documentation, as appropriate. The LLBGs are eight specific solid waste disposal facilities in the 200 East and 200 West Areas, which have been in operation since 1962. Waste disposed of in the LLBGs prior to 1970 is evaluated as part of the alternatives in this HSW EIS. Cumulative impacts of waste remaining onsite, including waste disposed of prior to 1970, are addressed in Section 5.0 and Appendix L. Uncertainties in this inventory of waste are discussed in Section 3.0.
17	See the last paragraph of Section 2.1.3. This paragraph indicates that some TRU waste will be mixed, but because it will be shipped to the Waste Isolation Pilot Plant (WIPP) untreated there is no distinction between mixed and non-mixed TRU for the EIS.
18	Uncertainties about hazardous chemical constituents in the previously disposed of waste are discussed in Section 3.5 This waste will ultimately go through a CERCLA or RCRA past-practice remedial action process prior to closure of the LLBGs.
19	The summary has been extensively revised and DOE elaborates further on the cumulative impacts in Section 5.14 and Appendix L.
20	This is an estimate that up to four fatalities *might* occur and does not mean that the accidents will occur. This is a statistical estimate of traffic accident fatalities based on historical data. This was a bounding case assuming that contact-handled (CH) MLLW would be sent to Tennessee for treatment. Other alternatives evaluate treatment of this waste onsite.
21	The cumulative impacts analysis addresses initial results of the System Assessment Capability (SAC) analyses, which were based on available data and assumptions about waste inventories in various waste sites at Hanford. Various disposal records, process information, and groundwater/vadose zone monitoring data were used to estimate the inventories at these waste sites. (See Section 5.14 and Appendix L in Volumes I and II of this HSW EIS.) Waste to be disposed of in the future, from onsite or offsite generators, is analyzed as a part of all of the alternative groups in this HSW EIS. This HSW EIS also evaluates various forecast waste quantities that include Hanford Only generated waste in addition to varying amounts of offsite waste. This evaluation reflects the uncertainty in waste

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	quantities that Hanford might receive under WM PEIS decisions for MLLW, LLW, and TRU waste. The inclusion of a Hanford Only waste volume provides the basis for determining the incremental impacts of offsite waste.
22	Wastes disposed of in the LLBGs since they opened in 1962 are evaluated in this HSW EIS. Wastes disposed of prior to 1962 are addressed as part of the cumulative impacts (see Sections 5.14 and Appendix L). Uncertainties about hazardous chemical constituents in the previously disposed of waste are discussed in Section 3.0. This waste will ultimately go through a CERCLA or RCRA past practice remedial action process prior to closure of the LLBGs.
23	The WM PEIS evaluated a broad suite of alternatives for waste management across the DOE complex, including managing most waste at generator facilities, or consolidating waste management at fewer sites that have existing facilities suitable to accept waste from other facilities. The impacts of those alternatives were compared for a variety of waste volumes at different DOE sites, including larger quantities of waste than are evaluated in this HSW EIS. As a result of that analysis, DOE decided the environmental and programmatic benefits of consolidated waste management at sites with extensive waste management experience, including Hanford, were preferable to other alternatives evaluated. An expanded discussion of the WM PEIS alternatives is provided in Section 1.5 of the revised draft HSW EIS.
24	This language is no longer used in this HSW EIS. DOE's basis for regulation of DOE LLW is set forth beginning at page A-152 of Appendix A of the "Implementation Guide for use with DOE M 435.1-1." Appendix A can be accessed at URL: http://www.directives.doe.gov/. Appendix A states that: "The regulation of low-level waste at DOE facilities, as developed in DOE Order 435.1, differs from the more generic but prescriptive approach taken by the NRC in developing requirements for commercial facilities in 10 CFR Part 61 and other rules. 10 CFR Part 61 was developed with several known conditions that are specific to commercial waste and are not necessarily appropriate for DOE low-level waste. These differences include (1) NRC has a formal licensing process while DOE uses the Directives process; (2) NRC requirements are for generic but unknown facilities and locations; (3) commercial waste streams are well defined; (4) DOE processed spent fuel for spent nuclear material; (5) DOE disposes of low-level waste onsite, where practical, at facilities which have been operating for many years; (6) land use controls for DOE low-level waste disposal facilities are likely to extend into the distant future; and (7) the management structure for DOE nationwide low-level waste management is well established. These factors lead to differences in waste management regulation and practices for DOE and NRC low-level waste disposal; however, the required level of health protection is essentially identical.

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	One specific result of the differences in the process used by DOE to regulate low-level waste is the approach to waste classification. The NRC developed a generic waste classification system for application to all facilities and all locations, which was based on a well-developed understanding of the characteristics of commercial low-level waste. The waste classification limits were developed from a performance assessment of generic low-level waste disposal facilities in various locations that was included in the Environmental Impact Statement for 10 CFR Part 61. The DOE approach places greater emphasis on site-specific decisions for site-specific conditions, and requires a site-specific performance assessment to develop limits, on the basis of criteria for radiation protection (dose limits) that are similar to the NRC. This approach recognizes that the locations for the disposal of wastes are well known, but the waste characteristics are not as well understood. DOE Manual 435.1-1 requires the development of waste acceptance criteria for each waste management facility to ensure justified limitations are placed on wastes to be disposed of. Sites may establish waste classifications as needed for operation of specific facilities, but they must establish waste acceptance criteria. This approach leads to the development of site-specific systems which take into account the environmental characteristics of the site and the characteristics of the wastes being disposed of, such as the Category 1 and 3 designations at Hanford, which are similar to the NRC classes A and C."
25	This language is no longer used in this HSW EIS. This waste will ultimately go through a CERCLA or RCRA past practice remedial action process prior to closure of the LLBGs. TRU waste that is retrieved from the LLBGs will be stored, treated, characterized, packaged, and shipped to WIPP for disposal.
26	This language is no longer used in this HSW EIS. Information on the canyon disposal initiative can be found in Section 3.0.
27	This revised draft HSW EIS evaluates Hanford Only waste volumes. There are only minor differences between the Hanford Only waste volume and the Lower Bound waste volume.
28	The basic decision for retrievably stored suspect TRU waste is to determine whether it is TRU waste or LLW. If the waste is determined to be TRU waste, it will be retrieved and shipped to WRAP or another facility for certification prior to being shipped to WIPP for disposal. The basis for the 50% estimate is an analysis of waste records.
29	1. The current inventory of waste stored and/or disposed of at Hanford includes wastes received from offsite sources in the past. Estimates for future waste shipments from offsite sources are not included in the Hanford Only waste volume. 2. The waste volume is correct and based on conversations with Oak Ridge staff. They are not listed in the text because they don not currently send us waste and therefore are

not included in the SWIFT forecast. Discussion with Oak Ridge Operations Office indicated that the smaller volume of waste was the maximum amount that would potentially be shipped to the Hanford Site. This has been included in the Upper Bound waste volume. Based on the WM PEIS decision, Oak Ridge will continue to manage most of its own waste.

3. The isotopic characteristics of the additional offsite waste included in the Upper Bound waste volumes were based on radionuclide profiles contained in *The Current and Planned Low Level Waste Disposal Capacity Report* (DOE 1998). A summary of long-lived radionuclides for all waste streams is included in tables in Appendix F in Volume II of this HSW EIS.

The chemical content for the Hanford Only and Lower Bound volumes comes directly from the SWIFT forecast. The chemical content of the additional offsite waste included in the Upper Bound volumes was extrapolated from information contained in the Solid Waste Information and Tracking System (SWITS) database.

30 In Appendix B, Tables B.11 through B.13 contain the volumes of CH and RH TRU waste to be managed (totals ranging from 45,748 to 47,305 m^3). The total volumes of TRU waste expected to be shipped to WIPP range from 41,512 cubic meters (Hanford Only TRU waste) to 43,036 cubic meters (Upper Bound waste) with the volume of RH-TRU waste at about 2500 cubic meters in both cases. The flow diagrams in Appendix B, Section B.5, provide further explanation.

The TRU Management Plan, Rev 3, shows an anticipated total volume of about 33,500 cubic meters of TRU at Hanford. The TRU waste sites provided volume information to TRU Management Plan in the Integrated Planning, Accountability, and Budgeting System (IPABS) management tool. There are differences because IPABS and the TRU Management Plan are based on a best estimate and the HSW EIS is based on conservative estimates.

TRU Management Plan Rev 3 (page 37) (available on line at http://www.wipp.carlsbad.nm.us/library/ntwmp/rev3/Cover.pdf) states that the anticipated volume of DOE waste to be disposed of at WIPP is 116,100 cubic meters, of which 113,300 cubic meters is CH TRU (of which about 3,200 cubic meters has already been disposed of), and 2,800 cubic meters is RH TRU waste. WIPP's total capacity for both CH-TRU waste and remote-handled (RH) TRU waste is set at 175,600 cubic meters by the Land Withdrawal Act. The total volume of RH-TRU waste cannot exceed 7,080 cubic meters.

31 The volume listed in the 1996 Integrated Database (640,000 m^3) includes all non-TRU waste buried from 1944 through 1996. The "previously disposed of" figure for LLW (283,067 m^3) includes only LLW buried in the LLBGs that are the responsibility of the

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	Waste Management Project (from approximately 1962 through 1998). The remainder consists of the naval reactor compartments and waste in pre-1970 burial grounds that will eventually be addressed under CERCLA.
32	The use of rail is not part of the proposed action evaluated in this HSW EIS. Shipments of waste by rail may require constructing a spur from the existing rail lines, which, if proposed, would require additional NEPA review.
33	The LLW uranium inventories evaluated in the HSW EIS include the 825 MTU that may be eventually disposed of at Hanford. It is included in the source term. The analysis conducted under this EIS did not indicate that groundwater standards for total uranium would be exceeded (see Section 5.3 and Appendix G of this HSW EIS).
34	Specific discussion of the use of soil mounds over trenches as an interim measure to shed water has been included in this HSW EIS. Section 5.18.1 addresses potential groundwater mitigation measures, and DOE considers early capping as part of this discussion. The SAC analysis demonstrated that some advantages are associated with early capping. For purposes of modeling groundwater impacts it is more conservative to assume that trenches are capped at the end of the operating period.
35	Studies of seismicity at the Hanford Site have shown that the depth of seismic activity is related to crustal stratigraphy (layers of rock types) (PNNL-11557-20). The main geologic units important to earthquakes at Hanford and the surrounding area are • • • Paleozoic craton • Since records have been kept, most of the earthquakes at the Hanford Site have originated in the Columbia River Basalt Group. The crystalline basement has had the next greatest amount of earthquakes followed by the pre-basalt sediments. However, the stratigraphic distribution of earthquakes will vary on a yearly basis. For example in FY 1999, 39 earthquakes occurred in the basalt layer, 6 were in the pre-basalt sediments, and 27 were in the crystalline basement (PNNL-11557-12). In contrast, for FY 2002, there were 13 earthquakes in the basalt layer, 12 earthquakes in the pre-basalt sediments, and 17 earthquakes in the crystalline basement (PNNL-11557-20) (Hartshorn et al. 1999, Hartshorn et al. 2002).

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36	Two earthquakes triggered the Hanford Strong Motion Accelerometers during the five years of its operation. Additional information on this subject can be found in the Annual Hanford Seismic Report for FY 2001 (Hartshorn et al. 2001).
37	Section 3.7 of the first draft HSW EIS presents the consolidated cost estimates for each alternative. Section 3.5 of the revised draft HSW EIS updates those costs for the alternatives considered in the revised document. The detailed cost estimates are contained in Appendix C of the Technical Information Document ID (FH 2002), which is available over the Internet at http://www.ecy.wa.gov/programs/nwp/pdf/HSW EIScomments.pdf.
38	Section 5.11.1.1.3 describes the evaluation of the postulated accident scenarios involving radioactive material. These scenarios included a design basis earthquake and a beyond design basis earthquake. Additional details regarding this evaluation are in the Central Waste Complex Interim Safety Basis (Vail 2001a) and Solid Waste Burial Grounds Interim Safety Analysis (Vail 2001b and Vail 2001c) documents.
39	A systematic evaluation of the water lines will be performed to determine if any of these water lines are located near waste sites that are subject to near-term remedial or closure actions. Moving water lines away from waste sites that are to be isolated with surface barriers will eliminate the potential for leaking lines to flush contaminants from the vadose zone. In some situations a field survey of the lines will be performed to identify areas where this type of situation may exist. Finally, water lines to certain inactive facilities may not be needed and could simply be capped and shut down. Plans are to complete water system renovation of the Central Plateau by 2008 (DOE-RL 2002).
40	"Other solid waste" means non-radioactive, non-hazardous routinely generated garbage.
41	The principal criterion for "other suitable facilities" would be facilities where we would have the capability to conduct inspection and verification of wastes for treatment or disposal.
42	DOE welcomes specific suggestions on this topic. In Section 6, we identify the regulatory requirements followed in conducting operations at Hanford Site, including RCRA and State Dangerous Waste Regulations under the Hazardous Waste Management Act (Section 6.3). Section 6.19 addresses permits required to construct and operate treatment, storage, and disposal facilities related to the alternatives. Whenever we discuss facilities involved with treatment and storage and disposal of mixed waste, it is our intent to comply with all applicable requirements.

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43	Implementation of the No Action Alternative would not enable DOE to comply with the waste management and land disposal requirements of the State Dangerous Waste Regulations (including RCRA requirements). Text in this HSW EIS (Section 3.0) addresses this issue.
44	Text has been added to Appendix D, Section D.1, of the revised draft HSW EIS to clarify the regulatory status of the LLBGs.
45	Table 6.1 of the first draft HSW EIS was not intended to be all inclusive, but to avoid confusion we revised the text and removed the table from the revised draft HSW EIS.
46	The analysis of commercial facilities is performed as part of facility-specific NEPA documentation or similar State documentation, for example, ATG was analyzed as part of a City of Richland State Environmental Policy Act EIS. There is no intention to receive MLLW from offsite for storage, send it back out to a commercial treatment facility, and then return it back to Hanford for disposal. All MLLW from offsite generators is assumed to be treated prior to being received at Hanford for disposal. Contact-handled MLLW generated at Hanford would be sent offsite to a commercial treatment facility in some alternatives.
47	The descriptions of closure and cap components in the first draft HSW EIS are intended to summarize actions that will be addressed in detail in the dangerous waste management documentation required by Washington Administrative Code (WAC) 173-303. MLLW units are to be closed in accordance with WAC 173-303-610 regulations. For purposes of analysis at this time, it is reasonable to expect that LLBG mixed waste disposal units will be closed with environmentally protective caps and other controls as required. Post-closure is part of the long-term stewardship activities discussed in Section 5.18.
48	The WM PEIS was a comprehensive evaluation of DOE nationwide waste management, and DOE determined there was sufficient information to make decisions regarding the sites that were suitable for long-term waste management missions. The HSW EIS evaluates alternatives for consistent with the WM PEIS decisions at Hanford, and does not repeat the nationwide comparison of impacts across DOE sites contained in that document. A discussion of the WM PEIS and its relationship to the HSW EIS can be found in Section 1.5. Not withstanding the above, as encouraged by Ecology and others, the HSW EIS includes an evaluation that assumes only Hanford wastes are managed at Hanford in the future.
49	The HSW EIS now includes alternatives for creating new spaces for disposal of waste outside the LLBGs as suggested by Ecology and others.

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50	Capabilities needed for remote-handled (RH)TRU wastes and non-standard containers of TRU waste would be similar to those already provided in WRAP. These include nondestructive examination, nondestructive assay, headspace gas sampling, repackaging, and visual examination of waste packages. These are described in various text boxes in Section 2.2.2. Additional capacities for processing and certifying CH-TRU waste would increase throughput and accelerate shipment of TRU waste to WIPP.
51	The proposed modifications are discussed in a "modified T Plant" text box in Section 2.2.2. Without additional capabilities to process RH-TRU waste and non-standard containers of TRU waste, these wastes could not be certified and shipped to WIPP. Modifying T Plant is one alternative analyzed that would help us to certify TRU waste.
52	WIPP has applied for changes to its permit to allow it to receive waste containing polychlorinated biphenyls (PCBs). EPA has indicated acceptance, but it is not final yet. Based on the assumption that the changes will be accepted, the sludge would not require treatment of PCBs.
53	There are uncertainties regarding timing of TRU waste receipts and the volume of wastes received, because CERCLA decisions have not been made. See Section 3.0 in this HSW EIS.
54	The term "cover" as used here means the backfill placed over the waste and trench to bring the level to grade. Cover has been changed to backfill in the revised draft HSW EIS. Caps are applied later to reduce water penetration into the waste.
55	The performance of the burial grounds and the value of cement as a waste form were assessed in specific performance assessments for the 200 East and 200 West burial grounds. The documents (listed below) were reviewed by a peer review panel before they were issued and are reviewed annually for any significant changes. The performance assessment showed the results for the 1,000-year compliance period, while the EIS analysis addresses the impacts over the 10,000-year time frame (Wood et al. 1995, Wood et al. 1996).
56	Yes. Please see Response 55.
57	DOE Order 460.1A sets out DOE policy on packaging and transportation safety. The Order states that onsite hazardous materials transfers shall comply with the U.S. Department of Transportation (DOT) hazardous materials regulations, or the site- or facility-specific cognizant DOE Operations or Field Office approved Transportation Safety Document that describes the methodology and compliance process to meet equivalent safety for any deviation from the hazardous materials regulations. For offsite

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	hazardous materials packaging and transportation safety, DOE's policy, as stated in DOE Order 460.1A, is that each package and shipment of hazardous materials shall be prepared in compliance with the DOT hazardous materials regulations and applicable tribal, state, and local regulations not otherwise preempted by DOT. DOE does not use the U.S. Nuclear Regulatory Commission (NRC) Uniform Manifest.
58	DOE welcomes specific suggestions on this topic. In Section 6, we identify the regulatory requirements followed in conducting operations at Hanford Site, including RCRA and State Dangerous Waste Regulations under the Hazardous Waste Management Act (Section 6.3). Section 6.19 addresses permits required to construct and operate treatment, storage, and/or disposal (TSD) facilities related to the alternatives. Whenever we discuss facilities involved with treatment, storage, and disposal of mixed waste, it is our intent to comply with all applicable requirements. DOE acknowledges the dual regulatory authority of EPA and the State of Washington under RCRA and CERCLA and is committed to complying with all applicable requirements. DOE is addressing the uncertainties associated with burial ground performance and characterization through the CERCLA and RCRA past practice processes.
59	The 200 Area LERF is regulated under the Dangerous Waste Portion of the Hanford RCRA permit and is subject to requirements for groundwater monitoring under WAC 173-303-645. Due to declining water table levels under the 200 Area, the LERF groundwater monitoring system could no longer perform effectively, and alternative environmental monitoring methods had to be examined. Ecology has reviewed DOE's draft plans (Ecology, February 7, 2002), and is working with DOE to resolve remaining issues (Ecology, July 1, 2002).
60	The text has been revised.
61	The text has been revised.
62	Yes, all floors are inspected and repaired as necessary.
63	Biological and ecological resources (vegetation, wildlife, aquatic ecology, and threatened and endangered species) potentially impacted by the proposed actions are assessed in Appendix I and summarized in Section 4.6 of this HSW EIS. Wildlife species evaluated and ecological resource impacts are summarized in Section 5.5 of this EIS.
64	Thank you.
65	Hanford shrub-steppe is identified as a priority habitant in Section 4.6.4 of this HSW EIS.

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66	Figures showing concentrations over the entire 10,000-year time period have been added in Section 5.3 and Appendix G.
67	The natural vegetation is expected to be reestablished after closure of the disposal facilities and the borrow area. Potential mitigation measures for addressing ecological impacts are described in the Biological Resources Management Plan (BRMaP) and the Biological Resources Mitigation Strategy (BRMiS), which are discussed in Section 5.18 of this HSW EIS.
68	No mining in the 300 Area or Fitzner/Eberhardt Arid Lands Ecology (ALE) Reserve portions of the National Monument is projected. Area C where mining may occur is outside of ALE, but close enough for noise consideration. This impact on wildlife from such noise is addressed in Section 5.9.
69	Microbiotic crusts are discussed in Appendix I. To clarify the potential impact of solid waste management alternatives at Hanford to the crusts we have included this discussion in the descriptions of the Affected Environment (Section 4) and Environmental Consequences (Section 5), and Appendix I.
70	We did not omit consideration of other habitats based upon non-priority status (see Section 5.5 and Appendix I).
71	This HSW EIS has been revised to reflect the survey results and we expect to do periodic surveys in the future.
72	The approach taken in the HSW EIS is consistent with the methods, characteristics, and controls associated with a composite analysis as described by the Columbia River Comprehensive Impact Assessment (CRCIA) team. The analysis modules included in the SAC parallel those identified by CRCIA and were developed through work group meetings that included regulator and stakeholder participation. Several key modules were adopted directly from the CRCIA including the module used to calculate human health impacts (the HUMAN code) and the module used to calculate impacts to ecological species (the ECEM code).
73	The CRCIA (DOE-RL 1998) was a study initiated by DOE, Ecology, and EPA to assess the effects of Hanford-derived materials and contaminants on the Columbia River environment, river-dependent life, and users of river resources for as long as these contaminants remain intrinsically hazardous. The acronym CRCIA is identified in Volume 1 and document mentioned in Volume II, Appendix F, but the formal citation was not placed in the reference section.

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	CRCIA was developed to provide screening, impact, and risk assessment procedures to be used under the Hanford TPA, the RCRA, and CERCLA programs. The approach taken in the first draft HSW EIS is consistent with the methods, characteristics, and controls associated with a composite analysis as described by the CRCIA team. Key elements of the approach include ensuring that factors that will dominate the risk are included and providing an understanding of the uncertainty of the results. Dominant factors were identified through scoping studies and the development of conceptual models for each of the analysis modules used. A stochastic modeling approach was taken to estimate uncertainty in the results. Aspects of uncertainty that could not be included in the calculation were considered in the analysis of the modeling results and discussed in the document presenting those results (PNNL 14027). The analysis modules included in the System Assessment Capability parallel those identified by CRCIA and were developed through work group meetings that included regulator and stakeholder participation. Several key modules were adopted directly from the CRCIA including the module used to calculate human health impacts (the HUMAN code) and the module used to calculate impacts to ecological species (the ECEM code).
74	MLLW will be treated to remove organics. With regard to previously buried waste, there is insufficient information about the constituents and/or inventory of these to do groundwater modeling and subsequent ecological risk assessment. The TRU waste will be removed and sent to WIPP and thus pose no concern to Hanford Site biota. The concern about the contaminants analyzed in the ecological risk assessment is that of their radiological rather than their chemical toxicity, with the exception of uranium, for which there was analysis for both.
75	The EPA provides a general protocol with considerable latitude for conducting ecological risk assessments, into which the framework of the HSW EIS ecological risk assessment falls.
76	Best estimates are median values from a range of laboratory samples. This is included parenthetically in this HSW EIS.

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77	DOE uses two definitions of the term "seeps." On the Columbia River, seepage occurs below the river surface and exposed riverbank, particularly noticeable at low-river stage. The seeps flow intermittently, apparently influenced primarily by changes in the river level. Use of the word seeps in this context corresponds to the commenter's definition. The second use of the term in the HSW EIS corresponds to releases of radionuclides and chemicals to the unsaturated soil beneath the LLBGs that may occur as the waste packages degrade and water (from rain and snow melt) "seeps" through the waste. While the term may not exactly correspond to the reference cited in the commenter's question, it is descriptive of the phenomena. Thus, using an additional dilution factor in this case is appropriate.
78	The K_d values referenced in Table I.2 come from Table G.1 (HSW EIS, Volume II, 2002). A footnote has been added to Table I.2 to reflect this fact.
79	The contaminant data used as ECEM model input is provided in Appendix I. The full suite of ECEM terrestrial and aquatic receptors is also provided. Information related to the model parameters and algorithms is contained in the Columbia River Comprehensive Impact Assessment part 1 (DOE/RL-96-16, Rev 1 and Final. U.S. Department of Energy, Richland, WA March 1998) and Eslinger, P.W., C. Arimescu, B.A. Kanyid, and T.B. Miley. 2002. User Instructions for the Systems Assessment Capability, Rev. 0, Computer Codes. Volume 2: Impact Modules. PNNL-13932-Volume 2, Pacific Northwest National Laboratory, Richland, Washington.
80	The uncertainty factor of 15 was used to convert a "chronic mortality" benchmark based on a 7-day test for the mosquitofish where the level of mortality was not specified, not an "acute mortality" benchmark, which is typically an LC50 based on a 4-day or shorter test (DOE 1998). The uncertainty factor of 15 was used to extrapolate from the mosquitofish to other Columbia River receptors exposed mostly to surface water (fish, freshwater shrimp, water flea, etc.). No further uncertainty factors are needed, because the general exposure scenario for the mosquitofish and receptors are similar. Since the first draft HSW EIS, new alternatives have been incorporated, necessitating new groundwater modeling of contaminants reaching the Columbia River, and hence a new assessment of potential risk of adverse effects to aquatic and riparian biota. The new assessment consists of a re-analysis of risk that uses new uranium chemical aquatic toxicity benchmarks.
81	Presence alone of threatened or endangered species or critical habitat does not necessitate formal consultation under the Endangered Species Act. The U.S Fish and Wildlife Service (FWS) letter of April 23, 2002, (see Appendix I) states that "...if a listed species is likely

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to be affected by the project, the involved Federal agency should request Section 7 consultation.…" According to the FWS Endangered Species Consultation Handbook, formal consultation is necessary 1) after the action agency determines that the proposed action may affect listed species or critical habitat, or 2) National Marine Fisheries Service (NMFS) or FWS does not concur with the action agency's finding that the proposed action is not likely to adversely affect the listed species or critical habitat. There are no threatened or endangered species or critical habitat in any of the terrestrial habitats to be disturbed under any of the alternatives in this HSW EIS (see Appendix I). Thus, because no threatened or endangered species or critical habitat is likely to be adversely affected, there is no basis for initiating formal consultation with either NMFS or FWS.

Regarding documentation for State-listed species of concern we assume the comment meant the Washington State Department of Fish and Wildlife not the U.S. Fish and Wildlife Service. Table 4.12 in this EIS identifies the Washington State-listed animal species of concern. This information was obtained from the website: www.wa.gov/wdfw/. Based on information provided subsequently from the Washington State Department of Fish and Wildlife (letter dated August 20, 2002), this EIS has been updated.

82 Uranium isotopes are the main constituents addressed by the HSW EIS analysis. The solubility and release of uranium disposed of in cementicious wastes (i.e., within high-integrity containers [HICs] or macroencapsulated in grout) is expected to be significantly reduced below expected solubility for uranium not disposed of in cementicious wastes. Release calculations for uranium isotopes are described in more detail in Appendix G.

83 This HSW EIS uses the definition of cumulative impact as defined by NEPA (40 CFR 1508.7):

"Cumulative impact" is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

84 The inventory estimated for mercury is small, 2.5 kg (5.5 lb), and would not contribute substantially to groundwater contamination. Given the small, estimated inventory, the decision was made to use a K_d value for mercury that is the same value as for lead. The values are based primarily on chemical similarity and solubility.

85 Environmental justice is concerned with assessment of disproportionate distribution of adverse impacts of an action among minority and low-income populations that is significantly greater than that experienced by the rest of the population. Adverse impacts

are defined as negative changes to the existing conditions in the natural environment (for example, land, air, water, wildlife, vegetation) or in the human environment (for example, employment, health, land use). Executive Order 12898 further directed federal agencies to consider effects to "populations with differential patterns of subsistence consumption of fish and wildlife."

DOE is cognizant of the concern of Native Americans and others that operations at Hanford, including those discussed in this HSW EIS, will adversely impact Native Americans and other minority and low-income populations. One of the concerns, as it applies to Native Americans, is that through their lifestyle (e.g., a higher percentage of fish in the diet when compared to other demographic groups) they would be affected disproportionately more than other populations through operations at Hanford, and the by pollution from those operations, of the groundwater and the Hanford Reach of the Columbia River. Groundwater modeling shows that the pollutants of concern (technetium- 99 and iodine-129) where affected groundwater interdicted with the Columbia River would be significantly diluted. The groundwater itself, at a hypothetical well l km from the Columbia River would be well within benchmark maximum contaminant levels.

In addition, often cited in support of disproportional adverse impacts of Hanford's operations on the Columbia River and Native Americans is a U.S. Environmental Agency Report entitled "Columbia River Basin Fish Contaminant Survey 1996-1998. (EPA 910-R-02-006. Region 10, Seattle, WA). EPA did a special study of radionuclides for a limited number of fish samples on the Hanford Reach. White sturgeon were collected from the Hanford Reach of the Columbia River, artificial ponds on the Hanford Site, and from the upper Snake River and analyzed for radionuclides. The levels of radionuclides in fish tissue from Hanford Reach of the Columbia River and the ponds on the Hanford Site were similar to levels in fish from the Snake River. Cancer risks were estimated for consumption of fish that were contaminated with radionuclides. These estimates of risks were not combined with the potential risks from other chemicals, such as PCBs (Aroclors and dioxin-like PCBs), chlorinated dioxins and furans, and a limited number of pesticides. The potential cancer risks from consuming fish collected from Hanford Reach and the artificial ponds on the Hanford Site were similar to cancer risks in fish collected from the upper Snake River. These risks were small relative to the estimated risks associated with radiation from naturally occurring background sources, to which everyone is exposed.

EPA's study reported that the chemicals and or chemical classes that contributed the most to cancer risk for most of the resident fish were PCBs (Aroclors and dioxin-like PCBs), chlorinated dioxins and furans, and a limited number of pesticides. For most of the anadromous fish, the chemicals that contributed the most to cancer risk were PCBs (Aroclors and dioxin-like PCBs), chlorinated dioxins and furans, and arsenic.

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	DOE has been monitoring radionuclides and chemical constituents in fish in the Hanford Reach since 1945 (Poston, T. M., R. W. Hanf, R. L. Dirkes, and L. F. Morasch. 2002. *Hanford Site Environmental Report*, PNNL-13910, Pacific Northwest National Laboratory, Richland, Washington). A Native American scenario was evaluated in the TWRS EIS (DOE and Ecology 1996). This HSW EIS evaluated the impacts of a sweat lodge as part of its exposure scenarios (see Appendix F).
86	DOE is cognizant of the concern of Native Americans and others that operations at Hanford, including those discussed in this HSW EIS, will adversely impact Native Americans and other minority and low-income populations. One of the concerns, as it applies to Native Americans, is that through their lifestyle (e.g., a higher percentage of fish in the diet when compared to other demographic groups) they would be affected disproportionately more than other populations through operations at Hanford, and by the pollution from those operations, of the groundwater and the Hanford Reach of the Columbia River. Groundwater modeling shows that the pollutants of concern (technetium-99 and iodine-129) where affected groundwater interdicted with the Columbia River would be significantly diluted. The groundwater itself, at a hypothetical well l km from the Columbia River would be well within benchmark maximum contaminant levels. The HSW EIS evaluates the impacts of three exposure scenarios, one of which includes a sweat lodge. These scenarios are consistent with EPA, Model Toxics Control Act (MTCA), and the Hanford Site Risk Assessment Methodology. The exposure pathways included ingestion, dermal absorption (bathing), biota, dairy, meat, game, fruit, vegetables, and inhalation. See Tables in Appendix F. The risk factors for estimating health effects take into account exposure to children.
87	The applicable ambient air quality standards are found in Section 4 (Table 4.5) of this HSW EIS.
88	The HSW EIS is based on a very large body of information and has been revised to address many comments regarding its scope, organization, data presentation, and content.

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89	The maximum point of impact from multiple and widely dispersed sources is not necessarily directly underneath the LLBGs or at the LLBG boundary. To model the groundwater impacts from multiple and widely dispersed disposal units over long periods of time, a 1-km "point of analysis" location was deemed to be more appropriate and representative than a regulatory "point of compliance" well location. Current results from the RCRA-compliant groundwater monitoring have not identified any groundwater impacts from the LLBGs. The point of analysis approach is considered more technically appropriate for a NEPA evaluation of groundwater impacts. More specific clarification about the differences between the "point of assessment" used in the HSW EIS groundwater impact analysis and the RCRA "point of compliance" for land disposal unit groundwater monitoring wells is provided in Section 5.3 and Appendix G.
90	Modified RCRA Subtitle C covers are assumed to be used in all action alternatives.
91	Table G.4 and Figure G.3 have been added to Appendix G to help clarify infiltration rates.
92	The tables in Section 5.3 have been replaced by graphs that show groundwater concentration in relation to the drinking water maximum contaminant levels (MCLs).
93	The resident gardener scenario is modeled for two different time periods. During Hanford operations through the end of active institutional controls (about 2146), the resident gardener is 20.6 km ESE from the 200Areas (off the Hanford Site). This gardener is exposed via atmospheric releases. Sometime following the end of active institutional controls a hypothetical residential gardener is assumed to move onto the Hanford Site just above the point where groundwater will have maximum concentration, 1 km down-gradient from the disposal burial grounds. This hypothetical gardener is exposed via irrigation of crops using contaminated well water. The pathways reported in the tables will depend on when a scenario is modeled with respect to the end of operations. Parameters are summarized in Appendix F, and results presented in Section 5 of this HSW. Section 5.11 indicates that details of the scenarios are found in Appendix F. The location of the resident gardener corresponds to the points of analysis used in this comparative assessment. The points of analysis are located along lines approximately 1 km (0.6 mi) down-gradient from aggregate HSW disposal facilities within the 200 East Area, 200 West Area, the Environmental Restoration Disposal Facility (ERDF) areas, and near the Columbia River located down-gradient from all disposal facility areas. All locations were selected based on simulated transport results of unit releases at selected HSW disposal facility locations. Points of analysis approximately 1 km down-gradient from the overall waste disposal facilities in each area are not meant to represent points of compliance but rather common locations to facilitate comparison of impacts from broad waste management selections and locations defined for each alternative.

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	The HSW EIS is based on a very large body of information and has been revised to address many comments regarding its scope, organization, data presentation, and content.
94	Atmospheric models limit the location of receptors to no closer than 100 m.
95	Appendix F has been modified to clarify the location of the resident gardener in the resident gardener scenario. (Please see Response 93, too.)
96	Footnote (b) in Tables 5.18 and 5.19 have been revised to specify Section F.1.7 in Appendix F.
97	Information has been added to indicate that these doses are below the 10-mrem/rear dose limit in the Washington State air regulations see Section 5.11.1.1.2. 1).
98	A single conversion factor(0.0006 latent cancer fatality [LCF]/person-rem) is used in this revised draft HSW EIS (see Section F.1.7).
99	Yes. The discussion refers to the 50-year committed effective dose equivalent (CEDE) that would be received by the individual after the initial intake of contamination.
100	The impacts to the groundwater at a point 1 km down-gradient of the disposal facilities are addressed in Section 5.3 and Appendix G. The impacts to a resident gardener from drinking water at this same point are addressed in Section 5.11 and Appendix F.
101	Table 5.25 provides the accident consequences for this beyond design basis earthquake. The analysis was performed as part of the referenced safety documentation (Vail 2001). Reference: Vail, T.S. 2001. Central Waste Complex Interim Safety Basis. HNF-SD-WM-ISB-007 Rev. 1-E. Fluor Hanford. January 2001.
102	Groundwater monitoring is conducted according to DOE Orders, the RCRA permit, and Tri-Party Agreement (TPA) requirements for the disposal areas, and will be expanded as necessary according to agreements between DOE and regulatory agencies to support future waste management operations. The cost associated with expansion of the groundwater-monitoring network would be largely independent of the alternatives considered in the HSW EIS, and would not be an important discriminator among the potential actions under consideration.
103	Please see Response 102.

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104	Groundwater monitoring at Hanford would be addressed under milestones established by the TPA independently of this EIS. The summary has been substantially revised in this HSW EIS. The details of the cumulative impacts are presented in Section 5.14 and Appendix L. The details of the groundwater impacts are presented in Section 5.3 and Appendix G. Models were used in our analysis to determine potential future groundwater impacts. The results of past groundwater monitoring alone will not predict future results. Please see Response 102, too.
105	Please see Response 102, too. Groundwater monitoring at Hanford would be addressed under milestones established by the TPA independently of this EIS. This EIS has been revised to include additional discussion on groundwater monitoring (Section 1.3.4.6).
106	Please see Responses 102-105, too. The overall cost estimates included in Section 3.5 for each alternative group include a separate line item for expected groundwater monitoring costs.
107	This sitewide simulation capability, known as SAC (System Assessment Capability), has been designed as a stochastic capability with an option to perform deterministic simulations. SAC is a computer software tool that enables the user to model the movement of contaminants from all waste sites at Hanford through the vadose zone, groundwater, and the Columbia River, and to estimate the impact of contaminants on human health, ecology, local cultures, and economy. The results of initial runs of the model, including some 1,500 of the 2,100 identified sites, are provided in Section 5.14 of this HSW EIS. The SAC model has been through some verification and validation analysis in a process called “history matching” and continues to be developed and tested.
108	The infiltration rate used in this HSW EIS approximates the long-term effect of cover use on waste release as it compares to a no cover scenario examined under the No Action Alternative. This revised draft HSW EIS provides additional information about the effect of the lower design infiltration rate of the modified RCRA Subtitle C cover system on waste release and considers the effect of cover degradation after the cover design life of 500 years. The models used for the LLBG disposal authorization did not assume the use of a cover. The no-cover infiltration rate used for the disposal authorization is the same as the one used in the no-cover No Action Alternative. This infiltration rate is also assumed for the period of time after the cover system is totally degraded under the action alternatives.

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	The points of analyses used in this comparative assessment were located along lines approximately 1 km (0.6 mi) down gradient from aggregate HSW disposal areas within the 200 East, 200 West, and the ERDF areas and near the Columbia River located down gradient from all disposal site areas (Figure G.1). All locations were selected based on simulated transport results of unit releases at selected HSW disposal site locations. Points of analysis approximately 1 km down gradient from the overall waste disposal facilities in each area are not meant to represent points of compliance but rather common locations to facilitate comparison of impacts from broad waste management selections and locations defined for each alternative HSW disposal sites are not contiguous units and therefore do not lend themselves to the "100-m compliance" estimates that are more reasonably done on a trench-by-trench basis. A more detailed, highly resolved analyses of local-scale facilities similar to analyses by Wood et al. (1995 and 1996) performed for post-1988 LLW and Mann et al. (2001) performed for the ILAW disposal facility would be required.
109	See Response 108 regarding consistency between EIS analysis and disposal authorization. Although the original performance assessments (PAs) (Wood et al. 1995, 1996) and subsequent PA summaries (Wood 2003) differ in scale, the HSW EIS analysis in fact cites Wood's work and uses many of the same key assumptions and modeling input parameters as they relate to • and soil-debris release models) • - Tc-99 – ~3240 Ci - I-129 – ~5 Ci • - Tc-99 – 1 x 10-11 cm^2/s - I-129 – 1 x 10-12 cm^2/s • - 64 mg/l (non-cemented wastes) - 0.23 mg/l (cemented wastes) The principal differences relate to • conventional trench on the dose impacts at 100 m. The analysis do a comparative

analysis of the aggregate dose impact of HSW EIS disposal sites using several alternatives of trench design, configuration, and location outside of the aggregate HSW EIS disposal site boundaries.

- sectional flow and transport at a trench scale to examine dose impacts at the 100-m scale. The HSW EIS uses a one-dimensional model of the vadose zone flow and transport to evaluate dose impacts outside of the HSW disposal areas. As a result, the latter approach does not examine local-scale spreading below a trench or disposal facility in the vadose zone.

- model than used in this analysis but both models used have similar hydraulic characteristics with updates sitewide groundwater model. The former analysis focuses on groundwater impacts at 100 m. The latter examines dose impacts at selected points of analysis down-gradient of aggregate HSW disposal areas.

In addition, the results for the ILAW disposal in the HSW EIS assessment relied on the ILAW PA as summarized by Mann et al. (2001).

Groundwater impacts from Low-Level Waste Management Areas (WMAs) 1, 2, 3, and 4 are discussed in Sections 2.8 and 2.9 in *Hanford Site Groundwater Monitoring for Fiscal Year 2001* (Hartman et al. 2002), which addresses the eight LLBGs in question. Based on results of fence line monitoring of the WMAs, the current interpretation is that there is no evidence that the specific WMAs in question have contributed to contaminants found in groundwater underlying these areas. See Section 5.3.3.1 of this HSW EIS.

110 Groundwater monitoring is conducted according to DOE Orders, the RCRA permit, and TPA requirements for the disposal areas, and will be expanded as necessary according to agreements between DOE and regulatory agencies to support future waste management operations.

The cost associated with expansion of the groundwater-monitoring network would be largely independent of the alternatives considered in the HSW EIS, and would not be an important discriminator among the potential actions under consideration.

111 For issues regarding consistency and other related questions, see also Responses 108-110.

Additional reasonable alternatives have been evaluated (see Section 3 for description of the action alternatives and Section 5 for the evaluation of the action alternatives). Additional information on mitigation measures has been provided in Section 5.18.

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	A discussion of the impacts for the disposal facilities evaluated in this HSW EIS relative to the cumulative impacts from all Hanford sources on groundwater has been included to the extent currently possible in Section 5.14 and Appendix L.
112	See Response 110 regarding groundwater monitoring requirements.
113	See Response 110.
114	Release models deal with how the contaminant gets out of the waste form and how fast. Source-release models were selected and used to approximate contaminant releases from the variety of LLW types considered in this analysis. The models considered included a soil-debris release model and a cement release model. The appropriate release models are described in detail in Appendix G.
115	The text has been revised. There are some instances where unsealed boreholes have provided a preferential path in the vicinity of liquid discharge facilities where saturated flow conditions exist. However, old unsealed boreholes are not expected to provide a pathway for contaminant migration under unsaturated flow conditions that would be expected to exist beneath solid waste disposal facilities.
116	This possibility is acknowledged in Section 4.5.1.4. Details regarding groundwater and surface water contaminants are documented in the Hanford Site Environmental Report 2001 (Poston et al. 2002).
117	Figure 4.16 has been revised to show the wells north and east of the Columbia River. Water levels are measured annually in a small set of wells north and east of the Columbia River. Every 5 years, water levels are measured in a larger set of wells. Thus, the contours are based on a combination of new data, historical data, and other factors such as topography. The networks are listed in Water-Level Monitoring Plan for the Hanford Groundwater Monitoring Project (PNNL-13021). Detailed discussion of the subsurface modeling and assumptions is provided in Section 5.3.2. Additional details regarding unconfined and confined aquifers are in the "Three-Dimensional Analysis of Future Groundwater Flow Conditions and Contaminant Plume Transport in the Hanford Site Unconfined Aquifer System: FY 1996 and 1997 Status Report" (Cole et al. 1997), Hanford Site Groundwater Monitoring for Fiscal Year 2000 (Hartman et al. 2000), Consultation Draft: Site Characterization Plan, Reference Repository Location, Hanford Site, Washington (DOE 1988), and Fresh-Water Potentiometric Map and Inferred Flow Direction of Groundwater Within the Mabton Interbed, Hanford Site, Washington State - January 1987 (Spane 1987).

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118	Additional detail, as supported by the data, has been added to the map.
119	All chromium is assumed to be hexavalent.
120	Additional information on this topic is as follows:

On the north side of the 200 East Area in the Gable Mountain-Gable Butte Gap is evidence appears of erosional channels that may allow communication between the unconfined and the uppermost basalt-confined aquifer (Graham et al. 1984; Jensen 1987). Evidence that hydraulic intercommunication occurs in the Gable Mountain-Gable Butte Gap area, where erosional windows have been identified, includes:

- chemical composition of groundwater indicating mixing
- presence in the uppermost confined aquifer of chemical species (i.e., nitrate ion) and radioisotopes (e.g., tritium and I-129) that are associated with near-surface waste water disposal
- similarity of hydraulic heads in the unconfined and uppermost confined aquifers in the vicinity of the Gable Mountain -Gable Butte Gap where the Elephant Mountain basalt is absent
- geologic information from borehole logs and geophysical information indicating an area where the Elephant Mountain basalt (confining layer) is absent, and within this area, locations where the underlying Rattlesnake Ridge interbed (water-bearing unit) and portions of the Pomona basalt (confining layer) are absent.

The area where the Elephant Mountain basalt is absent represents an area where increased aquifer intercommunication occurs, unimpeded by a confining layer. Another area where increased leakage may occur is in the vicinity of fault zones. Springs are present in the Rattlesnake Hills along the western boundary of the SGM domain that bring groundwater from the basalt-confined aquifer system to the surface. These springs are found where major thrust faults intersect the ground surface (DOE 1988). This provides evidence that the major thrust faults provide conduits for flow between aquifer systems. Anticlines may also be areas of increased communication because of fracturing. However, there is no direct evidence of intercommunication associated with anticlines other than in the area where erosional windows are also present.

Elsewhere on the Hanford Site, the Elephant Mountain basalt provides a significant impediment to vertical intercommunication between the aquifers owing to its thickness and low vertical hydraulic conductivity, which may range from 1E-8 m/d (3.3E-8 ft/d) (Graham et al. 1984) to 2.6E-4 m/d (8.5E-4 ft/d) (Nevulis et al. 1987). The effectiveness of the Elephant Mountain basalt as a confining layer and impediment to vertical

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	communication between the unconfined and uppermost confined aquifers is evidenced by the hydraulic head difference between the two aquifers and difference in groundwater chemistry. However, the rate of pervasive flow through the confining unit may still be significant because it takes place over a large area. These details do not change the assessment documented in the HSW EIS.
121	See Response 39. The occurrence of current managed and unplanned discharges are not expected after site closure and will not be important to the future potential release of contaminants for HSW disposal facilities. However, the text has been revised to add discussion of leaking raw water distribution lines.
122	See Response 120.
123	The LLBGs contain over 100 radioactive and non-radioactive constituents that potentially could impact groundwater. Screening of these constituents considered a number of aspects that included 1) their potential for dose or risk, 2) their decay or degradation rates, 3) their estimated inventories, and 4) their relative mobility in the subsurface system within a 10,000-year period of analysis. Establishing the relative mobility of each contaminant, they were grouped based on their mobility in the vadose zone and underlying unconfined aquifer. Contaminant groupings were used, rather than the individual mobility of each contaminant, primarily because of the uncertainty involved in determining the mobility of individual constituents. The waste constituents were grouped according to estimated or assumed Kd of each constituent. Based on an assumed infiltration rate and estimated levels of sorption and associated retardation, the estimated travel times of a number of constituents through the thick vadose zone to the unconfined aquifer beneath the LLBGs were calculated well beyond the 10,000-year analysis. Thus, these constituents were eliminated from further consideration. Of the remaining constituents, technetium-99, iodine-129, carbon-14, and uranium isotopes were considered of sufficient quantity and mobile enough to warrant detailed analysis of groundwater impacts. Selenium and chlorine, while mobile, were screened out because their total inventories were less than 0.01 Ci. Tritium was not evaluated because of its relatively short half-life. With some exceptions, estimated inventories of hazardous chemical constituents associated with LLW and MLLW disposed of after 1988 being considered under each alternative were expected to be found at trace levels. In particular, MLLW, which would be expected to contain the majority of hazardous chemical constituents, would undergo pre-disposal treatment to meet current HSSWAC and LDRs before being disposed of in permitted MLLW facilities. Consequently, groundwater quality impacts from these constituents would not be considered significant. Analysis of MLLW inventories for this assessment did identify two exceptions that included lead and mercury inventories

associated with the projected MLLW that were estimated at 336 kg (741 lb) and 2.5 kg (5.5 lb), respectively. Because of its affinity to be sorbed into Hanford Sediments, lead falls within the Kd Group 5 (Kd = 40 mL/g) and would not release to groundwater within the 10,000-year period of interest in this analysis. The inventory estimated for mercury is assumed to be small enough that it would not release to groundwater in substantial concentrations. Even the most conservative estimates of release would yield estimated groundwater concentrations at levels of two orders of magnitude below the current standard of 0.002 mg/L.

LLW disposed prior to September 1987 may contain significant hazardous chemical inventories but no specific requirements existed to account for or to report of the content of hazardous chemical constituents in this category of LLW. As a consequence, analysis of these constituents and estimated impacts based on the limited amount of information on estimated inventories and waste disposal location would be subject to large uncertainty. These facilities are part of LLW and MLLW facilities in LLW management areas 1, 2, 3, and 4 that are currently being monitored under RCRA Interim Status programs. Final evaluation of these facilities under RCRA and/or CERCLA guidelines will eventually require analysis of the impacts of the chemical components of these disposed inventories. Any analysis with information that is currently available would be at best speculative without more detailed inventory characterization information. These analysis would require a more thorough and detailed characterization of these wastes at some future date.

From a risk standpoint, an initial assessment using the newly developed Sysytem Assessment Capability (Bryce et al. 2002) concluded that the two most significant hazardous chemical constituents impacting groundwater now and in the future include chromium and carbon tetrachloride. The key sources of these constituents are from waste sources other than LLBGs. Neither of these constituents are suspected to be in LLBGs in large quantities.

Elevated levels of chromium are found in some of the operating areas within the 100 Areas, especially in 100-H area. With regard to carbon tetrachloride, DOE has been conducting an expedited response action to treat carbon tetrachloride contamination originating from liquid discharge sites in 200 West area that received large quantities of carbon tetrachloride. Since 1992, soil-vapor extraction has been used to remove carbon tetrachloride from the vadose zone as part of this expedited response action (Rohay 1999; Hartman et al. 2001) at the 200-ZP-2 Operable Unit, located in the 200 West Area, with the concurrence of the EPA and the Washington State Department of Ecology (Ecology). To track the effectiveness of the remediation effort, measurement of soil-vapor concentrations of chlorinated hydrocarbons are made at the inlet to the soil-vapor-extraction system and at individual off-line wells and probes through the soil-vapor extract sites. As of September 1999, 76,500 kg (168,683 lb) of carbon tetrachloride had been removed from the groundwater and vadose zone beneath the 200 West Area. The soil-vapor concentrations monitored deep within the vadose zone during the past few years

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	suggest that soil vapor-extraction remediation has removed much of the carbon tetrachloride from the vadose zone (Hartman et al. 2001).
124	The vadose zone was modeled as a stratified one-dimensional column because of the large number of solid waste disposal facilities that needed evaluation. A one-dimensional approach would be expected to yield results that would be more conservative than those produced with multi-dimensional approaches which consider lateral spreading of infiltration and contaminant transport. The effect of features suspected to be preferential pathways in the vadose zone, such as clastic dikes, has been the subject of past and ongoing modeling and field research studies. To date, there have no definitive research or field studies that have established these features as preferential pathways for flow and contaminant transport. There are some instances where unsealed boreholes have provided a preferential path in the vicinity of liquid discharge facilities where saturated flow conditions exist. However, old unsealed boreholes are not expected to provide a pathway for contaminant migration under unsaturated flow conditions that would be expected to exist beneath solid waste disposal facilities.
125	This information is provided as additional information to the reader about the average travel time from source zones to the underlying water. The overall analysis considers the total arrival of plume from a unit release by considering both the processes of advection and dispersion in vadose zone contaminant transport and not just the 50 percent arrival time of unit mass as implied by the comment.
126	The updated analysis provides additional information about the maximum and cumulative flux of key constituents from HSW disposal facilities to the Columbia River over the 10,000-yr period of analysis. A deterministic simulation using the SAC for technetium-99 and uranium is also provided to illustrate the impact of HSW disposal facilities relative to all other waste sources at the Hanford. The cumulative effect of all constituents considered is incorporated into the health impacts in Section 5.11 and Appendix F, which include figures that show dose over the 10,000-year time period of analysis.
127	Although, the 218-W-5 Expansion Area of 202 hectares was included as a contingency for unforeseen operational needs, its use is not foreseen at this point. However the ecological and cultural resource surveys were made on the area to ascertain, what, if any problems might occur if it were to be used. If we were to determine that use of this area was needed, additional evaluation would be done.

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128	Burial Ground 218-W-6 is part of the LLBG. It has never been used for waste disposal. In this revised draft HSW EIS there is one alternative in which it would be used (see Table 5.1).
129	The section referenced should have been Section 4.3.3 in the first draft HSW EIS. Section 4 and Appendix E have been modified in the revised draft HSW EIS.
130	Additional information on air quality modeling assumptions is provided in Appendix E of this revised HSW EIS.
131	Groundwater monitoring is conducted according to the RCRA permit and TPA requirements for the disposal areas, and will be expanded as necessary according to agreements between DOE and regulatory agencies to support future waste management operations. DOE routinely monitors external radiation levels and radionuclides in soil within the LLBGs. The data referred to in this HSW EIS were obtained from sampling in the trenches under the near field-monitoring program, which would detect other radionuclides. The Hanford environmental monitoring program is discussed in Section 4 of this HSW EIS.
132	The scope of this HSW EIS changed, but was not reduced as a result of the WM PEIS decisions. The HSW EIS is intended to evaluate the proposed actions and the consequences of various alternatives for consistent with the WM PEIS decisions at Hanford. A discussion of the WM PEIS and its relationship to the HSW EIS can be found in Section 1.5. The WM PEIS was a comprehensive evaluation of DOE nationwide waste management, and DOE determined there was sufficient information to make decisions regarding the sites that were suitable for long-term waste management missions. The WM PEIS was widely distributed, and documents cited in the WM PEIS were made available at numerous libraries and reading rooms in Washington and Oregon. Likewise, documents cited in this HSW EIS are available in public reading rooms listed in published notices and this document. *The Technical Report on Affected Environment for the Sites Considered n the DOE Waste Management Programmatic Environmental Impact Statement* (M/B SR-01) supports the WM PEIS; requests for copies of the document should be referred to Ms. Carol M. Borgstrom, Director, U.S. Department of Energy, Office of NEPA Policy and Assistance, EH-42, 100 Independence Avenue S.W., Washington D.C. 20585

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133	The RADTRAN model and codes have been well documented and verified and the details are included by reference in this HSW EIS. Documentation for the model is available in public reading rooms, as listed in public notices and in this EIS, and also is available upon request from the HSW EIS Document Manager. Inclusion of the air emission equations was considered to be more appropriate, because they are relatively straightforward.
134	The Prototype Barrier Treatability Test Report (DOE/RL-99-11, 200-BP-1, p. 4-1) indicates the following regarding a 0.15-m Asphaltic Concrete Coated with Fluid-Applied Asphalt: Essentially no drainage of water through the barrier silt-loam layers was observed under ambient and extreme (3 times normal precipitation including 1,000-year storms) precipitation conditions. The upper silt-loam layers and capillary barrier functioned to effectively store precipitation for subsequent removal by evapotranspiration, thereby preventing drainage. As expected, drainage did occur for the gravel and riprap side slopes, but was effectively diverted by the sloped asphalt layer. No change in water content or drainage was observed under the asphalt layer except at its very edge.
135	Available data on contaminant migration beneath existing trenches are limited. Models were used in our analysis to determine potential future groundwater impacts, because the results of past groundwater monitoring alone will not predict future results. Information on infiltration can be found in Section 5.3 and Appendix G.
136	The revised draft HHSW EIS analysis does evaluate the potential impacts of these earlier disposals by evaluating the effect of higher infiltration rates during operations. Results of analyses of earlier disposal facilities using release and vadose zone infiltration rates of 5 cm/yr, a rate reflective of managed bare surface soil conditions over the older disposal areas during the operations phase, estimated arrival of mobile contaminants (such as technetium-99 and iodine-129) at immediate down-gradient locations several hundred years before impacts of later disposals were realized. Peak concentrations of technetium-99 and iodine-129 were estimated to arrive at down-gradient locations between years 2050 and 2100 from 200 East Area locations and year 2300 and 2350 from 200 West Area locations. These results are considered to be a bounding analysis of impacts for the following reasons: • release and would be leached at rates reflective of this assumed high rate of infiltration. In reality, the actual leaching of wastes would be expected to be much lower. • be much higher than would be expected. This high rate of infiltration applied in the

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	vicinity of waste trenches would be expected to decline to rates more reflective of natural recharge as it encounters soils in their natural dry state below the waste trenches and migrates downward and laterally in the vadose zone in the surrounding areas. Descriptions of the underlying assumptions and resulting estimated impacts (that is, contaminant concentration levels and peak arrival times) from these analyses are provided in detail in Appendix G of this HSW EIS.
137	Retrieval of TRU waste from the LLBGs has already started. Shipment of TRU waste to WIPP has also started. Over one third of the TRU waste in the LLBGs is scheduled to be retrieved by 2006 (Hanford Performance Management Plan [HPMP] DOE 2002). Retrieval will be completed before the end of the operational period. No substantial releases are expected to occur before the waste is retrieved. Please see Response 136.
138	DOE would agree with the commenter that sorption characteristics of certain contaminants inferred from observations beneath tank farms can be variable when influenced by the combination of extreme chemical characteristics of tank wastes suspected to have leaked into the vadose zone and the characteristics of soils found in these areas. The leak volume, extreme pH conditions, and high salt content in wastes originating from tanks alleged to have leaked within the S-SX Tank Farm are suspected to be contributing factors in observed transport of certain constituents like cesium-137. With regard to cobalt, the commenter refers to a cobalt-60 plume that has been observed in the northern part of 200 East Area near the in the B-BX-BY waste management area. The occurrence of this plume is suspected to have originated from a liquid discharge facility that received wastes containing complexing agents (EDTA and/or ferro-ferric-cyanide). However, the combination of geochemical conditions and the occurrence of liquid discharges in both of these cases are unique to the waste site impacts in question and cannot be interpreted as being representative of expected geochemical or vadose zone flow and transport conditions that would be expected at solid waste burial grounds. LLBGs have only received what would be considered dry solid wastes with very low liquid contents. LLBGs have not received tank wastes nor any other types of liquid wastes with such extreme chemical characteristics as cited above. There is no evidence that the extreme geochemical conditions suspected to exist beneath some past tank leaks or near some liquid discharge sites persist beneath LLBGs. Distribution coefficients selected for use in the EIS for the constituents in question were based on geochemical conditions that would be reflective of solid waste disposal environment that can be characterized as having a low organic content, near neutral pH conditions, and low salt content.

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139	The basis for this statement is found in the main conclusions on groundwater impacts from Low-Level Waste Management Areas (WMAs) 1, 2, 3, and 4 in Sections 2.8 and 2.9 in *Hanford Site Groundwater Monitoring for Fiscal Year 2001* (Hartman et al. 2002), which addresses the eight LLBGs in question. Based on results of fence line monitoring of the WMAs, the current interpretation is that there is no evidence that the specific WMAs in question have contributed to contaminants found in groundwater underlying these areas. See Section 5.3.3.1 of this HSW EIS.
140	Solid waste placed into the LLBGs may have contained all of the contaminants identified in Section 5.3 of this HSW EIS. However, these constituents in groundwater are thought to only have originated from other past practice disposal actions outside of the LLBGs. Based on results of fence line monitoring of the WMAs, the current interpretation is that there is no evidence that the specific WMAs in question have contributed to contaminants found in groundwater underlying these areas. See Section 5.3.3.1 of this HSW EIS.
141	The summary has been substantially revised in response to comments and consistent with CEQ regulations (40 CFR 1502.12). The summary presents the major conclusions, areas of controversy, including issues raised by the public, and highlights of the analyses of the EIS. Subject matter references have been added where they are considered helpful to the general reader.
142	The summary has been extensively revised in the revised draft HSW EIS. Subject matter references have been added where they are considered helpful to the general reader.
143	A figure of the Hanford land-use plan was included in the main text of the HSW EIS and has been added to the summary.
144	The figure has been revised.
145	The text has been revised.
146	The text has been revised.
147	The HSW EIS uses both Safe Drinking Water Act maximum contaminant levels (MCLs) and DOE derived concentration guides (DCGs) for its evaluations. These respective values were developed to meet different public health protection functions. MCLS were developed for the protection of public drinking water supplies. DCGs were developed to demonstrate compliance with DOE's dose limits to the public. Additional information about the relationship between MCLs and DCGs is in Section 4.5.3.2 of the first draft HSW EIS.
148	Please see Response 123.

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149	The recommended changes have been incorporated with a slight modification to the second recommendation (for lines 27-28), which now states: "The EPA issued portion of the RCRA permit covered the Hazardous and Solid Waste Amendments, Section 3004(u), portion of the RCRA permit."
150	Updated costs are now included in Tables 3.6 and 3.7 in Section 3.5.
151	The vadose zone was modeled as a stratified one-dimensional column. In this analysis, it was not appropriate to represent the vadose zone as multidimensional because of the large number of LLBG sites modeled and the limited characterization of the vadose zone. Multidimensional modeling of the vadose zone has been performed for some waste sources and types (Mann et al. 1997; DOE/ORP 2001) but was not practical for this analysis for the large number of sites in question. A one-dimensional approach will yield more conservative results than a multi-dimensional approach.
152	This comment raises the same issue as Comment 100; please see Response 100.
153	This comment raises the same issue as Comment 101; please see Response 101.
154	This comment raises the same issue as Comment 117; please see Response 117.
155	Alternatives have been added. The Hanford Only waste volume has been added to address the "limited range of waste volumes."
156	The WM PEIS was a comprehensive evaluation of DOE nationwide waste management, and DOE determined there was sufficient information to make decisions regarding the sites that were suitable for long-term waste management missions. The WM PEIS was widely distributed, and documents cited in the WM PEIS were made available at numerous libraries and reading rooms in Washington and Oregon. Likewise, documents cited in this HSW EIS are available in public reading rooms listed in published notices and this document.
157	The scope of this HSW EIS has been revised to evaluate disposal of the immobilized low-activity waste generated by the Hanford Waste Treatment Plant. Other past buried wastes at Hanford are addressed as part of the cumulative impact analysis.
158	Disposal of waste in lined mega-trenches and use of the ERDF have been added as alternatives.
159	Wastes disposed of in the LLBGs since they opened in 1962 are evaluated in this HSW EIS. Wastes disposed of prior to 1962 are addressed as part of the cumulative impacts (see Sections 5.14 and Appendix L). Uncertainties about hazardous chemical constituents

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	in the previously disposed of waste are discussed in Section 3.0. This waste will ultimately go through a CERCLA or RCRA past practice remedial action process prior to closure of the LLBGs.
160	Evaluations of an Upper Bound TRU waste volume that includes TRU waste from offsite sources have been added.
161	This HSW EIS has been revised to include analysis of the disposal of the immobilized low-activity waste.
162	The "no import of out of state waste" scenario is evaluated as a result of evaluating the Hanford Only waste volume that has been added to this HSW EIS. We analyzed an Upper Bound volume that represents the maximum potential volume of waste that we reasonably expect could be brought to Hanford based on current conservative projections. We do not envision more than that amount being brought to Hanford in the future. Further environmental review would be required if that situation were to change. The waste volumes analyzed in the WM PEIS reflect the total volumes anticipated for disposal at Hanford Site and the Nevada Test Site. Neither site would be expected to receive the total the waste volume.
163/164	DOE acknowledges the State's comments concerning the potential acceptance of out-of-state waste, however DOE is not aware of an "inconsistency of a proposed action with any approved State or local plan and laws…" (40 CFR 1506.2[d]). Additional discussion of mitigation measures has been added to Section 5.18 in this HSW EIS.
165/166	This HSW EIS considers post-closure institutional controls (see Section 2.0) and costs (see Section 3.5) in its analysis beyond 2046. The radionuclides evaluated for groundwater transport are all generally very long-lived. With the exception of carbon-14 with a half-life of 5730 years, the half-lives are greater than 150,000 years. Thus, radioactive decay is negligible over the 10,000 years evaluation period. Ten half-lives is the general rule of thumb to calculate when radioactivity will approach zero. Figures showing key radionculide concentrations in groundwater over time for the 10,000-year period have been added to Section 5.3.

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167	Additional discussion of limitations, uncertainties, and assumptions has been provided throughout this revised HSW EIS.
168	The text has been revised throughout the EIS to provide additional information about characteristics of disposed waste (e.g., Section 2.0, Appendix F, etc.) and groundwater movement (e.g., Sections 4.0, 5.3, etc.) to support conclusions.
169	See responses to related comments on this subject (e.g., Response 63 to the comment regarding the Great Basin pocket mouse). Please also see Response 67, regarding the restoration of priority habitat.
170	A discussion of uncertainties has been added to Section 3.0 of this HSW EIS.
171	The evaluation of cumulative impacts has been substantially expanded (see Section 5.14 and Appendix L in Volumes I and II of this EIS).
172	For all waste alternatives analyzed in this HSW EIS, DOE has analyzed the movement of contaminants through groundwater to the Columbia River. In all cases, it found that the water quality of the Columbia River would be indistinguishable from the current river background levels. The concentrations of all constituent contaminants were well below benchmark maximum contaminant levels at a hypothetical well located near the Columbia River. The "analysis of impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason" (40 CFR 1502.22 [c]). The health impacts on downstream populations of groundwater reaching the Columbia River are discussed in Section 5.11 and Appendix F. The ecological impacts are discussed in Section 5.5 and Appendix I. The impacts of groundwater reaching the river are discussed in Section 5.3 and Appendix G. Additional discussion of uncertainties has been added to Section 3.0. Additional discussion of mitigation measures appears in Section 5.18. For purposes of conservatism the No Action Alternative assumes that caps would not be placed on the LLBGs, although DOE intends to cap them.
173	DOE is committed to cleanup of the Hanford Site through the TPA process. DOE does not believe that any offsite DOE wastes shipped to Hanford will be problematic, will complicate future remediations, or will divert resources or disposal capacity from other Hanford cleanup activities. The HSW EIS has been prepared in accordance with NEPA and the CEQ and DOE implementing regulations.

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174	In Section 6 of this HSW EIS, we identify the regulatory requirements followed in conducting operations at Hanford Site, including RCRA and State Dangerous Waste Regulations under the Hazardous Waste Management Act (Section 6.3). Section 6.19 addresses permits required to construct and operate treatment, storage, and disposal facilities related to the alternatives. Whenever we discuss facilities involved with treatment and storage and disposal of mixed waste, it is our intent to comply with all applicable requirements. Please see Response 81 regarding consultation requirements under the Endangered Species Act. For all waste alternatives analyzed in this HSW EIS, DOE has analyzed the movement of contaminants through groundwater to the Columbia River. In all cases, it found that the water quality of the Columbia River would be indistinguishable from the current river background levels. The concentrations of all constituent contaminants were well below benchmark maximum contaminant levels at a hypothetical well located near the Columbia River. The "analysis of impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason" (40 CFR 1502.22 [c]).
175	This HWS EIS includes a revised purpose and need statement that was developed in consultation with EPA and Ecology staff. The revised EIS also includes the analysis of additional alternatives and encompasses indirect effects of the alternatives. Additional discussions of the affected environment and the environmental impacts are included in Sections 4 and 5, respectively. Additional information on cumulative impacts is provided in Section 5.14 and Appendix L. Irreversible and irretrievable commitment of resources is discussed in Section 5.15. Impacts to long-term productivity are included in Section 5.16. DOE is not aware of an "inconsistency of a proposed action with any approved State or local plan and laws…" (40 CFR 1506.2[d]).
176	Please see Response 89 regarding the "Point of Compliance." Existing groundwater monitoring data do not indicate that releases from LLBGs have occurred. The analysis in this HSW EIS evaluates potential long-term groundwater impacts that might occur as a result of contaminant migration from the LLBGs. The text has been revised throughout this EIS to provide additional information about characteristics of disposed waste (e.g., Section 2.0, Appendix F, etc.) and groundwater movement (e.g., Sections 4.0, 5.3, etc.).

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177	Groundwater monitoring is conducted according to DOE Orders, the RCRA permit, and TPA requirements for the disposal areas, and will be expanded as needed according to agreements between DOE and regulatory agencies to support future waste management operations. The cost associated with expansion of the groundwater-monitoring network would be largely independent of the alternatives considered in this HSW EIS, and would not be an important discriminator among the potential actions under consideration.
178	Please see Responses 63-81, which address the issues summarized in this comment.
179	Please see Response 81.
180	Additional information has been included in the revised draft HSW EIS. See Section 4.0 for the species list that has been updated based on information from the State of Washington Department of Fish and Wildlife (WDFW). See Section 5.5 and Appendix I for discussion of ecological assessment/impact issues.
181	In the revised draft HSW EIS both Appendix F (Methods for Evaluating Impacts on Health and from Radionuclides and Chemicals) and Section 5.11 (Human Health and Safety Impacts) have been revised. The revisions address some of the concerns raised in the comment, including a substantially increased discussion of the concept of resident gardener. Please also see Response 93.
182	Please see Responses 85 and 86 regarding exposure scenarios, methodologies used for measuring health impacts, and concerns about sensitive populations. DOE is not aware of any incorrect assumptions "regarding the grouted vs. non-grouted Tc-99." The estimates of the Tc-99 inventories in un-grouted and grouted wastes is reflective of current estimates of solid wastes forecasts for the Hanford Site.
183	With respect to modeling input, the transport and deposition of material released to the atmosphere were evaluated using the atmospheric transport component of MEPAS Version 4.0. This component implements the models from earlier versions of MEPAS as described by Droppo and Buck (1996). The models are similar to and consistent with the models recommended by EPA in the Industrial Source Complex dispersion model (EPA 1995). Also, the atmospheric dispersion models in the MEPAS program provide nearly identical results to those generated using the EPA CAP88 program, as verified in a benchmarking study performed on the MEPAS, MMSOILS, and RESRAD computer programs (Mills et al. 1997). The RESRAD program employed the CAP88 program for atmospheric transport calculations (Cheng et al. 1995). Radiological dose conversion factors (DCFs) for intrusion, both well drilling and basement excavation scenarios, were taken from Low Level Burial Ground Performance

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	Assessments (e.g., WHC-SD-WM-TI-730, Performance Assessment for the Disposal of Low-Level Waste in the 200 East Area Burial Grounds). These DCFs were multiplied by maximum concentrations reported in waste streams. Maximum concentrations were derived from the Solid Waste Information Tracking System (SWITS) database. Section 5.11 and Appendix F have been substantially revised in this revised draft HSW EIS. Appendix F includes an example input and output from the MEPAS program (Droppo et al. 1996, EPA 1995, Mills et al. 1997, Cheng et al. 1995).
184	Hanford Site groundwater and vadose zone models have been incorporated into a sitewide model as part of the Groundwater/Vadose Zone Integration Project (DOE-RL 1999a, b; DOE-RL 2000). This sitewide simulation capability, known as SAC, has been designed as a stochastic capability with an option to perform deterministic simulations. It uses the groundwater model of the Hanford Site produced and supported by the Groundwater Monitoring Program. Currently, the groundwater portion of this model implements a three-dimensional conceptual model of the unconfined aquifer. This model has been inverse calibrated to Hanford Site water table measurements from 1944 to present, and uses knowledge of geohydrologic units and field measurements of hydraulic conductivity to condition the model calibration. Future revisions of the SAC will incorporate inverse calibrated alternate conceptual models of the aquifer. However, at present, uncertainty in groundwater contaminant migration and fate is represented by the uncertainty in contaminant mobility as reflected in uncertainties in linear sorption isotherm model parameters (for example, distribution coefficients for various contaminants). At the time of preparation the first draft HSW EIS cumulative impacts evaluation used the best information available from the Groundwater/Vadose Zone Integration Project (DOE-RL 1999a, b; DOE-RL 2000) and from the Hanford Site Composite Analysis (Kincaid et al. 1998). The HSW EIS provides a conservative analysis commensurate with the purpose of the document, which is to bound and compare the consequences of the alternatives. However, initial runs of the SAC code using information for about 1500 of the 2100 waste sites at Hanford are summarized in the Cumulative Impacts Section of this revised draft HSW EIS. A discussion of uncertainties has been added to Section 3.0 of this HSW EIS.
185	Cost estimates are for life-cycle activities and are in constant 2001 dollars. No costs are discounted. Details of the cost estimates are contained in Appendix C of the Technical Information Document (FH 2002). Costs include post-closure activities, such as monitoring during the institutional control period. Discussion of post-closure institutional controls (see Section 2.0) and costs (see Section 3.5) beyond 2046 has been added to this HSW EIS.
186	The discussion of transportation has been added in Section 2.2.4, Section 5.8, and

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Appendix H in Volumes I and II of this HSW EIS. The impacts of transporting waste to and from Hanford through the states of Oregon and Washington are included.

The use of rail is not part of the proposed action evaluated in this HSW EIS. Shipments of waste by rail may require constructing a spur from the existing rail lines, which, if proposed, would require additional NEPA review.

187 This HSW EIS has been substantially revised to address comments. Revisions include, but are not limited to, the addition of an evaluation of a Hanford Only waste volume to determine the impacts of not receiving offsite waste at Hanford, and the addition of cumulative impact information in Section 5.15 and Appendix L. An effort has been made to make reference documents more readily available.

188 Although the original performance assessments (PAs) (Wood et al. 1995, 1996) and subsequent PA summaries (Wood 2003) differ in scale, the HSW EIS analysis in fact cites Wood's work and uses many of the same key assumptions and modeling input parameters as they relate to

- and soil-debris release models)

- - Tc-99 – ~3240 Ci
  - I-129 – ~5 Ci

- - Tc-99 – 1 x 10-11 cm^2/s
  - I-129 – 1 x 10-12 cm^2/s

- - 64 mg/l (non-cemented wastes)
  - 0.23 mg/l (cemented wastes)

The principal differences relate to

- conventional trench on the dose impacts at 100 m. The analysis do a comparative analysis of the aggregate dose impact of HSW EIS disposal sites using several alternatives of trench design, configuration, and location outside of the aggregate HSW EIS disposal site boundaries.

- sectional flow and transport at a trench scale to examine dose impacts at the 100-m

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	scale. The HSW EIS uses a one-dimensional model of the vadose zone flow and transport to evaluate dose impacts outside of the HSW disposal areas. As a result, the latter approach does not examine local-scale spreading below a trench or disposal facility in the vadose zone. • model than used in this analysis but both models used have similar hydraulic characteristics with updates sitewide groundwater model. The former analysis focuses on groundwater impacts at 100 m. The latter examines dose impacts at selected points of analysis down-gradient of aggregate HSW disposal areas.
189	Please see Response 137.
190	The modeling did consider potential releases from the waste during the operational period. Appendix G has been revised to more clearly reflect this.
191	Please see Response 89 regarding the "Point of Compliance."
192/193	This HSW EIS includes summaries of the major components of the proposed action regulatory framework in Section 6. Detailed evaluation of other environmental regulatory programs and their requirements is more appropriately addressed in the documentation prepared for those programs. Information about CERCLA and RCRA corrective action is addressed in detail in environmental documentation that has been or will be prepared pursuant to the conduct of TPA activities.
194	This HSW EIS considers post-closure institutional controls (see Section 2.0) and costs (see Section 3.5) in its analysis beyond 2046.
195	The HSW EIS alternatives incorporate elements of some initiatives considered as part of the Performance Management Plan for the Accelerated Cleanup of the Hanford Site (HPMP, DOE/RL 2002). In some cases, detailed evaluation of proposals may be deferred to future NEPA documents because they are not ready for decision at this time.
196	The HSW EIS has been revised in response to general and specific comments. It is being circulated as a revised draft HSW EIS.
197	DOE notes the comment. The General Summary was most helpful to us in responding to the individual comments from Ecology.

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198	This HSW EIS has a revised purpose and need based on stakeholder comments. Other major revisions are the inclusion of the immobilized low-activity waste product from the waste treatment program, evaluations of new and reconfigured alternatives, and additional information about the alternatives and their impacts.
199	This HSW EIS has been revised to evaluate a Hanford Only waste volume so that the incremental impacts of the receipt of offsite waste can be ascertained. The major benefit of importing offsite wastes to Hanford is that it may enable other generator sites that do not have the capability to treat these wastes, to be cleaned up sooner, thereby freeing up resources that can then be employed to accelerate cleanup at Hanford.
200	Additional alternatives for the disposal of waste in deeper lined trenches have been added to this HSW EIS.
201	DOE has developed and analyzed the costs for each alternative considered in this HSW EIS. The scope of the cleanup activity is expected to include maintenance of the leachate collection system, monitoring of the cap performance, and maintenance of passive administrative controls (signs/postings). Groundwater monitoring is conducted according to DOE Orders, the RCRA permit, and TPA requirements for the disposal areas, and will be expanded as necessary according to agreements between DOE and regulatory agencies to support future waste management operations. DOE is committed to meeting environmental regulations and standards now and in the future. EPA and Ecology (under CERCLA and RCRA) require monitoring, reporting, and record keeping. Thus, there is a legal requirement that DOE, or its successor entities, meet these requirements.
202	Please see Response 156.
203	This HSW EIS has been revised to evaluate a Hanford Only waste volume.
204	Please see Response 158.
205	Please see Response 167.
206	Please see Response 168.
207	Please see Response 168.
208	Please see Response 171.

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209	See responses to related comments on this subject (e.g., Response 63 to the comment regarding the Great Basin pocket mouse). Please also see Response 67, regarding the restoration of priority habitat.
210	DOE recognizes that the cleanup of Hanford is a complex effort and is committed to it through the TPA process. As of February 1, 2003, DOE had met 99% of its TPA milestones on or ahead of schedule.
211	This HSW EIS has been expanded to address long-term stewardship. It expands upon the range and depth of alternatives analyzed, provides information describing accelerated cleanup plans and how they affect they affect the HSW EIS. The analysis also distinguishes between Hanford Only waste volumes and those projected to originate offsite. This HSW EIS considers post-closure institutional controls (see Section 2.0) and costs (see Section 3.5) in its analysis beyond 2046.
212	Please see Response 186.
213	The HSW EIS has been revised and reissued in response to comments on the first draft HSW EIS, and to incorporate new waste management activities and alternatives that have been under consideration since the first draft was issued. Revisions include the following: • a more comprehensive discussion of Hanford waste management activities as they relate to cleanup at Hanford and other DOE sites (see Summary and Section 1). • expanded analyses for groundwater quality (Section 5.3, Appendix G), transportation (Section 5.8, Appendix H), cumulative impacts (Section 5.14), and other consequences identified as being of particular concern in public comments. • evaluation of impacts from managing Hanford generated waste separately from offsite waste to facilitate understanding the incremental consequences from offsite waste that may be received for treatment or disposal at Hanford. • additional alternatives for disposal of LLW, MLLW, ILAW, and WTP melters in either independent or combined-use facilities. • evaluation of some new waste management activities proposed as a result of the C3T process and plans to accelerate Hanford cleanup, such as the Hanford Performance Management Plan issued in August 2002, to the extent possible. In some cases, those proposals would need to be evaluated during future NEPA reviews because they are not ripe for decision at this time.