Commentor No. 232 (cont'd): Susan Burke, INL Coordinator, Idaho Department of Environmental Quality

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 North Hilton • Boise, Idaho 83706 • (208) 373-0502

C.L. "Butch" Otter, Governor
Toni Hardesty, Director

March 19, 2010

Mary Beth Burandt
EIS Document Manager
DOE Office of River Protection
P.O. Box 1178
Richland, WA 99353

Re: Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington

Dear Ms. Burandt:

The Idaho Department of Environmental Quality (DEQ) has reviewed the above titled document (draft EIS) and has the following comments:

1. The Department of Energy's (DOE) preferred alternative to treat remote-handled special components (RH-SCs) from the Hanford Fast Flux Test Facility at the INL should meet the following conditions:

- No RH-SCs should be transported to the INL until a DOT approved transport cask exists and the actual dose of radiation to the public is calculated from such a cask. Section 4.2.12 of the draft EIS calculates a specific dose to a person stuck in traffic next to a shipment of RH-SCs but as noted elsewhere in the document, there are currently no DOT approved transports casks large enough to hold the components. Once a specific cask is identified for use, the transportation radiological exposure assessment should be recalculated. *232-1*
- No RH-SCs should be brought into Idaho until the DOE completes the Remote-Handled Waste Disposition Project DOE/EA-01386 (that was formerly, and still is in this EIS, referred to as the Remote Treatment Project) at the INL and it has a proven record of successfully treating remote-handled sodium contaminated components. *232-2*
- Any RH-SCs brought to the INL for treatment must comply with the INL Site Treatment Plan. The DOE must receive prior approval to bring the waste into Idaho and the waste must leave Idaho within one year. In addition, the RH-SCs must have a clear disposal path before they come to the INL. *232-3*
- The DOE must provide adequate funding for treatment of any RH-SCs before they are brought to the INL. *232-4*
- No RH-SCs may be brought to the INL that would adversely affect the DOE's schedule to remove waste from Idaho. *232-5*

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232-1 For analysis purposes in this *TC & WM EIS*, DOE uses a dose rate of 10 millirem per hour at 2 meters (6.6 feet) from the casks. This dose rate is the maximum value allowed for any certified cask containing radioactive materials (10 CFR 71.47 and 49 CFR 173.411). The impacts associated with transporting these RH-SCs are summarized in the Summary of this EIS, Section S.5.3, and Chapter 4, Section 4.2.12.

232-2 In its *Finding of No Significant Impact for the* "*Environmental Assessment for the Proposed Remote-Handled Waste Disposition Project*," issued February 18, 2009 (DOE 2009), DOE selected the Preferred Alternative of using INL's existing Idaho Nuclear Technology and Engineering Center (INTEC) facilities, with modification, for waste-processing activities. This *Final TC & WM EIS* was revised to include the analyses from this environmental assessment by reference. As described in Chapter 2, Section 2.5.3, of this *Final TC & WM EIS*, the Hanford RH-SCs would be stored in the Hanford 400 Area pending shipment to INL for processing.

232-3 In Chapter 8, Section 8.1.4, of this *TC & WM EIS*, there is a discussion regarding the potential applicability of the Spent Fuel Settlement Agreement (also known as the Governor's Agreement), dated October 16, 1995, and the stipulations in the agreement concerning receipt of waste for treatment at INL.

232-4 DOE will seek funding to carry out any actions that are part of the decisions made in the ROD for this *TC & WM EIS*, including treatment of the RH-SCs.

232-5 As described on page 2–110 of the *Draft TC & WM EIS*, the RH-SCs would be stored in the Hanford 400 Area pending shipment to INL for treatment, in coordination with INL's waste treatment schedule.

Commentor No. 232 (cont'd): Susan Burke, INL Coordinator, Idaho Department of Environmental Quality

Mary Beth Burandt
March 19, 2010
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2. The draft EIS is premised on the Remote Treatment Project (RTP) being built at the INL's Materials and Fuels Complex (MFC). The Remote-Handled Waste Disposition Project has already been built and recently started operation at the Idaho Nuclear Technology and Engineering Center at the INL. The final EIS should address this change. In particular, the draft EIS states that the RTP would be located adjacent to the Hot Fuel Examination Facility (HFEF) at the MFC which "would result in significant cost savings from the sharing of important, high cost equipment and systems. Annexing the facility to the HFEF also allows sharing of the HFEF's synergistic workforce." As the RTP will not be at the MFC, these statements need to be reconsidered in the final EIS. *232-6*

3. The Idaho DEQ agrees with the DOE's preferred alternative to treat bulk sodium at Hanford rather than at the INL. Treatment of the waste at Hanford eliminates transportation risks associated with moving the bulk sodium between Washington and Idaho. *232-7*

Thank you for the opportunity to comment on the draft EIS.

Sincerely,

Susan Burke
INL Coordinator

cc: Toni Hardesty, Director, Idaho DEQ
Richard Provencher, Deputy Manager, DOE-ID

232-6 The *Finding of No Significant Impact for the* "*Environmental Assessment for the Proposed Remote-Handled Waste Disposition Project*," issued February 18, 2009 (DOE 2009), was acknowledged in the *Draft TC & WM EIS* in Chapter 1, Section 1.8; however, the analysis presented in the draft EIS was not consistent with the information in the EA. DOE acknowledges that the treatment facility for FFTF's RH-SCs, if taken to Idaho, would likely be conducted at INTEC, consistent with the final environmental assessment and subsequent decision. This final EIS was corrected by deleting reference to a proposed Idaho Remote Treatment Project adjacent to the Hot Fuel Examination Facility within the Materials and Fuels Complex. In addition, the analysis in this *Final TC & WM EIS* has been updated to reflect this change through the addition of INTEC into the affected environment discussion in Chapter 3, Section 3.3, and the incorporation of construction data from INTEC into Chapter 4, Section 4.2, of this *TC & WM EIS*. Operations data would remain similar to those used for treating the RH-SCs at the Materials and Fuels Complex.

232-7 Comment noted.

Commentor No. 233: Forest Shomer

From: Forest Shomer [ziraat@olympus.net]
Sent: Friday, March 19, 2010 4:29 PM
To: tc&wmeis@saic.com
Subject: comments

I live 200 miles 'upwind' of Hanford, but downstream as well.

Leaked radioactive fluids that make their way to the Columbia River will eventually reach the mouth of the river, be carried northward on the Kuroshio Current that sweeps our coast, and that radioactivity that should have been contained will spread to every mile of shoreline of my home, the Olympic Peninsula. *233-1*

That's completely wrong! It bequeaths vast potential for mutagenic pollution to all future generations, the entire food chain from tiny marine organisms to fish, shellfish, marine mammals and ultimately, the human dinner table. How totally irresponsible.

Don't let this happen. Get the cleanup process accelerated and don't bring more waste to Washington. The public voted on this and 70% had no difficulty discerning the miscarriage of environmental responsibility that is afoot. *233-2*

There is only one chance to prevent this utter catastrophe to the local biosphere--and that is to act now to stop the ruination of the Pacific Northwest originating at Hanford.

Forest Shomer
PO Box 639
Port Townsend WA 98368
--

Forest Shomer
Port Townsend, WA, USA
inspass@whidbey.net

233-1 DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities downriver from Hanford. One of the purposes of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks. The TPA, a legal agreement between DOE, Ecology, and EPA, identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

233-2 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 234: John Felton

From: John Felton [jsf@pacifier.com]
Sent: Friday, March 19, 2010 4:18 PM
To: tc&wmeis@saic.com
Subject: Hanford EIS public comment on storage tanks

I am writing to comment on the storage tanks at Hanford.

Overall, the existing tanks must be remediated right away. The longer it takes, the greater the risk to the water table and to the Columbia River. The tanks are failing, and the longer this draws out, the more it will continue to cost and the more the region will be ruined for years to come. *234-1*

Hanford is a critically ill patient, and all the agencies involved (from local to state to federal) are the medical staff trying to decide what to do and how best to do it. The longer everyone tries to debate and negotiate their position, the less chance the patient has to live. How would you react if a loved one of yours was lying in a hospital bed urgently needing care and the entire staff was debating how to take care of him/her? The longer the delay in treating the patient, the lesser the chance he/she has to live. Would you simply sit in the waiting room for the staff to debate what to do? Or, would you get up in their face and demand immediate action? Do you want your loved one to die? This is exactly what is happening with Hanford. Do you want it to die? The leaking tanks are slowly seeping their contents toward the ground water. When it gets there, it will never be drinkable or usable again. It is important to act now to prevent further damage from occurring. *234-2*

As far as the suggestions on Ecology's web site, here are a few of my comments:

Single Shell Tank Retrieval Options - Clean up and remove 100% of the waste, not 99% of the waste. The State needs to comply and get this done. Good enough never is. *234-3*

Supplemental Treatment of Low level Waste – Additional plants should be built to ensure all waste is properly treated. On this there should be no compromise. Vitrification turns unstable, liquid materials into more stable solid waste. Build as many vitrification plants as are needed, and treat the waste! *234-4*

Transuranic Waste – Do not move any of it until a finalized plan is in place. We want it out of Washington, but not at the risk of having it come back if an agreement has not been made. Under no circumstances should any permits be modified unless all are in agreement on what the plan for transport and disposal is. *234-5*

Iodine 129 Issue - Make DOE prove that all the Iodine 129 will be captured if the waste is vitrified. If this cannot be proven, then do what is necessary to remove it properly and thoroughly. *234-6*

234-1 As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities in the region. One of the purposes of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms by landfill closure, selective clean closure, or clean closure. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks, including remediation of the contamination in the vadose zone.

234-2 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

234-3 A goal of 100 percent retrieval of the waste removed from the tanks is not practical. Some residual waste would be left in the tanks. This can be likened to drinking a milkshake through a straw—even though almost all of the milkshake is removed through the straw, some small amount, residual, would be left on the inside of the straw. On a much bigger scale, pumps are used to remove the waste from the tanks, but some residual would be left behind. DOE's preference relative to waste removal includes those alternatives that remove at least 99 percent of the waste from the tanks (see Chapter 2, Section 2.12). Among these are Tank Closure Alternatives 4, 6A, and 6B, which call for the removal of 99.9 percent of the waste. As a point of clarification, it is DOE's responsibility, not the State of Washington's, to take the actions proposed in this *TC & WM EIS*.

234-4 The analyses in this *TC & WM EIS*, along with all the public and stakeholder input DOE has received, will help inform DOE's decisions, including those related to supplemental treatment facilities and technologies.

234-5 As stated in the Alternatives in Chapter 2, Section 2.12, of this *Final TC & WM EIS,* DOE prefers to consider the option to retrieve, treat, and package waste that may be properly and legally designated as mixed TRU waste from specific tanks for disposal at WIPP, as analyzed in Tank Closure Alternatives 3, 4, and 5. DOE would not, however, generate a waste stream without a clear

Commentor No. 234 (cont'd): John Felton

Interim Storage Canisters/Facilities – Do it. All waste must be safely and securely contained until it can be shipped to its permanent storage location. Leave nothing to chance or uncertainty when dealing with any level of radioactive waste. *234-7*

Quick and effective action is what is needed at Hanford. Anything less and the patient will die. *234-1 cont'd*

John Felton

P.O. Box 406
Vancouver, Washington 98666

path to disposal. Initiating retrieval of tank waste identified as mixed TRU waste would be contingent on DOE's obtaining the applicable disposal and other necessary permits, and ensuring that the WIPP Waste Acceptance Criteria and all other applicable regulatory requirements have been met. Retrieval of tank waste identified as mixed TRU waste would commence only after DOE had issued a *Federal Register* notice of its preferred alternative and a ROD.

234-6 As discussed in Chapter 7, Section 7.1.6, secondary-waste-form performance is a particular area of focus for DOE, especially with regard to partitioning and capture of iodine-129, a conservative tracer, in secondary-waste forms. Additional sensitivity analyses have been added to this final EIS that evaluate the changes in potential impacts that might result if partitioning or recycling of some contaminants, e.g., iodine-129, could be increased into primary-waste forms and/or if secondary-waste-form performance could be improved. The discussion found in Chapter 7, Section 7.5, was added to summarize these results. The results of these analyses will aid DOE in formulating appropriate performance targets for secondary-waste forms. As referenced in the discussion in Section 7.5.2.8 and further discussed in Appendix E, Section E.1.2.4.5.6, DOE has drafted a roadmap that implements a strategy for development of better-performing secondary-waste forms, including iodine-bearing waste.

234-7 An element of all Tank Closure action alternatives is the storage of IHLW in the Canister Storage Building, as well as additional Interim Storage Modules, as required, until disposition decisions are made and implemented (see Chapter 2, Section 2.5.2).

Commentor No. 235: Dennis O. Donnelly

From: Dennis Donnelly [dennidonn@ida.net]
Sent: Friday, March 19, 2010 5:53 PM
To: tc&wmeis@saic.com
Subject: TC & WM EIS comment letter

Dennis O. Donnelly
56 Tulane Ave.
Pocatello ID 83201

March 19, 2010

Gentlemen,

Please accept this letter as my commentary on the currently proposed Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.

Section 5.3.2 of this TC & WM EIS, on page 5-1078, discusses human health impacts in terms of predicted cancer incidence and toxic effects from the modeled future transport of radionuclides and toxic chemicals in the environment resulting from this action.

I question the legitimacy of this study based on its inadequate modeling and assessment of health effects, for the following reasons. *235-1*

1. Discussion of health effects omits teratogenic effects of radioactive effluent, which I understand are far more limiting than cancer incidence for population exposure, and should therefore be considered.
2. The modeled transport maps all show as smooth plumes in the groundwater, that all end at the edge of the Columbia river. This document ignores piping and channeling of groundwater flow in the lava rock subsurface which can result in much faster flow than smooth 'best-case' plumes used in the modeling. The piping and channeling may also convey the groundwater under the river itself to feed the center-pivot agricultural watering systems to the east of the river that show clearly in the dispersion maps. And the Columbia river is a high speed pathway to fisheries and irrigation downstream. All these pathways need to be analyzed, not just for human impact but for environmental impact, by the NEPA law. *235-2*
3. No model maps consider future agricultural or domestic activity on the Hanford reach itself, which will certainly be redeveloped as future needs dictate. *235-3*
4. Modeling time-span is arbitrarily limited such that uranium-238 and total uranium are just beginning to appear in the offsite environment at the end of the modeling time-span. I didn't even see modeling of transuranic elements, which are all of major environmental (and carcinogenic) concern. *235-4*

235-1 Current standard practices by U.S. agencies were followed to calculate human health impacts. Teratogenic effects are recognized as effects of radionuclides, but these effects are not part of the analysis. The purpose of evaluating human health impacts was to inform a relevant comparison of alternatives; the set of representative scenarios selected was deemed adequate in that context.

235-2 DOE disagrees with the commentor's assertion that this *TC & WM EIS* ignores preferential underground pathways, or that the modeling used a smooth "best-case" approach. The discussions in Appendix L, Section L.4.3.2.3, regarding the zonation and parameterization of the flow model explicitly mention that a high-conductivity channel in the unconfined aquifer is necessary to achieve a good calibration and is a necessary feature of the model framework.

DOE also disagrees with the assertion that the unconfined aquifer can feed center-pivot agricultural watering systems to the east of the Columbia River. The supporting characterization data are in conflict with this supposition.

DOE agrees with the commentor's general observation that heterogeneities in the hydraulic conductivity zonation can influence projections of risk through the groundwater pathway.

235-3 DOE used the NEPA process as documented in the *Final Hanford Comprehensive Land-Use Plan EIS* (DOE 1999) to examine reasonable future land use alternatives at Hanford and conducted this process with nine cooperating agencies and consulting tribal governments. Based on this analysis, DOE adopted the Final Hanford Comprehensive Land-Use Plan designations, policies and implementing procedures in a ROD (64 FR 61615). The *Final Hanford Comprehensive Land-Use Plan EIS* must be reviewed periodically to ensure it remains current; the first such review was documented in the *Supplement Analysis, Hanford Comprehensive Land-Use Plan EIS* (DOE 2008c). An amended ROD was issued in 2008 to confirm the continued viability and use of the Hanford Comprehensive Land-Use Plan (73 FR 55824, September 26, 2008).

In June 2000, a Presidential Proclamation was issued that permanently withdrew from the public domain most of the Hanford lands designated as "Preservation" by the Hanford Comprehensive Land-Use Plan and established the Hanford Reach National Monument (65 FR 37253, Proclamation 7319 of June 9, 2000). The monument is superimposed over approximately 195,000 acres (304 square miles) of the 586-square-mile Hanford Site. The majority of monument land is managed by the U.S. Fish and Wildlife Service (USFWS) through a permit and MOU granted by DOE (DOE 2001); DOE manages some monument lands

Commentor No. 235 (cont'd): Dennis O. Donnelly

Because this study appears to be a self-serving study by the United States Department of Energy and the atomic industry generally, I call for much-needed formal review of this material by disinterested agencies such as the US Environmental Protection Agency, the United States Geologic Service, the United States Fish and Wildlife Service, and the International Atomic Energy Agency. *235-5*

Dennis O. Donnelly

that are undergoing or supporting environmental cleanup. However, monument lands continue to be under the custody and accountability of DOE for the Federal Government.

While cleanup and remediation work is ongoing, an agricultural or domestic land use is not considered. However, Appendix Q, Section Q.2.2, of this *TC & WM EIS* does describe a suite of scenarios, including agricultural and domestic use, that could occur after the site is cleaned up, under the assumption that there is a loss of administrative control. In addition, the sensitivity analysis discussed in Appendix V provides information on the potential impacts of a rising water table resulting from additional recharge to the unconfined aquifer.

235-4 The modeling time span of 10,000 years was based on precedent and NEPA requirements that the flow field must provide a basis for an unbiased evaluation of the *TC & WM EIS* alternatives for the 10,000-year period of analysis. Many of the results from the groundwater transport runs showed increases in uranium-238 concentrations at the end of 10,000 years. Therefore, uranium-238 from the SX tank farm was analyzed as a test case for 30,000 years to determine if peak concentrations occurred beyond the standard analysis period. The results of this long-term analysis are discussed in detail in Appendix O, Section O.6.4, of this EIS. The contaminants selected for the groundwater transport analysis are listed in Table O–2, which includes TRU elements. The contaminant transport results indicate that these elements are not the most important indicators of long-term groundwater impacts, due to their limited mobility.

235-5 Hanford operations are affected and, in many cases, regulated by numerous Federal legal requirements addressing environmental compliance, remediation, planning, preservation, and waste management. Major Federal laws, regulations, and Executive orders that may apply to the alternatives analyzed in this *TC & WM EIS* are presented in Chapter 8. Certain laws, such as the Endangered Species Act, U.S. Fish and Wildlife Coordination Act, and National Historic Preservation Act, require DOE to consult and coordinate with other Federal agencies, state and local agencies, and federally recognized American Indian tribal governments. Chapter 8 and Appendix C of this *TC & WM EIS* identify the process for such interaction, as well as the primary occasions for DOE interaction with these governmental entities regarding the *TC & WM EIS* preparation process.

Commentor No. 236: Keats Landis

From: EdwardPaulLandis@aol.com
Sent: Friday, March 19, 2010 6:20 PM
To: tc&wmeis@saic.com
Subject: public comment on this EIS report

Please continue clean up all around the tanks and deep under the ground of these tanks. Please make certain the clean up extends all the way to the Columbia River. Clean out the tanks thoroughly as opposed to leaving the highly contaminated materials inside the tank capped. No cap can protect the grounds and surrounding areas due to the make up of our geological area. *236-1*

Do not accept other nuclear or radioactive waste from other areas in the states. We are still intensely trying to figure out our present cleanup and contamination sites. The transportation alone to Hanford would be fraught with time consuming research and needless economic spending when the constant real problem should be working on the intense clean up of each site. *236-2*

The FFTF reactor should be totally dissembled and disposed in a researched area where the geological layers would be inherently safe in order to disallow any leakage to other areas. *236-3*

It is my strong belief that the employees and management working on these Hanford sites should become a part of a new team to inform any new building of reactors for any new energy technologies in any part of the country. We cannot build new reactors without understanding the how and why of nuclear waste. Why use nuclear reactors as new energy sources if the contamination of the waste in the end presents it own sets of problems? *236-4*

Keats Landis - 3/19/2010
Yarrow Point, WA 98004

236-1 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. This closure includes the tank system, along with the vadose zone as impacted by the tank farms (i.e., past leaks). However, as discussed in the Summary, Section S.1.3.2, and Chapter 1, Section 1.4.2, of this *TC & WM EIS*, DOE will not make decisions on groundwater remediation, including the remediation of groundwater contamination resulting from non-tank-farm areas in the 200 Areas, because that is being addressed under the CERCLA (42 U.S.C. 9601 et seq.) process. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

236-2 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

In general, the scope of this *TC & WM EIS* does not include groundwater remediation activity as part of the proposed actions evaluated. DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

236-3 Regarding the complete dismantlement of FFTF (essentially FFTF Decommissioning Alternative 3), although nearly all elements of FFTF and the two adjacent support facilities would be removed under this alternative, the lower portion of the RCB concrete shell would remain. This would be backfilled with either soil or grout to minimize void space. The area would be regraded and revegetated, with no need for a barrier. DOE's preference is for FFTF Decommissioning Alternative 2, under which some below-grade structures

would remain; however, these would be grouted in place to immobilize the hazardous constituents. The filled area would then be covered with a modified RCRA Subtitle C barrier to further isolate the entombed structures and prevent infiltration of water. These actions (grouting and barrier placement) would minimize the migration of any contaminants to the environment.

236-4 Nuclear energy production and its resulting waste are not within the scope of this *TC & WM EIS*. Regarding the safe disposal of waste generated from nuclear energy production, the current Administration has established a Blue Ribbon Commission on America's Nuclear Future that has issued a report and recommendations for a path forward for managing the country's HLW. DOE's decisions regarding management of Hanford waste will be consistent with Administration policies. For a more comprehensive discussion of this topic, see Section 2.10 of this CRD.

Commentor No. 237: Richard Till, Land Use Law Clerk, Friends of the Columbia Gorge

From: Rick Till [Rick@gorgefriends.org]
Sent: Friday, March 19, 2010 6:47 PM
To: tc&wmeis@saic.com
Subject: Hanford Tank Closure and Waste Management DEIS
Attachments: Hanford Tank Closure and Waste Management DEIS.pdf

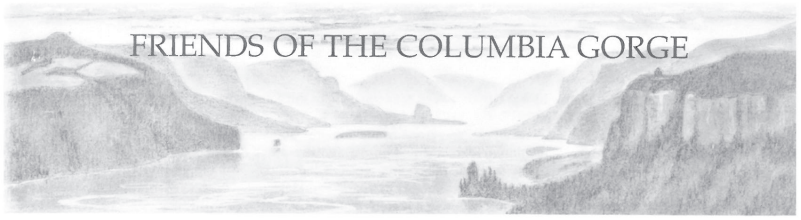
Ms. Burandt, please find the attached comment on the Hanford Tank Closure and Waste Management DEIS.

Thanks,

Richard Till, Land Use Law Cler
Friends of the Columbia Gorge
rick@gorgefriends.org
522 SW 5th Ave., Suite 720
Portland, Oregon 97204-2100
(xxx) xxx-xxxx x xxx
Fax: (xxx) xxx-xxxx

Response side of this page intentionally left blank.

Commentor No. 237 (cont'd): Richard Till, Land Use Law Clerk, Friends of the Columbia Gorge



SUBMITTED VIA E-MAIL

Mary Beth Burandt, Document Manager
U.S. Department of Energy
Office of River Protection
P.O. Box 1178
Richland, WA 99352
Email: TC&WMEIS@saic.com

Re: U.S. Department of Energy's Draft Tank Closure and Waste Management Environmental Impact Statement.

To Whom It May Concern:

Friends of the Columbia Gorge has reviewed and would like to comment on the above-referenced Draft Environmental Impact Statement (DEIS). Friends is a non-profit organization with approximately 5,000 members dedicated to protecting and enhancing the resources of the Columbia River Gorge. Our membership includes hundreds of citizens who reside within or near the Columbia River Gorge and use the Columbia River and the Columbia River Gorge for recreational activities.

The National Environmental Policy Act (NEPA), 42 USC § 4321 *et seq.*, requires that the Department of Energy take a hard look at the potential direct, indirect, and cumulative social, economic, physical, and biological effects of the proposed action and reasonable alternatives. The Department of Energy must reasonably and objectively define the purpose and need of the proposed action so it can "rigorously explore and objectively evaluate all reasonable alternatives," 40 C.F.R. § 1502.14(a).

1. USDOE should remove all radioactive tank wastes at Hanford and clean up 99.9% of existing soil and groundwater contamination at the site.

237-1

An unknown number of single-shell tanks at Hanford are currently leaking into the surrounding soil. As a result, contaminants are currently entering the Columbia River at levels greater than 1,500 times the drinking water standard. Unless the contamination is cleaned up promptly and thoroughly, the amount and toxicity of radioactive materials entering the Columbia River will continue to increase.

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237-1 As discussed in Chapter 5 of this *TC & WM EIS*, DOE acknowledges that benchmark standards could be exceeded in groundwater at the Core Zone Boundary and/or at the Columbia River nearshore at various dates. The term "benchmark standards" as used in this *TC & WM EIS* represents dose or concentration levels that correspond to established human health effects. For groundwater, the benchmark is the MCL, provided that an MCL is available. Ecology may impose additional mitigation measures through future permitting processes or remedial actions under the scope of the TPA.

In reference to the commentor's statement that "contaminants are currently entering the Columbia River at levels greater than 1,500 times the drinking water standard," the location along the Columbia River, the timing, and the constituent to which the commentor refers are not clear. Additional information has been added to this *Final TC & WM EIS* to further describe the groundwater conditions at Hanford. Specifically, the commentor is referred to figures in Appendix U depicting maximum concentrations of several contaminants at various Columbia River nearshore locations, as follows: Figures U–18 and U–19 show chromium concentrations of about 61 and 380 micrograms per liter, respectively (relative to the benchmark standard of 100 micrograms per liter), and most concentrations are below 20 micrograms per liter; Figure U–20 shows a chromium concentration of about 5 micrograms per liter; Figures U–21 through U–23 show similar nitrate concentrations; Figures U–25 and U–26 show strontium concentrations near 320 picocuries per liter (relative to the benchmark standard of 8 picocuries per liter); Figure U–28 shows tritium concentrations of about 14,000 picocuries per liter (relative to the benchmark standard of 20,000 picocuries per liter); and Figure U–34 shows uranium isotope concentrations near 145 picocuries per liter (relative to the benchmark standard of 15 picocuries per liter). DOE believes it is more accurate to say that there are several areas of nearshore groundwater contamination that exceed benchmark standards by one to two orders of magnitude (as opposed to more than three) but that these areas are narrowly confined; that groundwater contamination in the vicinity of operable units is more typically near or below the benchmark; and that groundwater contamination away from operable units (i.e., the bulk of the shoreline) is more than several orders of magnitude below benchmarks.

DOE agrees that retrieval of the waste from the tank farms has a positive effect of reducing potential human health impacts. As shown in Figure S–14 of the Summary and Chapter 2, Figure 2–125, for retrieval of 99.9 percent of the waste, the peak lifetime radiological risk for the drinking-water well user is about

Commentor No. 237 (cont'd): Richard Till, Land Use Law Clerk, Friends of the Columbia Gorge

Friends of the Columbia Gorge is very concerned about the dangers of continuing contamination of the Columbia River. Friends recommends that the USDOE remove *all* tanks at the Hanford site and remediate all soil and groundwater contamination at the site. Allowing even a small amount of contamination to remain would pose a significant risk of cancer, even from drinking well water miles away from the radioactive tanks. Although USDOE proposes to remove 99% of the waste, increasing that number to 99.9% would decrease the cancer risk at least fivefold. Friends recommends adopting a preferred alternative in the final EIS that removes 99.9% of the radioactive wastes.

237-1 cont'd

2. USDOE has failed to review the cumulative impacts of shipping new radioactive wastes to Hanford.

Although the draft EIS proposes to ship three million cubic feet of new radioactive and "mixed" radioactive waste to Hanford from off-site locations around the country, the EIS fails to include a route-specific analysis of the cumulative environmental impacts of the proposal. This is unacceptable. Shipping new waste to Hanford poses a serious threat to human health and safety. The specific route(s) chosen for shipping directly influences the types and levels of potential impacts, and must be evaluated as a cumulative impact of the proposal to ship new wastes. The final EIS must include a route-specific analysis of the proposal to ship new radioactive wastes to Hanford. Deferring such an analysis to a later date, as USDOE proposes to do, would unlawfully piecemeal the required environmental analysis.

The required route-specific analysis must evaluate and compare the risks to human health and natural resources posed by the possible routes. In a previous, non-route-specific EIS, USDOE estimated that trucking radioactive wastes to Hanford could cause approximately 816 fatal cancers in adult humans. This statistic is incomplete and inadequate because it neglects to include children, who are three to ten times more likely to get cancer from exposure to radioactive waste than adults. The final EIS must evaluate the cancer risks to all humans, and should compare such risks based on the possible routes.

237-2

The required route-specific analysis should also evaluate the safety and human health risk posed by possible terrorist attack, accident, or other catastrophic event. It is not uncommon for trucks shipping materials through the Columbia River Gorge to overturn and leak hazardous materials into Gorge waterways. For instance, just two months ago the Oregon Department of Environmental Quality announced an $8,000 fine imposed against a company whose tanker truck overturned last summer, spilling asphalt oil into McCord Creek, a tributary of the Columbia River in the Columbia River Gorge. The asphalt oil coated the creek for approximately 100 feet; slicked its banks; and covered vegetation, soil, and rocks. *See* Justin Carinci, *$8K fine issued for asphalt oil spill*, Daily Journal of Commerce (January 11, 2010), http://djcoregon.com/news/2010/01/11/8k-fine-issued-for-asphalt-oil-spill-bldgc/. While the adverse environmental effects of that asphalt oil spill were significant, a similar event involving radioactive wastes would be absolutely devastating to the resources of the Columbia River Gorge. This is one of the many reasons why Friends of the Columbia Gorge strongly opposes the shipping of radioactive materials through the Columbia River Gorge National Scenic Area.

/////

100-fold lower than no waste retrieval. It is also about 10 times lower than the 90 percent retrieval of tank waste and several-fold lower than the 99 percent retrieval of tank waste.

237-2 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

DOE uses DOE Order 151.1C, *Comprehensive Emergency Management System*, as a basis to establish a comprehensive emergency management program that provides detailed, hazard-specific planning and preparedness measures to minimize the health impacts of accidents involving loss of control over radioactive material or toxic chemicals, as discussed in Chapter 3, Sections 3.2.10.5 and 3.3.10.5, emergency preparedness at Hanford and INL, respectively. Hanford contractors are responsible for maintaining emergency plans and response procedures for all facilities, operations, and activities under their jurisdiction and for implementing those plans and procedures during emergencies. Plans and procedures are reviewed and approved by DOE in accordance with DOE Order 151.1C. The DOE, contractor, and state and local government plans are fully coordinated and integrated. The Transportation Emergency Preparedness Program was established by DOE to ensure its operating contractors and state, tribal, and local emergency responders are prepared to respond promptly, efficiently, and effectively to accidents involving DOE shipments of radioactive material. This program is a component of the overall emergency management system established by DOE Order 151.1C.

Commentor No. 237 (cont'd): Richard Till, Land Use Law Clerk, Friends of the Columbia Gorge

3. USDOE should formally reject the shipping of new radioactive wastes to Hanford.

The draft EIS proposes to ship three million cubic feet of new radioactive and "mixed" radioactive wastes to Hanford from off-site locations around the country. The hydrogeography at Hanford is not appropriate for the storage of radioactive materials, as evidenced by the fact that existing contamination at the Hanford site is already entering the Columbia River. In addition, the shipping itself would expose hundreds and potentially thousands of people to radioactive waste on our nation's highways and roads. The final EIS should amend the preferred alternative to formally reject the shipping of any new radioactive wastes to Hanford.

237-3

4. USDOE must consult with NMFS and USFWS regarding impacts to threatened and endangered species.

Several endangered plant and animal species may inhabit areas that would be impacted by the proposed tank closure and waste management plan. This includes numerous anadromous fish species and all terrestrial wildlife that rely on the Columbia River for portions of their life cycle. Pursuant to Section 7 of the Endangered Species Act, the Forest Service must consult with the National Marine Fisheries Service ("NMFS") and the Fish and Wildlife Service ("USFWS") to ascertain whether the alternatives would impact any threatened or endangered species.

237-4

5. Conclusion.

Thank you for the opportunity to comment, which preserves our standing.

Sincerely,

Richard F. Till
Land Use Law Clerk

237-3 DOE recognizes the potential negative impacts on Hanford groundwater that offsite waste poses and proposes that the receipt and disposal of offsite waste be delayed, at least until the WTP is operational (74 FR 67189), except for certain limited exemptions. These exemptions were specified in DOE's January 6, 2006, Settlement Agreement with the State of Washington (as amended on June 5, 2008) regarding *State of Washington v. Bodman* (Civil No. 2:03-cv-05018-AAM), signed by DOE, Ecology, the Washington State Attorney General's Office, and DOJ. In addition, for this *Final TC & WM EIS*, DOE is no longer proposing transportation of RH-LLW containing significant amounts of technetium-99 from INL to Hanford, which removes a possible long-term source of groundwater contamination. The transportation of radioactive materials and waste, both coming to and leaving Hanford, must comply with DOT and NRC regulations that promote the protection of human health and the environment. This includes requiring the use of certified packaging that minimizes the radiation dose rate outside the transportation package. As indicated in the *TC & WM EIS* Summary, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that transportation of radioactive waste would cause an additional fatality as a result of radiation from either incident-free transportation or postulated transportation accidents.

237-4 Communications have occurred with DOE and with USFWS, the National Marine Fisheries Service (NMFS), the Washington State Department of Fish and Wildlife, and the Washington Natural Heritage Program concerning listed species that are potentially present on Hanford (see Appendix C, Section C.2.1). Further, as reported in Chapter 3, Section 3.2.7.4, special studies were undertaken to identify the presence of special status species within areas potentially disturbed by the various Tank Closure, FFTF Decommissioning, and Waste Management alternatives. Potential impacts on special status species at Hanford are addressed in Chapter 4, Section 4.1, and there is no impact (that is, "no effect") on any federally or state-listed threatened or endangered species. If circumstances change, DOE will evaluate the need and undertake additional informal consultation with the appropriate agencies to ensure protection of listed species. Consultation with the U.S. Forest Service is beyond the scope of this EIS, since it is DOE and not the U.S. Forest Service that is undertaking the action.

Commentor No. 238: Melissa Laird

From: melissa laird [melissalaird7@gmail.com]
Sent: Friday, March 19, 2010 7:07 PM
To: tc&wmeis@saic.com
Subject: Comment on Waste Management EIS

Citizens of Washington State have already commented on bringing new nuclear waste to Hanford. Initiative 297 showed that the overwhelming majority of citizens oppose bringing new nuclear waste to Hanford which is already the most contaminated place in the Western Hemisphere. Having the DOE ignore this Initiative is hugely disenfranchising and one of the most demoralizing strikes against our democracy in a generation. *238-1*

Washington State is a place of amazing beauty and economic vitality, largely through its natural resources such as trees, soil for agriculture and fisheries. As the DOE continues to pollute soil and groundwater around Hanford, it will add more radioactivity to the already contaminated soil and threaten our amazing agricultural production and fisheries. Don't destroy our state's economy with your pollution! Hanford as a radioactive waste site is geologically inappropriate. Basalt is very porous adding to the threat of radionucleides flowing into groundwater and into the Columbia River. The University of Washington and Fred Hutchinson Cancer Research Center have demonstrated that cancer rates are on the rise at Hanford and will continue to rise with this pattern of radioactive toxins spreading. *238-2*

We need to back up and focus on clean-up using the strictest possible approach by removing tanks and contaminated soil -- not just capping over old tank farms. *238-3*

The Department of Energy needs to find a site such as Nevada or Utah which has salty soils with groundwater much deeper than Hanford to serve as a permanent storage of nuclear waste. Using Hanford by default is unfair and unsafe. Let us protect the natural resources of the Northwest: healthy fish and farms, clean water, sagebrush and beautiful forests. *238-4*

238-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

238-2 See response to comment 238-1 for a discussion on the transport and disposal of offsite waste.

The analysis of long-term impacts on groundwater beneath all of the potential waste disposal sites was explicitly predicated on the presence of porosity in the suprabasalt sediments and the basalt itself, as well as the partial or complete presence of water in the porous media. This is described in Appendix L, "Groundwater Flow Field Development," and Appendix N, "Vadose Zone Flow and Transport," of this *Final TC & WM EIS*.

238-3 Please note that all of the action alternatives would involve retrieval of at least 90 percent of tank waste before tank closure would take place. The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. This closure includes the tank system, along with the vadose zone as impacted by the tank farms (i.e., past leaks). DOE's preferred retrieval option (i.e., to retrieve at least 99 percent of the tank waste) is consistent with the TPA goal of residual waste not exceeding 10.2 cubic meters (360 cubic feet) for 100-series tanks or 0.85 cubic meters (30 cubic feet) for the smaller 200-series tanks, corresponding to 99 percent retrieval.

Decisions made by DOE on the proposed retrieval actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

238-4 DOE explained in the *WM PEIS* (DOE 1997) that additional analyses would be prepared to implement DOE's programmatic decisions. This *TC & WM EIS* analyzes the potential environmental impacts associated with a number of

Commentor No. 238 (cont'd): Melissa Laird

proposed actions, including disposal of LLW and MLLW potentially shipped to Hanford from offsite DOE locations. Depending on the outcome of this *Final TC & WM EIS* and its ROD, DOE will evaluate whether additional NEPA reviews or updates to previous decisions are appropriate, as needed.

Commentor No. 239: Brian Kelly, Restoration Coordinator, Hells Canyon Preservation Council

From: Brian Kelly [brian@hellscanyon.org]
Sent: Friday, March 19, 2010 7:31 PM
To: tc&wmeis@saic.com
Subject: Hanford EIS Comments-please reply
Attachments: Hanford EIS Comments.docx

Please reply to acknowledge receipt of these comments.

Attached are comments about the TC&MW EIS for Hanford site.

Thank you.

Brian Kelly
Restoration Coordinator
Hells Canyon Preservation Council
Post Office Box 2768
La Grande, OR 97850
xxx-xxx-xxxx extension 24
www.hellscanyon.org

Response side of this page intentionally left blank.

Commentor No. 239 (cont'd): Brian Kelly, Restoration Coordinator, Hells Canyon Preservation Council

Hells Canyon Preservation Council, PO Box 2768, La Grande, OR 97850

To: Mary Beth Burandt, NEPA Document Manager, US Department of Energy, Office of River Protection, Attn:TC& WM EIS, P.O. Box 1178, Richland, WA 99352.

Sent by email to: TC&WMEIS@saic.com

March 19, 2010

Regarding: Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington

Dear Ms. Burandt,

Please accept these comments regarding the Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington. I submit these comments on behalf of Hells Canyon Preservation Council, a non-profit organization of approximately one thousand members based in La Grande, Oregon. Our mission involves the protection and restoration of the Hells Canyon, Wallowa and Blue Mountain ecosystems.

The Columbia River flows along the Hanford Site for about fifty miles. The Snake River and Yakima River join the Columbia nearby. Salmon, steelhead and sturgeon depend on these important waterways for their survival.

Hanford is considered to be the most contaminated radioactive site in the hemisphere and it is the largest environmental clean-up project in the world.

Fifty-three million gallons of high-level radioactive waste have been stored in underground tanks at the Hanford Site and many of these tanks are leaking highly-toxic liquid into the soil.

239-1

We are extremely concerned about the pollution of the Hanford site and we urge you to clean up the site to the absolute highest standard.

Post Office Box 2768 La Grande, Oregon 97850 Phone (541) 963-3950 Fax (541) 963-0584
E-Mail: hcpc@hellscanyon.org Web: www.hellscanyon.org

239-1 As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford. One of the purposes of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks.

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

Commentor No. 239 (cont'd): Brian Kelly, Restoration Coordinator, Hells Canyon Preservation Council

The Environmental Impact Statement

The Environmental Impact Statement (EIS) to address the Hanford clean-up includes:

* Treatment of the 53 million gallons of highly radioactive waste and closing the aging underground tanks.

* Disposing of solid waste with the possibility of receiving additional waste from other facilities.

* Decommissioning the Fast Flux Test Facility, a nuclear reactor from the 1980s.

Specific Comments

* *The DOE should clean-up all 53 million gallons of buried nuclear waste to a 99.9% rate of retrieval or higher.* ***239-2***

* *Drop the proposal to ship radioactive waste into Hanford from across the nation.* Shipments on Interstate 84 could travel through the Blue Mountains and the communities of Pendleton, La Grande, and Baker City.Cabbage Hill and Ladd Canyon are well-known as treacherous sections of the highway in the winter and numerous truck accidents occur there every winter.Hanford is already extremely contaminated.Do not import more contaminated waste! ***239-3***

* *Clean up the waste that has leaked into the ground and prevent it from reaching the Columbia River.* A complete clean-up is needed to protect salmon, steelhead, sturgeon and other aquatic life from contamination by radioactive waste.DOE's proposal is not thorough enough.All contaminated soil and groundwater must be treated! ***239-1 cont'd***

We appreciate the opportunity to comment on this project.

Sincerely,

Brian Kelly

Restoration Coordinator

Hells Canyon Preservation Council

239-2 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

239-3 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 240: Allyn Boldt

From: Allyn Boldt [a.boldt@verizon.net]
Sent: Friday, March 19, 2010 7:33 PM
To: tc&wmeis@saic.com
Subject: TC & WM EIS comments
Attachments: ALB Draft TC & WM EIS comments.doc

Attached as a MS word file.

Allyn Boldt
1019 S. Irby St.
Kennewick, WA

Response side of this page intentionally left blank.

Commentor No. 240 (cont'd): Allyn Boldt

Date: March 19, 2010

To: Mary Beth Burandt
EIS Document Manager
DOE Draft TC&WM EIS Comments
Office of River Protection
P.O. Box 1178
Richland, Washington 99352

Subject: Comments on the Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington

References: 1) DOE/EIS-0391, 2009, *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*, U.S. Department of Energy, Washington, D.C.

2) EPA Manual 1640, 1987, *Policy and Procedures for the Review of Federal Actions Impacting the Environment*, U.S. Environmental Protection Agency, Washington, D.C.

3) DOE/EIS-0286F, 2004, *Final Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement*, Richland Operations Office, Richland, Washington.

The U.S. Department of Energy (DOE) has requested comments on the Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site (reference 1), TC & WM EIS. This letter provides 4 comments on the draft TC & WM EIS.

1) The treatment and disposal of Effluent Treatment Facility Wastes and off-site wastes should be revised for the final TC & WM EIS or deleted from a final tank closure EIS and be the subject of a separate, later solid waste EIS.

The draft TC & WM EIS is unsatisfactory and inadequate concerning the treatment and disposal of Effluent Treatment Facility, ETF, wastes and off-site wastes. By the definitions of the Environmental Protection Agency, EPA, in reference 2, the treatment and disposal of both ETF wastes and off–site wastes are "EU - Environmentally Unsatisfactory" and "Category 3 – Inadequate".

> "Environmental Impact of the Action
> EU – Environmentally Unsatisfactory
> EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ)."
>
> "Adequacy of the Impact Statement
> Category 3 – Inadequate
> EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ."

240-1

240-1 In response to this and similar comments, an expanded discussion of the behavior of a variety of waste forms within the IDF(s) in the light of uncertainties including infiltration, waste-form performance, and decisions regarding the importation of offsite LLW and MLLW has been added to Chapter 7, Section 7.5, of this *Final TC & WM EIS*. As a point of clarification, DOE would like to point out that the rating the *Draft TC & WM EIS* received from EPA was an EO–2, which stands for Environmental Objections – Insufficient Information. This rating was provided by EPA Region 10 in its letter dated May 3, 2010, along with comments. DOE has met with both EPA Region 10 and EPA Headquarters to discuss their comments. These comments have been addressed in this CRD. Since that meeting, EPA has agreed to be a cooperating agency on this *Final TC & WM EIS*.

The magnitude of the environmental impact of all EIS alternatives disposing ETF wastes and off-site wastes can be derived by comparison of the peak number of square kilometers groundwater that exceeds the Maximum Contaminant Levels (MCL) for Iodine-129 and Technetium-99 at calendar year 8440. The peak groundwater value at year 8440 is derived from the Integrated Disposal Facility (IDF) leachates. The principal waste sources in the IDF leachates are the ETF wastes and the off-site wastes. The difference between year 8440 values on Figures 5-1232 and 5-1202 of the reference 1 document projects 33 square kilometers of groundwater will exceed the I-129 MCL. The difference between year 8440 values on Figures 5-1237 and 5-1206 of the reference 1 document projects 3.5 square kilometers will exceed the Tc-99 MCL.

240-1 cont'd

Neither the TC & WM EIS nor the previous Hanford Solid Waste Environmental Impact Statement (HSW EIS) (reference 3) evaluated more than a single waste form for disposal in the IDF. Reasonably available alternatives outside the spectrum of alternatives analyzed in the draft TC & EM EIS include vitrified glasses. The draft TC & WM EIS is inadequate for the purposes of the National Environmental Policy Act and/or Section 309 review. As the planned research and selection of an ETF waste form is scheduled to be complete in 2015, the solid waste disposal of ETF wastes and off-site wastes should be removed from the tank closure EIS and be the subject of a separate stand alone solid waste EIS (a revised draft HSW EIS, reference 3).

2) The draft TC & WM EIS does not evaluate the cumulative effects of reasonably foreseeable future actions on other Hanford site vadose zone and groundwater contaminants when combined with the tank closure and solid waste management evaluations.

The council on Environmental Quality's (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) define cumulative effects as

> The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions (40CFR1508.7).

240-2

Please evaluate the cumulative effects on the environment with reasonably foreseeable future removal or in-situ remediation actions on other Hanford site vadose zone and groundwater sources.

3) The presentation of data and results in the draft TC & WM EIS is difficult to comprehend and should be revised to clarify the presentation and comprehension of cleanup alternatives.

Clarify the presentation of source terms and impacts by presenting individual sources contributing to an alternative. The sources and impacts can be presented in a spreadsheet file included in the attached disc with the report. For example, the contributions from closed tanks cannot be separated from other deep(?) vadose zone sources under the tank farms. The contribution of tank closure secondary wastes and Effluent Treatment Wastes cannot be separated from the contributions of off-site wastes in the Integrated Disposal Facility. This methodology will allow the reader or reviewer to configure and evaluate a set of closure actions not included in the current draft TC & WM EIS.

240-3

4) The TC & WM EIS should include an additional alternative that corresponds to the proposed "Tri-Party Agreement".

The TC & WM EIS is a complex document and difficult if not impossible for the public to comprehend the many alternatives of which none correspond to the proposed Tri-Party Agreement (TPA). It is not readily apparent that the reader has to extrapolate to the proposed TPA configuration. The TC & WM EIS should be revised to include the proposed TPA configuration and state that it is the preferred alternative for public understanding and acceptance.

240-4

I thank you for the opportunity to comment on the Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site.

Allyn Boldt

1019 S. Irby St.
Kennewick, WA 99338

240-2 Hanford remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. Cleanup decisions regarding the non-tank-farm contamination sites will be made in consultation with Federal and state agencies. Other Hanford remediation activities are considered in the cumulative impacts analysis, although this *TC & WM EIS* is conservative in that it does not fully reflect the effectiveness of remediation activities, and does not consider groundwater remediation.

As noted in Section S.3.5 of Appendix S, 403 waste sites are involved in the other past, present, and reasonably foreseeable future actions considered in the cumulative impacts analysis. Appendix S also describes the development of the waste site characteristics for the cumulative impacts analysis, including key characteristics such as the current or future end state. The current or future end state helps to determine how the waste sites were factored into the cumulative impacts analysis. For instance, for waste sites subject to landfill closure, the inventory of contaminants would be disposed of in place; for waste sites subject to "remove, treat, and dispose," the inventory would be removed to the extent possible, treated as necessary, and disposed of in the ERDF or an IDF. The groundwater modeling incorporates the disposition locations for the contaminant inventories from each waste site, and thus the long-term cumulative impact analyses reflect the current or future end states to the extent possible.

Despite its consideration of end states, however, this EIS is not able to fully reflect the effectiveness of all remediation activities. There are significant uncertainties in estimating the degree of cleanup to be achieved by the remediation activities. Among these uncertainties are (1) the inventories of contaminants released to the ground at many of the sites; (2) for liquid release sites, the portion of the originally disposed contaminants remaining in the vadose zone and the portion that has migrated into the groundwater; (3) the selection of specific cleanup/containment methods for some sites; and (4) the effectiveness of the cleanup/containment methods. Therefore, the cumulative impacts analysis for this *TC & WM EIS* is conservative in that it does not account for cleanup/containment of waste and contaminated soil at liquid release sites, or cleanup/containment of current or future groundwater contamination.

DOE received comments on the potential impacts of future remediation activities that are in various stages of planning (which, given the inherent uncertainty, were not included in the cumulative impacts analysis). In response, DOE performed a sensitivity analysis to evaluate the potential impacts if certain remediation

Commentor No. 240 (cont'd): Allyn Boldt

activities were conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. The goal of the sensitivity analysis is to help DOE, EPA, and Ecology prioritize cleanup efforts in the future. This analysis is provided in Appendix U of this EIS and is discussed further in Chapter 7, Section 7.5.

240-3 In response to this and similar comments, the data presentation in Chapters 5 and 6 and Appendices N and O has been revised in this *Final TC & WM EIS* to provide additional clarification. In addition, an expanded discussion of the overall IDF performance in the context of uncertainties regarding infiltration, waste-form performance, and decisions regarding the importation of offsite LLW and MLLW has been added to Chapter 7, Section 7.5.

240-4 The TPA, a legal agreement between DOE, Ecology, and EPA, identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

The alternatives presented in this *TC & WM EIS* were developed under NEPA (42 U.S.C. 4321 et seq.) to address the essential components of DOE's three sets of proposed actions (tank closure, FFTF decommissioning, and waste management) and to provide an understanding of the differences between the potential environmental impacts of the range of reasonable alternatives. Consistent with CEQ guidance, this EIS analyzes the range of reasonable alternatives that covers the full spectrum of potential combinations. The alternatives considered by DOE in this EIS are "reasonable" in the sense that they are practical or feasible from a technical and economic standpoint and meet the agency's purposes and needs. Potential conflicts with laws and regulations do not necessarily cause an alternative to be unreasonable, but additional mitigation commitments may be required if it is selected for implementation. For a more comprehensive discussion on compliance with regulatory requirements, see Section 2.7 of this CRD.

The *TC & WM EIS* closure alternatives considered for the tank farms include no action, landfill closure, selective clean closure, and clean closure, which would include actions to remove the source of contamination. This EIS does not include proposed actions to address potential groundwater impacts resulting from the tank farms (i.e., past leaks), as this will be addressed along with the 200 Area non-tank-farm areas CERCLA process. All CERCLA remedial actions

Commentor No. 240 (cont'd): Allyn Boldt

include consideration of the applicable, relevant, and/or appropriate requirements under Federal and state laws and regulations that must be achieved as part of the remedies, or can be waived by EPA.

Commentor No. 241: Chuck and Lynetta Weswig

Comments regarding the Tank Closure and Waste Management Environmental Impact Statement

March 19, 2010

To: Mary Beth Burandt, Document Manager
TC & WM EIS
Office of River Protection
US DOE

Fax: 1-888-785-2865

We are opposed to the USDOE's "preferred" decisions in the Environmental Statement that was presented in Portland on Feb 10, 2010.

We cannot simply bury and cover up a problem that will exist for years and years in the future. It is inconceivable that the DOE would continue to consider and implement a plan that will lead to ongoing contamination of the Columbia River.

We were appalled that words such as "never been done before" & "would simply cost too much" were being used to justify a decision of this magnitude. That "cannot do" mentality would have prevented many of this countries past accomplishments.

We are in support of the Oregon DOE "Alternative 7 The Oregon Proposal" as outlined in their letter of January 4, 2010.

From

Chuck & Lynetta Weswig
1000 SW Hillcroft Ave
Portland, OR 97225

241-1

241-1 Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

Chapter 2, Section 2.6.4, of this *Final TC & WM EIS* has been revised to include a discussion of the Oregon Department of Energy's proposal and how DOE has addressed the range of reasonable alternatives for tank waste storage, retrieval, and treatment and remediation of the existing tank farms in its original Tank Closure alternatives. DOE has carefully considered the Oregon proposal and, as explained in Section 2.6.4, has determined that it is not reasonable.

Commentor No. 242: Mike Fox

From: Mike Fox [mike@foxreport.org]
Sent: Friday, March 19, 2010 7:40 PM
To: tc&wmeis@saic.com
Subject: Comments on the FFTF

Dear Sirs:

The FFTF should be preserved and renovated to lend support to the looming increase in nuclear energy in the United States and the world. At this time there are 56 new reactors under construction around the world and another 24 in advance stages of planning. Many more are in preliminary stages. The world will have a nuclear energy future but the United States has been pursuing a suicidal energy policy to excluded the US from that future in many other nations.

In addition to helping develop advanced nuclear fuel designs, advanced fuel cladding designs, and contributed to the first of a kind physics in the development of advanced reactor safety features, (such as turning off the coolant pumps at full-power), the FFTF reactor has the capability of producing dozens of special advanced medical isotopes diagnosing and treating cancer, arthritis, AIDS, and others.

All of this has been known for 2 decades, yet Washington bureaucrats continue to pursue a policy of destruction of the FFTF and to withhold from the public health benefit the demonstrable advances in the technology of cancer treatment, for lack of key isotopes. The FFTF is fully capable of making dozens of specialty isotopes which oncologists have been requesting. The FFTF is unique in the world for these missions, since it has high neutron spectra (<10E15 neutrons/sec), has a fast neutron spectrum (ie wide range of neutron energies), and impressively, a huge target volume for making these isotopes.

Finally, there seems to be a current fiction inside Washington that solving the critical Mo-99 supply problem will solve the entire medical isotope shortage problem. This is utterly untrue. Please preserve this national treasure for nuclear energy, nuclear safety. and nuclear medicine.

242-1

242-1 DOE issued a ROD (66 FR 7877; January 26, 2001) for the *NI PEIS* (DOE 2000a) wherein DOE announced its decision that FFTF would be permanently deactivated. As discussed in Chapter 1, Section 1.4.2, Decisions Not to Be Made, DOE is not considering restarting FFTF, only decommissioning it.

Commentor No. 243: Marlene Oliver

From: Marlene Oliver [marleneo@curetc.com]
Sent: Friday, March 19, 2010 10:55 PM
To: tc&wmeis@saic.com
Subject: Draft Hanford Tank Closure and Waste Management EIS Statement
Attachments: SNM warns of severe shortage of medical isotopes Reuters March 18 2010.doc; Holdren Shanahan + Cosigners Feb 1st 2010l.doc

The EIS remains incomplete.

For example, the preferred alternatives for **FFTF** should include **RESTART/ removal from waste consideration at this time, and for the next several decades after restart,** and, at the very least, the NO ACTION alternative.

Nothing else is either acceptable or legal.

The DOE has received overwhelming numbers of FFTF letters of support, in the past and present, from US allies as well as American taxpayer-citizens and hundreds of distinguished scientists - **please see the attached letter**.

All were ignored.

Hopefully, now will change how DOE does the taxpayer's business.

The Federal Data Quality Act **mandates** sound science be used in federal decision making.

The Atomic Energy Act of 1954 **mandates** peaceful uses of nuclear technology.

Please, **DOE, OBEY THE LAW.**

Secretary Chu and President Obama's stated policy supports the development of nuclear technology for energy and other related needs.

FFTF is uniquely qualified to bring American nuclear technology, now being surpassed by China, France, Korea, Russia, and others, into the 21st century.

I attended a conference in Moscow: "Research Reactors in the 21st Century." Three scientists from the United States attended amongst two hundred others. Let's get with the program.

Help us to REGAIN American supremacy in nuclear technology.

NOTE: **100% of targeted cancer cells and infectious disease cells die and 80% of arthritis patients can be helped with radionuclides that FFTF can produce to relieve worldwide shortages** in the required quantity and with the required quality that physicians require and AVOID UNNECESSARY DEATHS **(please see the attached, dated today)**.

243-1

243-1 cont'd

243-1 DOE issued a ROD (66 FR 7877; January 26, 2001) for the *NI PEIS* (DOE 2000a) wherein DOE announced its decision that FFTF would be permanently deactivated. As discussed in Chapter 1, Section 1.4.2, Decisions Not to Be Made, DOE is not considering restarting FFTF, only decommissioning it. Thus, regardless of the alternative selected (including No Action), FFTF would not be available for future use.

Commentor No. 243 (cont'd): Marlene Oliver

We could reduce our healthcare bill by 50% once these technologies are adopted and embraced in the United States. Our country pays **TWICE AS MUCH FOR HEALTHCARE, per person**, as any other country in the world.

Also, I object to ALARA. ALARA costs US citizens billions of unneeded taxpayer dollars per year. Hundreds of times more radiation exists in a banana or a cup of milk as in a cup of Columbia River water sampled at the Richland pumphouse, just DOWNSTREAM of the Hanford site.

Again, SOUND SCIENCE should prevail.

Consult the UCLA independent hormesis study involving 10,000 subjects that shows that **nuclear workers live an average 8 years longer than members of the general public.**

Many thanks for this opportunity to comment on this EIS.

Marlene Oliver
94006 Northstar Lane PR NE
West Richland WA 99353
mobile xxx-xxx-xxxx
www.curetc.com
Innovative Cures Foundation, CEO 501(c)3
Curative Foundation, CEO 501(c)3
Fighting Children's Cancer Foundation, Director 501(c)3
(National Cancer Institute, CARRA)
(Centers for Disease Control - Washington Cares about Cancer Partnership)
Curative Technologies Corporation, CEO
IRIST.org, Director
EANM.org
SNM.org
World Association of Radiopharmaceutical and Molecular Therapy, founder
warmolth.org
Asia-Oceania Federation of Nuclear and Molecular Biology aofnmb.org
World Federation of Nuclear Medicine and Biology wfnmb.org
ANS-EWS
and PATIENT ADVOCATE

Response side of this page intentionally left blank.

Commentor No. 244: Kelly Skovlin

From: kskovlin@eoni.com
Sent: Saturday, March 20, 2010 2:03 AM
To: tc&wmeis@saic.com
Subject: Handford Waste Clean-up comment

U.S.Dept.ofEnergy,OfficeofRiverProtection
POBox450,MailStopH6-60
Richland,WA

DearMaryBethBurandt,

ThesearemycommentsregardingtheHandfordwasteclean-upeffort.

First,thetransportationofnuclearwastefromothersitesisnotacceptable.Wasteshould bedealtwithatthesiteonwhichitoccurstominimizetheexposureofpeopleandotherbeings totheradiationandotherhazardsthatareassociatedwiththewaste.Second,thetanks ofwasteshouldberetrievedattherateof99percent.Third,trenchesshouldnolongerbe usedtodisposewasteandtheyshouldbecoveredandsealedassecurelyaspossible. *244-1* *244-2*

IpreferTankClosureAlternative6C,FFTFDecommisioningAlternative3,andWaste ManagementAlternative3withoutshipmentsfromothernuclearwastesites.

ItwasnicetomeetyouinLaGrande.Thankyouforcomingtospeakwithusthereatthe University.

Sincerely,

KellySkovlin
802MillerDrive
LaGrande,OR97850

244-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

244-2 The removal of 99 percent of the tank waste is also DOE's preference as discussed in Chapter 2, Section 2.12.1. This level of waste removal would be achieved under all Tank Closure alternatives, with the exception of Alternative 1 (No Action) and Alternative 5. As noted in Chapter 2, Section 2.5.2, a barrier would be placed over the six sets of adjacent cribs and trenches (ditches) under all alternatives except Alternative 1 and the Option Case for Alternatives 6A and 6B. In the latter case, the trenches would be clean closed.

The commentor's preference for Tank Closure Alternative 6C and FFTF Decommissioning Alternative 3 is noted. While the commentor prefers Waste Management Alternative 3 without offsite waste shipments, this alternative calls for the shipment of LLW and MLLW to the site, as specified in the Settlement Agreement for waste disposal at Hanford (see Chapter 1, Section 1.9.3.3).

Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

Commentor No. 245: Karin Engstrom

From: Karin Engstrom [kengstrom@seanet.com]
Sent: Sunday, March 21, 2010 1:49 PM
To: tc&wmeis@saic.com
Cc: Joe McDermott; Eileen Cody; Sharon Nelson; lisa@hoanw.org
Subject: Comment on Hanford EIS: DOE/EIS-391-D
Attachments: TCWMEIS-Hanford.doc

March 19, 2010

To: Mary Beth Burandt, Document Manager
Office of River Protection
U.S. Department of Energy
TC & WM EIS, P.O. Box 1178
Richland, WA 99352

From: Karin Engstrom
6911 – 34th Avenue SW
Seattle, WA 98126
kengstrom@seanet.com

Re: Comment on Draft EIS: Tank Closure & Waste Management - DOE/EIS-391-D

I attended the public hearing in Seattle on Monday, March 8th at the Seattle Center. I was struck that the presentation and discussion **did not address** several important issues concerning environmental impacts:

- Most of Hanford is a Superfund site.
- The real risk of earthquakes or Mt. Rainier eruption. What are the plans?
- The maps of contamination are individually presented. Wonder if we overlay these maps? What would it look like? They aren't separate – they are a mix in the soil and groundwater. What happens in that contaminant interaction?
- The risk of contaminants in the air flows over Hanford.
- The risk to people who work at Hanford.
- How does this "clean up" and proposed movement of nuclear waste affect global climate change? How do you measure that?
- Several participants mentioned other Environmental Impact Statement studies being conducted. Why are these studies separated? The words that come to mind are – shell game!

Please respond to where I can find these answers in your document.

245-1

245-1 DOE's intent was to focus only on the key parts of this EIS during the public hearings. DOE held a 1-hour open house prior to each public hearing on the draft EIS to allow the public to meet informally with members of the *TC & WM EIS* team, ask questions, and learn more about this EIS. Informative factsheets also were provided at these open houses. To help readers understand the information presented in this EIS, DOE took several approaches. For those who may not want to read through this entire EIS, DOE published a Summary. The Summary is intended to provide a brief overview of the material contained in the *Draft TC & WM EIS*. For those interested in reading this entire EIS, DOE also issued a Reader's Guide to assist the public in navigating through the information presented. This guide serves as an introduction and guide to the contents of this EIS, highlights the key features of the reasonable alternatives, and helps readers review the technical analyses presented. Recognizing that many people may not read beyond the EIS Summary, the information presented in both the Summary and the Reader's Guide attempts to strike a balance between those readers interested in the more technical details regarding DOE's proposed actions and alternatives and readers seeking a simpler overview. To find specific topics within this EIS, readers can use the Index, which identifies the page numbers where many topics are discussed. For example, in the *Draft TC & WM EIS*, the phrase "National Priorities List," which identifies Superfund sites, is listed in the Index, as are the terms "earthquake" and "global climate."

The groundwater analysis conducted for this EIS does account for the transfer of contaminants through the vadose zone into the groundwater; this topic is discussed in the front section of Chapter 5 (before Section 5.1). In addition, Chapter 6, Section 6.4.1, and Appendix U, Section U.1, of this EIS contain maps showing the alternative combinations and their cumulative impacts, including the potential groundwater impacts (which represent ranges) and the potential impacts represented by the cumulative impacts analysis. Risks to Hanford workers are discussed in Chapter 4 under the normal operations analysis. The other EIS studies mentioned by the commentor are discussed in Chapter 1, Section 1.10, Related NEPA Reviews. DOE does not believe it has purposefully hidden information from the public and has tried several mechanisms to assist readers in finding the information they feel is important.

Commentor No. 245 (cont'd): Karin Engstrom

I've looked through my previous letters on Hanford EIS drafts in 2002 and more recently. It just seems to go in circles. If I had the time – I would dig through my files in the 1990's when I first moved to the Northwest and am sure I wrote letters on EIS drafts as well. What I notice is that the names of responsible DOE officers change but the problems don't.

This EIS goes on the assumption that the public must accept that the plan is to "clean up" Hanford and then prepare it to be the future nuclear waste dumping ground. I do not find the "alternatives" responsible solutions.

This is NOT an EIS about clean up. The issue has moved on and is now about making Hanford the nuclear waste dumping ground.

Common sense would tell anyone that ANY plans to create a nuclear waste dump on top of what is already there, isn't feasible. In reality, the damage has already gone too far and clean up is theoretical. The word, remediation, is meaningless. You cannot remediate contamination that is already there. *245-2*

There are no alternatives except to clean up with as little risk to the environment for all life.

If we are truly responsible, we will propose that all nuclear production – for any reason – be stopped. There is no place in the world to store the waste. It is contributing toward making human beings an endangered species.

I appreciate all your work within the confines of what you are told – but we need you to take a stand for the people and our future generations of the Northwest, the environment in general and the future of our earth. *245-3*

Please make this comment a part of your record.

cc: President Barack Obama
Senator Patty Murray
Senator Maria Cantwell
Congressman Jim McDermott
Governor Christine Gregoire
State Senator Joe McDermott
State Representative Eileen Cody
State Representative Sharon Nelson
Lisa – Heart of American Northwest

245-2 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

In general, the scope of this *TC & WM EIS* does not include groundwater remediation activity as part of the proposed actions evaluated. DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

245-3 Nuclear energy production and its resulting waste are not within the scope of this *TC & WM EIS*. Regarding the safe disposal of waste generated from nuclear energy production, the current Administration has established a Blue Ribbon Commission on America's Nuclear Future that has issued a report and recommendations for a path forward for managing the country's HLW. DOE's decisions regarding management of Hanford waste will be consistent with Administration policies. For a more comprehensive discussion of this topic, see Section 2.10 of this CRD.

Commentor No. 246: Tamara E. Shannon

From: Tamara Shannon [eaglet7@earthlink.net]
Sent: Sunday, March 21, 2010 3:17 PM
To: Hanford
Subject: Fw: Comments on Hanford waste removal
Attachments: HanfordLetter3-18-10.doc

Sorry this is late. I had a typo in the email address.

-----Forwarded Message-----
>From: Tamara Shannon <eaglet7@earthlink.net>
>Sent: Mar 19, 2010 1:57 PM
>To: TC&WMIES@saic.com
>Cc: Tamara Shannon <eaglet7@earthlink.net>
>Subject: Comments on Hanford waste removal
>

>Please include the attached comments for your review and decision making.

>Thank you. t.s.

>
>Tamara Shannon

Tamara Shannon

Response side of this page intentionally left blank.

Commentor No. 246 (cont'd): Tamara E. Shannon

3-18-2019

Mary Beth Burandt, Document Manger
TC & WM EIS
P.O. Box 1178
Richland, WA. 99352

Dear Mary Beth Burandt

I am for the 99.9% clean up of the existing Toxic material, from the tanks, troughs, unlined soil disposal ditches and tank leaks and all the places in between – CLEAN CLOSURE, nothing less. I saw the slide projecting the movement and dispersal of the various toxic wastes into the next millennium and was appalled that our government would leave anything uncleaned up within our technological abilities. I hope your scientists realize that whatever chemicals have "moved out" of the figures depicting the groundwater movement know that it isn't there because it has dissipated into the Columbia River, our life blood. It doesn't take rocket science to realize that if we pollute the places that we work, play, depend on for food, transportation, recreation and spiritual well-being, we won't "be" any more. ***246-1***

I am against any further storage of nuclear waste at Hanford, and am very upset that the concept of considering and documenting the effects of direct, indirect, cumulative and associated impacts was disregarded, concerning the transportation of nuclear waste to the Hanford site, should it become a National Radioactive Waste Dump. Again, it doesn't take rocket science to determine the adverse effects of transporting toxic wastes along *any* road way or water way, no matter how small or large the population is along the route. Any mishap along the way, whether it be from a natural disaster, terrorism, or human error is way beyond acceptable. Besides, humans aren't the only one that would be impacted by a mishap along the way, AND how can we even consider bringing more toxic wastes to Hanford when we don't have the track record for cleaning up what is already there? ***246-2*** ***246-3***

/s/ Tamara E. Shannon

3940 Blackberry Drive
Hood River, OR. 97031

246-1 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. This closure includes the tank system, along with the vadose zone as impacted by the tank farms (i.e., past leaks). However, as discussed in the Summary, Section S.1.3.2, and Chapter 1, Section 1.4.2, of this *TC & WM EIS*, DOE will not make decisions on groundwater remediation, including the remediation of groundwater contamination resulting from non-tank-farm areas in the 200 Areas, because that is being addressed under the CERCLA (42 U.S.C. 9601 et seq.) process. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

246-2 DOE analyzed and documented the direct and cumulative transportation impacts for incident-free operations and accidents in this *TC & WM EIS* in Chapter 4, Section 4.3, Public and Occupational Health and Safety—Transportation. A more detailed description of the transportation analysis was provided in Appendix H of the *Draft TC & WM EIS*. The results of the transportation analysis are summarized in the Summary of this *TC & WM EIS*. As shown in the Summary, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that the estimated total public radiation exposures from transporting radioactive waste to Hanford for disposal would result in any additional LCFs. The United Nations Scientific Committee on the Effects of Atomic Radiation, the International Atomic Energy Agency, and the International Commission on Radiological Protection all support the view that, "The standard of environmental control needed to protect man to the degree currently thought desirable will ensure that other species are not put at risk" (Linsley 1997). Therefore, the analysis of human health impacts is indicative of the potential impacts on plants and animals.

246-3 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

Commentor No. 247: David E. Delk, President, and Gisela Ray, Secretary, Alliance for Democracy, Portland Chapter

ALLIANCE for DEMOCRACY portland chapter

March 12, 2010

Mary Beth Burandt
DOE Draft TC&WM EIS Comments
Office of River Protection
PO Box 1178
Richland, WA 99685

Re: USDOE's preferred alternatives for the clean-up of the Hanford Nuclear Reservation.

Ms Mary Beth Burandt:

I am writing on behalf of the Alliance of Democracy, Portland OR chapter. As citizens, who are deeply concerned about the health of the people in this area, the health of the Columbia River and the environment in general, we strongly disagree with DOE's preferred alternatives for the Hanford clean-up. We would hope that an office, named "Office of River Protection", would share our outrage at the very real threat to the Columbia River.

- Removing 99% of the 53 million gallons of high-level nuclear waste from the leaky tanks sounds good, but ignores the fact that the 1% left behind contains 25% of the radioactive contamination. That's unacceptable. We need to remove the tank waste to the 99.9% level!

- A million plus gallons of high-level nuclear waste has already leaked into the soil. It is spreading into the ground water and toward the Columbia River. Now we learn that DOE not only wants to leave the leaky tanks in the ground but does not intend to clean up the spills. That's bad news for the cancer rates in that area. That's unacceptable. Even with a landscaped cap applied over the spill area, the contamination will continue to flow into the Columbia River. The contaminated soils must be cleaned up and the tanks removed!

- Insane! That is the only description for the DOE preferred alternatives of bringing additional radioactive waste to the Superfund site Hanford. We cannot aggravate the very condition we are trying to improve. Using Hanford as a national radioactive waste dump is unacceptable. The principle must be "Clean it up first."

- Bringing more waste to Hanford would require transporting almost 3 million cubic feet of radioactive and "mixed" radioactive materials over our roads. The expected exposure of the public to low level radiation and the possible contamination of the area in case of an accident is unacceptable. It is simple: no additional radioactive waste in Hanford!

We demand that DOE reconsider its preferred alternatives and give Hanford the thorough clean-up the people of the area deserve. This EIS is defective. It does not include all of the factors regarding this site (evidenced by the fact that DOE will have additional EISs later this year to consider the rest), makes the assumption that additional waste will come here (EIS does not look at option of not bringing new waste to Hanford) and therefore, violates the law which established the EIS process.

This EIS must be abandoned and a new EIS issued which includes all of the options and all of the waste, both existing and future.

David e. Delk, President
Alliance for Democracy, Portland Chapter

Gisela Ray
Secretary, Alliance for Democracy

112 NE 45th Ave. Portland OR 97213 I 503.232.5495 I www.afd-pdx.org

247-1

247-2

247-3

247-4

247-5

247-1 Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

247-2 As noted in Appendix D, Section D.1.1.4, of this EIS, there are uncertainties regarding the residual waste inventories. DOE currently does not have a technical basis for making more-specific assumptions about the expected compositions of the waste heels that would remain in the tanks after retrieval. Retrieval has been completed for only a small number of SSTs, and not much is known about the behavior of, or ability to remove, small volumes of residual waste. However, the tank closure process, which includes detailed examinations of the tanks, residual waste, and surrounding waste in the soil, requires preparation of detailed performance assessments and a closure plan. These documents will provide the information and analysis necessary for DOE and the regulators to make specific decisions on what levels of residual tank waste are acceptable in terms of short- and long-term risks.

See response to comment 247-1 regarding future DOE decisions.

247-3 As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities downriver from Hanford. One of the purposes of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks, including remediation of the vadose zone.

247-4 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

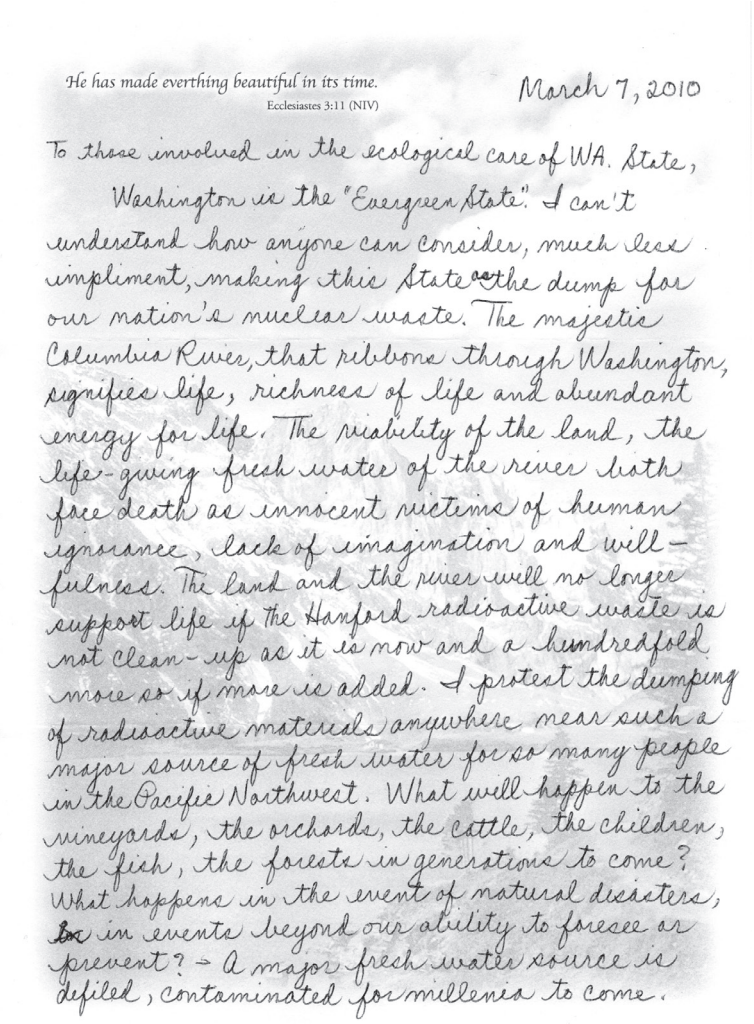
Commentor No. 247 (cont'd): David E. Delk, President, and Gisela Ray, Secretary, Alliance for Democracy, Portland Chapter

DOE is actively engaged in cleaning up Hanford under the TPA, a legal agreement between DOE, Ecology, and EPA that identifies cleanup actions and schedules, called milestones. Negotiations among the TPA agencies resulted in an agreement to make changes to the TPA that adjust cleanup schedules to focus currently anticipated funds on near-term, higher-priority milestones by delaying cleanup work identified by the agencies as lower priority at this time. A 45-day public comment period was held on this tentative agreement.

247-5 The purpose of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve and treat the Hanford tank waste; close the Hanford SST system; store and/or dispose of the waste generated from these tank waste activities; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate cleanup at Hanford and other DOE sites. Regarding the inclusion of all proposed actions concerning Hanford in one EIS, some proposed actions and alternatives concerning Hanford may be related, but involve different scheduling requirements that do not allow all of them to be analyzed in this *TC & WM EIS*. However, these separate but related actions are discussed in Chapter 1 and, if data were available, in the cumulative impacts analysis discussions in Chapter 6. For example, the transport and disposal of GTCC waste were not analyzed in the *Draft TC & WM EIS*. A separate EIS, the *Draft GTCC EIS*, was published in February 2011 and was not available when the *Draft TC & WM EIS* was issued in October 2009. However, information from the *Draft GTCC EIS* was incorporated into the *Final TC & WM EIS* cumulative impact analyses. Note that Hanford is one of a number of sites being considered for the disposal of GTCC waste. DOE has not yet made a decision on where GTCC waste will be disposed of.

Commentor Number 248 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 212.

Commentor No. 249: Sister Nancy A. Casale



He has made everthing beautiful in its time.
Ecclesiastes 3:11 (NIV)

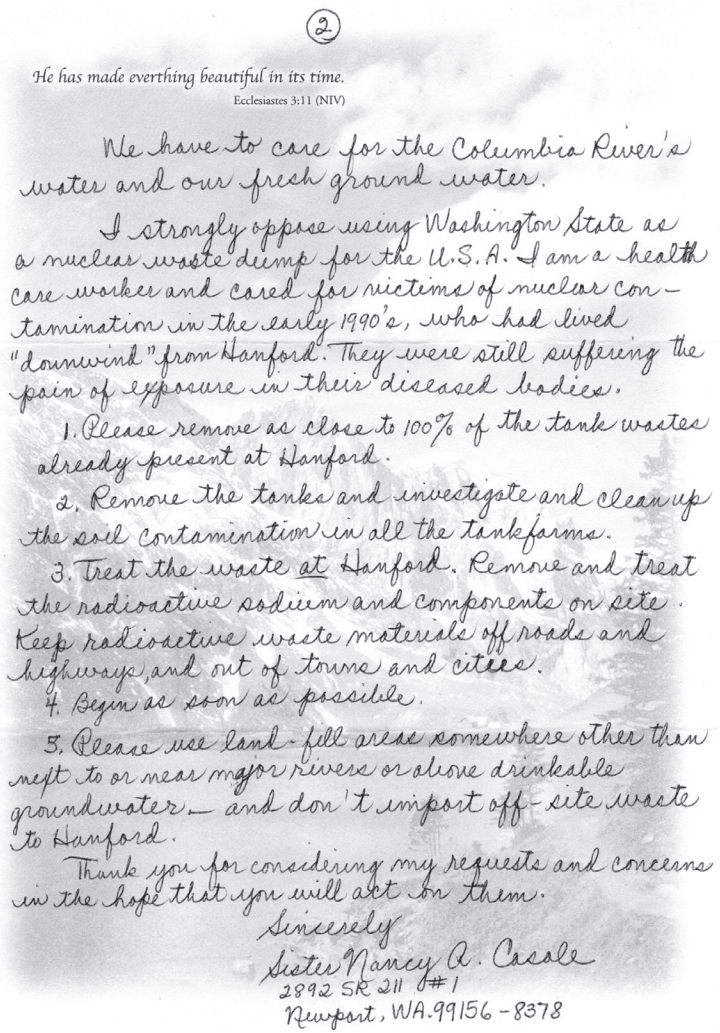
March 7, 2010

To those involved in the ecological care of WA. State,

Washington is the "Evergreen State". I can't understand how anyone can consider, much less impliment, making this State the dump for our nation's nuclear waste. The majestic Columbia River, that ribbons through Washington, signifies life, richness of life and abundant energy for life. The viability of the land, the life-giving fresh water of the river both face death as innocent victims of human ignorance, lack of imagination and willfulness. The land and the river will no longer support life if the Hanford radioactive waste is not clean-up as it is now and a hundredfold more so if more is added. I protest the dumping of radioactive materials anywhere near such a major source of fresh water for so many people in the Pacific Northwest. What will happen to the vineyards, the orchards, the cattle, the children, the fish, the forests in generations to come? What happens in the event of natural disasters, ~~&~~ in events beyond our ability to foresee or prevent? - A major fresh water source is defiled, contaminated for millenia to come.

249-1	**249-1**	Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

Commentor No. 249 (cont'd): Sister Nancy A. Casale



(2)

He has made everthing beautiful in its time.
Ecclesiastes 3:11 (NIV)

We have to care for the Columbia River's water and our fresh ground water.

I strongly oppose using Washington State as a nuclear waste dump for the U.S.A. I am a health care worker and cared for victims of nuclear contamination in the early 1990's, who had lived "downwind" from Hanford. They were still suffering the pain of exposure in their diseased bodies.

1. Please remove as close to 100% of the tank wastes already present at Hanford.
2. Remove the tanks and investigate and clean up the soil contamination in all the tankfarms.
3. Treat the waste at Hanford. Remove and treat the radioactive sodium and components on site. Keep radioactive waste materials off roads and highways, and out of towns and cities.
4. Begin as soon as possible.
5. Please use land-fill areas somewhere other than next to or near major rivers or above drinkable groundwater — and don't import off-site waste to Hanford.

Thank you for considering my requests and concerns in the hope that you will act on them.

Sincerely
Sister Nancy A. Casale
2892 SR 211 #1
Newport, WA. 99156-8378

249-1 cont'd

249-2

249-3

249-4

249-3 cont'd

249-1 cont'd

249-2 The potential doses to, and health impacts on, the public and workers from past Hanford operations have been the subject of a number of studies. Summaries of these studies are presented in Chapter 3, Section 3.2.10.3, of this EIS. As indicated in that section, the question of whether the population around Hanford has elevated cancer incidence or cancer mortality is unresolved. One past study showed no elevated levels of cancer around nuclear facilities, including Hanford; another study of 16 counties near Hanford determined that cancer incidence in white males and females was below the national average in most counties. The counties in which the incidences of cancer were higher than the national average were not those downwind of Hanford.

The Hanford Dose Reconstruction Project evaluated doses to, but not health effects on, members of the public from releases from 1944 through 1972. Airborne releases of iodine-131 from 1944 through 1957 were responsible for most of the dose from air emissions. The largest organ doses of 24 to 350 rad were to the thyroid. The maximum total effective dose equivalent to an adult from air emissions over the period from 1944 through 1972 was estimated to be 1 rem. The risk of a fatal cancer associated with a dose of 1 rem is about 1 in 1,600. The maximum dose through releases to the Columbia River (from eating nonmigratory fish) was estimated to be 1.4 rem.

249-3 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. DOE's preferred retrieval option (i.e., to retrieve at least 99 percent of the tank waste) is consistent with the TPA goal of residual waste not exceeding 10.2 cubic meters (360 cubic feet) for 100-series tanks or 0.85 cubic meters (30 cubic feet) for the smaller 200-series tanks, corresponding to 99 percent retrieval. DOE has already begun the process of retrieving waste from the tanks, such as tanks located in Waste Management Area C. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

249-4 As shown in the Summary, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, of this *TC & WM EIS*, it is unlikely that the estimated

Commentor No. 249 (cont'd): Sister Nancy A. Casale

total public radiation exposures from transporting radioactive waste associated with FFTF decommissioning, or transporting radioactive waste to Hanford for disposal, would result in any additional LCFs.

Commentor No. 250: Heart of America Northwest

Mary Beth Burandt
Document Manager
P.O. Box 1178
Richland, WA 99352

16 March 2010

Heart of America Northwest respectfully submits the following slideshow as formal comments on the draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site.

Heart of America Northwest
1314 NE 56th St, Suite 100
Seattle, WA 98105

Response side of this page intentionally left blank.

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

Hanford's Contamination Expected to Grow From Unacceptable Levels Today to Incredibly Unacceptable Levels in One Hundred Years and Thousands of Years… 10x Worse if USDOE uses Hanford as a National Radioactive Waste Dump

Source: USDOE's Own TCWMEIS
(Tank Closure Waste Management Draft EIS)
Presented by Heart of America Northwest 2010

TCWMEIS – Tank Closure Waste Management Environmental Impact Statement

- TCWMEIS was required due to legal and scientific errors in the 2004 Hanford Site Solid Waste EIS, which USDOE sought to rely on to use Hanford as national waste dump
- "Preferred alternative" proposes to use Hanford as national mixed radioactive hazardous and low level waste dump – once vitrification plant is "operational"
  - But, USDOE could start importing and disposing waste sooner, including extremely radioactive GTCC waste with Plutonium. Impact analysis missing from this EIS for adding GTCC wastes.
- "Closure" of Hanford's High-Level Waste Tank Farms – USDOE prefers leaving contamination in tank bottoms and in soil.

1

250-1

250-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

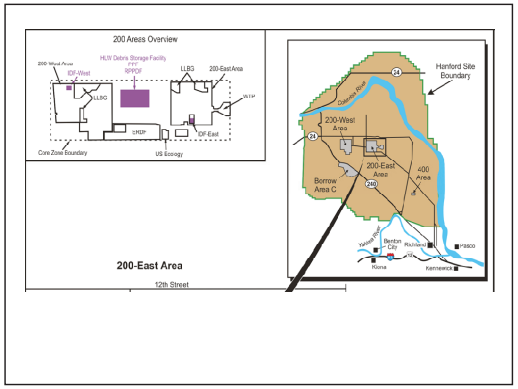
Regarding the commentor's concern about the inclusion of GTCC LLW in this *TC & WM EIS*, DOE has included information from the *Draft GTCC EIS* in the *Final TC & WM EIS* cumulative impacts analysis. For a more comprehensive discussion on GTCC LLW, see Section 2.12 of this CRD.

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

Columbia River at Risk

- Hanford Reach of the Columbia flows through Hanford for over 50 miles, past nine full scale nuclear reactors, hundreds of liquid waste and burial sites.
- Hanford Reach National Monument
- Contaminants already entering River along shore at levels >1,500 times Drinking Water Standard (Strontium-90)



250-2 **250-2** Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

One of the purposes of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks.

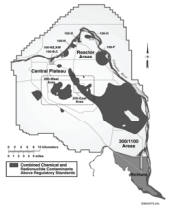
Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

Hanford's Unknown Dangers

- 53 million gallons of waste in Hanford's High-Level Nuclear Waste Tanks; 35 million gallons remain in Single Shell Tanks.
- USDOE admits that over one million gallons of waste has leaked from tanks… How fast and where is it spreading? Will anything be done?
- Over 200 square miles of contaminated groundwater (80+ sq. miles above Drinking Water Standards)… Contamination already entering River at levels >1,500 times DWS for Strontium…

Combined Distribution of All Contaminants in Groundwater on the Hanford Site



250-2 cont'd

Use of Unlined Burial Grounds

Dumping of radioactive waste in unlined burial grounds took place at Hanford until public pressure caused it to stop in 2004. Now, USDOE is proposing to not clean up the burial grounds, cribs, trenches & tank leaks, meaning there will be persistent contamination of the soil & groundwater for thousands of years.

250-3

3

250-3 The clean closure alternatives considered for the SST system are represented by the Base and Option Cases of Tank Closure Alternatives 6A and 6B. For both Base Cases, the assumption is that the SST system would be cleaned to levels that would allow for unrestricted use, which would involve removal of the tanks, ancillary equipment, and soils beneath the tanks (contaminated as a result of past leaks) down to the water table. The two Option Cases represent this type of clean closure along with removal of soils beneath the tank farms (contaminated as a result of infiltration from the contiguous cribs and trenches [ditches]). The analysis shows that the removal of the contaminants from the vadose zone does not capture the contaminants that may have already reached the groundwater table due to past practices (i.e., past leaks and contiguous cribs and trenches [ditches]).

See response to comment 250-2 for information about the sensitivity analysis performed by DOE for this EIS.

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

WA Voters Said Do Not Add More Waste to Hanford's Contamination, but USDOE blocked in court

- Initiative 297 2004 "Clean up contamination before adding more"
- End Dumping in Unlined Trenches
- The TCWMEIS is a slap in the face to WA voters who resoundingly voted against adding more waste to Hanford in 2004.

250-4

Key Decisions USDOE Proposes to Issue Using TCWMEIS:

- Where to bury offsite waste at Hanford:
  - **Fails to include an alternative of not using Hanford as a national radioactive and mixed radioactive hazardous waste dump!**
  - Whether to use landfills in both 200 East and 200 West areas, or just 200 East
  - USDOE proposes to add **approximately 3 million cubic feet of waste to Hanford's** contamination and compliance problems… approximately 17,500 truckloads of waste
  - **USDOE improperly left out of EIS a disclosure that it is also considering sending highly radioactive GTCC waste to be buried in Hanford landfill(s).** Includes Plutonium.

250-5

250-6

4

250-4 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Since 2004, DOE has buried all LLW in lined trenches (see Appendix E, Section E.3.3, for a description of the evolution of past waste disposal practices). DOE continues to strictly limit the amount of waste Hanford can accept, and ensures that disposal activities are protective of the environment and meet regulatory requirements. Previous use of unlined trenches for disposal was a big concern to stakeholders and Washington and Oregon States; DOE heard and addressed those concerns and is using lined trenches.

250-5 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

250-6 Appendix S, Section S.3.6, describes Hanford's consideration as a candidate location for a new GTCC disposal facility. DOE has included information from the *Draft GTCC EIS* in the *Final TC & WM EIS* cumulative impacts analysis. For a more comprehensive discussion on GTCC LLW, see Sections 2.1 and 2.12 of this CRD.

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

Key Decisions USDOE Proposes to Issue Using TCWMEIS:

- How much Waste to retrieve from the leaky Single Shell High-Level Nuclear Waste Tanks (SSTs):
  - 90%
  - 99%: USDOE's choice
  - 99.9%
- Over a million gallons of waste has leaked from SSTs, and the contamination has moved deeper and into groundwater – heading towards the Columbia River - despite USDOE claiming it would not move for thousands of years.

250-7

Key Decisions USDOE Proposes to Issue Using TCWMEIS:

- Whether USDOE will Clean-Up the High-Level Nuclear Waste Tank Leaks and the Billions of Gallons of Tank Wastes Deliberately Discharged into Soil Ditches (Cribs, Trenches)?
- Whether to remove the tanks and piping or add cement and leave behind under a "cap"?
- "Tank Closure" decisions
- USDOE wants to use "landfill" closure: Not investigate contamination; add cement; Not cleanup leaks and discharges – put big soil caps over tank farms
- Hazardous waste law says use "clean closure": must take all practical steps to remove residues; and, investigate and cleanup contamination before capping.

250-8

5

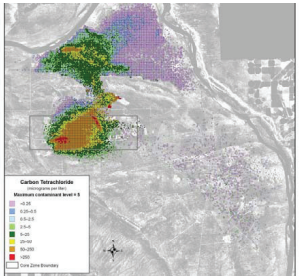
250-7 As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities downriver from Hanford. One of the purposes of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks, including remediation of the contamination in the vadose zone.

250-8 The alternatives presented in this *TC & WM EIS* were developed under NEPA (42 U.S.C. 4321 et seq.) to address the essential components of DOE's three sets of proposed actions (tank closure, FFTF decommissioning, and waste management) and to provide an understanding of the differences between the potential environmental impacts of the range of reasonable alternatives. Consistent with CEQ guidance, this EIS analyzes the range of reasonable alternatives that covers the full spectrum of potential combinations. The alternatives considered by DOE in this EIS are "reasonable" in the sense that they are practical or feasible from a technical and economic standpoint and meet the agency's purposes and needs. Potential conflicts with laws and regulations do not necessarily cause an alternative to be unreasonable, but additional mitigation commitments may be required if it is selected for implementation. For a more comprehensive discussion on compliance with regulatory requirements, see Section 2.7 of this CRD.

The *TC & WM EIS* closure alternatives for the tank farms include no action, landfill closure, selective clean closure, and clean closure (which would involve actions to remove the source of contamination). This EIS does not include proposed actions to address potential groundwater impacts resulting from the tank farms (i.e., past leaks), as such actions will be addressed as part of CERCLA remedial action for the non-tank-farm areas within the 200 Areas. All CERCLA remedial actions must meet the applicable, relevant, and/or appropriate requirements of Federal and state laws and regulations governing such actions or can be waived by EPA.

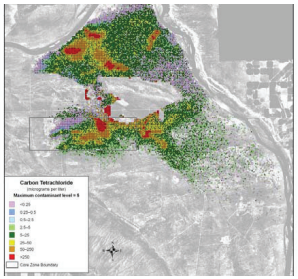
Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010



Carbon Tetrachloride level in groundwater now, darkest red area =>50x Drinking Water Standard. Carbon tetrachloride is a poison and carcinogen. River shown in blue runs through Hanford 50 miles.

Figure 6–99. Alternative Combination 3 Spatial Distribution of Cumulative Groundwater Concentration for Carbon Tetrachloride During Calendar Year 2005



Carbon Tet levels projected in year 2135. Carbon Tet is a poison and carcinogen. Dark red areas near Rivershore are >50x DWS. DWS set at level at which 1 adult male in 10,000 dies of cancer.

Figure 6–63. Alternative Combination 2 Spatial Distribution of Cumulative Groundwater Concentration for Carbon Tetrachloride During Calendar Year 2135 (USDOE's Preferred Alt)

250-9

6

250-9 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

One of the purposes of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks.

The commentor also expresses concern regarding the inventories used for the cumulative impacts analysis. Appendix S of this *TC & WM EIS* explains the process used to develop the inventory data set for the cumulative impact analyses. All disposal sites for which an inventory was identified and considered a potential contributor to cumulative impacts on groundwater, including burial grounds, cribs and trenches (ditches), and ponds, are included in the inventory listing provided in Appendix S and, therefore, were modeled. The inventories listed in Appendix S represent the radionuclide inventories (measured in curies) and chemical inventories (measured in kilograms), including total uranium, that were identified for those sites and for those constituents that were screened (described in Section S.3.6 as COPCs, i.e., those constituents that control groundwater impacts). The source cited in this final EIS for the information listed in the Appendix S tables is SAIC 2011, which is a more extensive database of the inventory information used by DOE to accomplish the screening to identify the COPCs. These COPCs, as well as other constituents determined not to be COPCs, particularly other volatile organic chemicals, can be found in this source documentation for the sites noted.

DOE conducted a detailed review of available inventory data and believes the inventory estimates analyzed in this EIS represent the best-available data at the time of its publication. None of the reviewed documents included a total uranium inventory estimate for these burial grounds and some liquid sites. However, DOE again reviewed the data and revised the burial ground inventories to include a calculated total uranium inventory. This inventory was included in this *Final TC & WM EIS* and analyzed appropriately. In addition, in response to a number of public comments, DOE undertook a detailed review of the tank past leaks inventory evaluated in the draft EIS and determined that the inventory for a number of unplanned releases needed to be revised. This inventory is relatively minor, but the inventory estimates and groundwater analyses were updated

Commentor No. 250 (cont'd): Heart of America Northwest

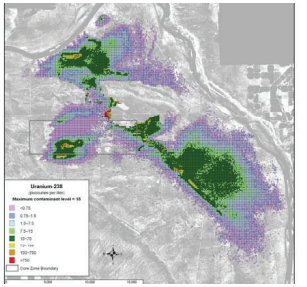
3/16/2010

Cumulative Impacts Without Adding More Waste or Considering Tank Wastes

Maximum Peak Year Concentrations of the COPCs from Non–*TC & WM EIS* Sources at the Core Zone Boundary and the Columbia River Nearshore

- Table U-2

Contaminant	Max concentration Central Plateau Inner (year)	Max concentration River shore (year)	DW Standard or benchmark
Pu (inc 239, 240)	2,660 (11,848)	4,250 (2983)	15 pCi/L
I-129	50.9 (4043)	9.1 (4540)	1. pCi/L
Chromium	2540 (2216)	16,100 (1978)	100



Uranium 238 in Groundwater in Year 2135
Dark red >50x Drinking Water Standard

Figure 6-65. Alternative Combination 2 Spatial Distribution of Cumulative Groundwater Concentration for Uranium-238 During Calendar Year 2135

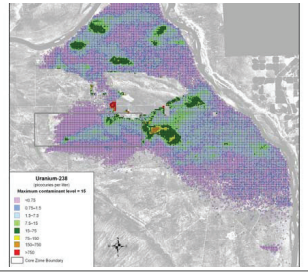
7

250-9 cont'd

accordingly in this *Final TC & WM EIS*. For a more comprehensive discussion of the age and accuracy of data, see Section 2.2 of this CRD.

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010



Uranium 238 in Year 3890 under Alt 2;
Uranium into River. New plumes from tank leaks, residues and discharges will grow for thousands of years under USDOE's plans to NOT cleanup tank leaks, waste discharge trenches and cribs, and to leave 1% in tanks.

Figure 6–66. Alternative Combination 2 Spatial Distribution of Cumulative Groundwater Concentration for Uranium-238 During Calendar Year 3890 . Discussion page 6-70.

250-9 cont'd

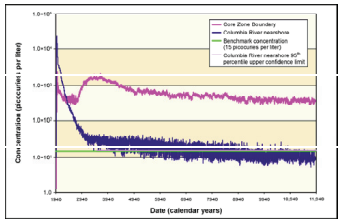


Figure 6–78. Alternative Combination 3 Cumulative Concentration Versus Time for Uranium-238

Uranium 238 over time in groundwater: increases on Central Plateau to 100 x DWS in 1,000 years. Sources include tank residues, leaks, and billions of gallons discharged to cribs.

Green: Drinking Water Standard
Pink: Central Plateau at edge of area expected for unrestricted public / Tribal use
Purple: Rivershore

8

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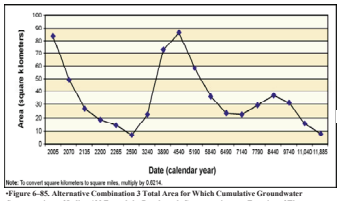
Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010



Note: To convert square kilometers to square miles, multiply by 0.0214.

•Figure 6–85. Alternative Combination 3 Total Area for Which Cumulative Groundwater Concentrations of Iodine-129 Exceed the Benchmark Concentration as a Function of Time

Square kilometers of Hanford where Iodine 129 contamination will exceed Drinking Water Standard

85 square km today

In 600 years, begins climbing back to 85 sq Km under Alt 3, with landfill in 200 West and offsite waste - not including all other contaminated sites

250-9 cont'd

USDOE Grossly Underestimates Radioactive and Chemical Wastes

- The EIS shows huge contamination levels in **groundwater and flowing into the River in 125** years, a thousand years and for thousands of years;
- But, those estimates are greatly understated because **the TCWMEIS leaves out huge quantities of wastes:**
  - **In unlined landfills**
  - **In liquid discharge cribs, trenches, ponds**
  - **In High-Level Nuclear Waste tank overflows**

9

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Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

Huge Amounts of Uranium Missing

- For the unlined commercial radioactive waste dump (run by the US Ecology company) in the center of Hanford, the EIS appears to have under reported the quantity of Uranium by tenfold:
- 10,800 curies reported in PNNL report 1998
- Only 1,820 Curies reported in the EIS
  - EIS App. Page S-91 table S-50b versus PNNL-11800 page 3.31
- ZERO Uranium reported in the EIS for US Ecology dump as a toxic chemical / heavy metal
  - page S-141, table S-76b

Huge Amounts of Uranium Missing

- Uranium impacts must be considered as a toxic heavy metal, not just as a radioactive carcinogen.
- All the burial grounds listed in Appendix S have a total of approx. 1,068 curies of uranium, but list only 83 total Kg under the chemical tables.
  - The 83 Kg is essentially from one burial ground (218-W-4C page S-125). Most other burial grounds with a curie inventory show no corresponding uranium chemical inventory.
- Nez Perce estimate that the TCWMFIS left out 96% of uranium on-site for toxicity and chemical impact analyses: 6.69 E+6 kilograms (6.69 million) in prior Hanford reports versus the EIS reporting total kg as 2.73 E+5 (273,000).

10

250-10

250-10 See response to comment 250-9 regarding the process used to develop the inventory data set for the cumulative impacts analysis in this *TC & WM EIS*.

For US Ecology specifically, the Washington State Department of Health's 2004 *Final Environmental Impact Statement, Commercial Low-Level Radioactive Waste Disposal Site, Richland, Washington* (Ecology and WSDOH 2004) was the source document. The PNNL-11800 document referred to by the commentor reports an inventory for US Ecology that was obtained from the Department of Health's 2000 *Draft Environmental Impact Statement; Commercial Low-Level Radioactive Waste Disposal Site, Richland, Washington*. DOE believes the inventory report in Appendix S of this *TC & WM EIS* is the most recent and has not revised it.

DOE conducted a detailed review of available inventory data and believes the inventory estimates analyzed in this EIS represent the best-available data at the time of its publication. None of the reviewed documents included a total uranium inventory estimate for these burial grounds. However, DOE again reviewed the data and revised the burial ground inventories to include a calculated total uranium inventory. This inventory was included in this *Final TC & WM EIS* and analyzed appropriately. For a more comprehensive discussion of the age and accuracy of data, see Section 2.2 of this CRD.

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

Huge Amounts of Toxic Chemicals Ignored in the EIS

- Volatile Organic Chemicals documented spreading out of unlined burial grounds, but NOT even reported as contaminants of concern in the EIS.
- Chemicals in the tanks and tank leaks ignored

250-11

Huge Amounts of Radionuclides as well as Chemicals Ignored

- High-Level Nuclear Waste Tank Overflows that were larger than the largest reported leak are missing from the TCWMEIS
- Waste in pipelines that go beyond tank farm boundaries are ignored
- **Enough Plutonium Missing to Build 8 Nuclear Weapons:**
  - several burial grounds are missing radioactive data for plutonium in Appendix S of the EIS. Based on data from a September 1996 Westinghouse Hanford Co. report (WHC-EP-0912) 218-W-2A has 6.38 Kg PU, 218-E-10 has 4.94 Kg Pu, and 218-W-4b has 66.47 Kg Pu, yet the EIS lists these burial grounds as having no curies associated with Plutonium. By comparison, 218-W-4a has 35 Kg of Pu with a corresponding 2,570 curies of Pu listed in Appendix S.

250-12

11

250-11 See response to comment 250-9 regarding the process used to develop the inventory data set (including volatile organic chemicals) for the cumulative impacts analysis in this *TC & WM EIS*.

As explained in Appendix S, the inventories for the sites were identified using the most recent information available. As stated in Table S–5, the liquid inventories were obtained from (1) SIM, Rev. 1 (Corbin et al. 2005); (2) *Radionuclide Inventories of Liquid Waste Disposal Sites on the Hanford Site* (Diediker 1999); (3) the *Hanford Site Waste Management Units Report* (DOE 1987); (4) technical baseline reports; (5) the latest version of WIDS; or (6) other sources. The solid-waste inventories were taken from (1) the *Summary of Radioactive Solid Waste Received in the 200 Areas During Calendar Year 1995* (Anderson and Hagel 1996) or other site-specific solid-waste references; (2) the *Hanford Site Waste Management Units Report* (DOE 1987); (3) technical baseline reports; (4) the latest version of WIDS (Shearer 2005); and (5) other sources.

250-12 DOE conducted an extensive review of existing inventory data for Hanford, and the resulting inventories are analyzed in this EIS. The list of radionuclides and chemicals was reduced by subjecting it to a "screening" process to select a set of COPCs. This screening process is described in Appendix Q, Section Q.2, Approach for Long-Term Performance Assessment. The results of this screening process provided the list of COPCs (radionuclides and chemicals) used in the analysis of the tank waste and cumulative impacts waste sites. As discussed in Appendix Q, only those radionuclides and chemicals that contributed to less than 1 percent of the impacts were eliminated.

With regard to waste pipeline inventories, Appendix D, Section D.1.2, Tank Ancillary Equipment Waste, provides a discussion of the inventories for the ancillary facilities, including the transfer piping associated with the SST and DST farms within the permit and waste management areas. Tables D–9 through D–12 provide the radioactive and nonradioactive inventories for the SST and DST ancillary equipment.

DOE conducted a detailed review of available inventory data and believes the inventory estimates analyzed in this EIS represent the best-available data at the time of its publication. The primary source of referenceable inventory data for the burial grounds used in this EIS was the *Summary of Radioactive Solid Waste Received in the 200 Areas During Calendar Year 1995* (Anderson and Hagel 1996). As discussed in the introduction to this source document, the inventory data contained within included not only the inventory disposed of in 1995, but also the cumulative inventory through 1995. DOE's review of *The*

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

Benefits of "Clean Closure" Underestimated; Harms from "Landfill Closure" Underestimated

- **The huge quantities of waste missing from the EIS lead to gross underestimation of the benefits from cleaning up tank leaks, removing tank pipelines, removing the contamination from unlined ditches, trenches and ponds (Clean Closure);**
- The projections of contamination levels and resultant cancer rates from exposure are low for the "landfill" closure alternatives
- **Clean-Up! Do not leave wastes under caps using "landfill" closure. Insist on Clean Closure.**

250-13

USDOE Only Considers Using Hanford landfill(s) as national radioactive waste dump - adding 3 million cubic feet of radioactive and radioactive toxic waste

Mostly from new nuclear weapons production

What's missing from this choice?

Alternative 2:	Alternative 3:
Landfills in 200 East and 200 West used as national waste dump	IDF landfill in 200 East used as national waste dump

250-14

12

History of the 200 Area Burial Ground Facilities (Anderson 1996) concluded that it may not be the best source for burial ground inventory data. The following statement is an excerpt from the preface to Anderson (1996): "Much of the information is not associated with referenceable documentation, and comes from the author's experiences and associations with others during the time spent in the burial grounds which covered a quarter of a century." However, to address the example provided by the commentor, the 4,930 curies of plutonium estimated in Anderson and Hagel (1996) converts to 67 kilograms of plutonium when the appropriate specific activity (curies/grams) factors are applied; this is approximately the same inventory estimate provided in *The History of the 200 Area Burial Ground Facilities* (Anderson 1996). Therefore, DOE sees no discrepancy in this case.

250-13 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. The clean closure alternatives considered for the SST system are represented by the Base and Option Cases of Tank Closure Alternatives 6A and 6B. For both Base Cases, the assumption is that the SST system would be cleaned to levels that would allow for unrestricted use, which would involve removal of the tanks, ancillary equipment, and soils beneath the tanks (contaminated as a result of past leaks) down to the water table. The two Option Cases represent this type of clean closure along with removal of soils beneath the tank farms (contaminated as a result of infiltration from the contiguous cribs and trenches [ditches]). See response to comment 250-5 regarding factors influencing future DOE decisions.

250-14 See response to comment 250-4 for a discussion on the transport and disposal of offsite waste.

DOE recognizes the potential negative impacts on Hanford groundwater that shipment of offsite waste to the site could pose. The *TC & WM EIS* analysis shows that receipt of offsite waste streams containing specific amounts of certain isotopes, specifically, iodine-129 and technetium-99, could cause an adverse impact on the environment. One means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford. Other mitigation measures, such as recycling secondary-waste streams into the primary-waste-stream feeds within the WTP to increase iodine-129 capture in ILAW and bulk vitrification, are discussed in Chapter 7, Section 7.5, of this *Final TC & WM EIS*.

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

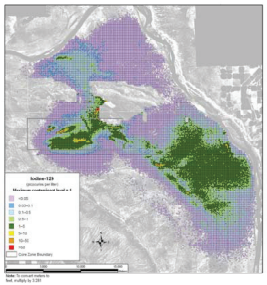
Using Hanford as a national radioactive waste dump for 3 million cubic feet of radioactive waste

- **Increases cancer risk to future generations using the groundwater, from the one landfill, tenfold to 100 times WA State's cancer risk standard**
  - Will include highly radioactive (Remote Handled) wastes and Transuranic wastes (e.g., Plutonium) in concentrations just below the legal limit requiring deep geologic disposal
  - TCWMEIS appears to have left these wastes out of modeling impacts
- USDOE illegally left out of the EIS its separate pending plan to import and bury highly radioactive "GTCC" wastes – as hot as High-Level Nuclear Waste.

250-15

Impacts of USDOE's Plans (Combo Alt 2) – Radioactive Iodine 129

- Iodine in Groundwater today
- Darkest red is >50x DWS
- Table 6-44



250-16

13

250-15 See response to comment 250-14 regarding offsite waste and mitigation measures.

The *TC & WM EIS* analysis shows that receipt of offsite waste streams that contain specific amounts of certain isotopes, specifically, iodine-129 and technetium-99, could cause an adverse impact on the environment. Therefore, one means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford. Other mitigation measures, such as recycling secondary-waste streams into the primary-waste-stream feeds within the WTP to increase iodine-129 capture in ILAW and bulk vitrification glass, are discussed in Chapter 7, Section 7.5, of this final EIS.

Ecology's foreword to the draft EIS included its views and positions concerning DOE's analysis in the document and has been updated in this final EIS.

Regarding the commentor's concern about the inclusion of GTCC LLW in this *TC & WM EIS*, DOE has included information from the *Draft GTCC EIS* in the *Final TC & WM EIS* cumulative impacts analysis. For a more comprehensive discussion on GTCC LLW, see Sections 2.1 and 2.12 of this CRD.

250-16 The alternatives presented in this *TC & WM EIS* were developed under NEPA (42 U.S.C. 4321 et seq.) to address the essential components of DOE's three sets of proposed actions (tank closure, FFTF decommissioning, and waste management) and to provide an understanding of the differences between the potential environmental impacts of the range of reasonable alternatives. Consistent with CEQ guidance, this EIS analyzes the range of reasonable alternatives that covers the full spectrum of potential combinations. The alternatives considered by DOE in this EIS are "reasonable" in the sense that they are practical or feasible from a technical and economic standpoint and meet the agency's purposes and needs. Potential conflicts with laws and regulations do not necessarily cause an alternative to be unreasonable, but additional mitigation commitments may be required if it is selected for implementation. For a more comprehensive discussion on compliance with regulatory requirements, see Section 2.7 of this CRD.

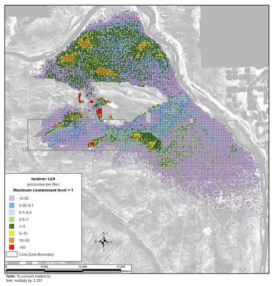
The *TC & WM EIS* closure alternatives for the tank farms include no action, landfill closure, selective clean closure, and clean closure (which would involve actions to remove the source of contamination). This EIS does not include proposed actions to address potential groundwater impacts resulting from the tank farms (i.e., past leaks), as such actions will be addressed as part of CERCLA remedial action for the non-tank-farm areas of the 200 Areas. All

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

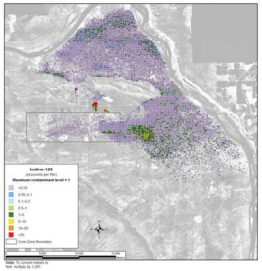
Impacts of USDOE's Plans (Combo Alt 2) – Radioactive Iodine 129

- Iodine in Groundwater in Year 3890
- **Tank residues and leaks are not cleaned up (landfill closure);** 200 East IDF landfill only
- Darkest red is >50x DWS
- Table 6-45



Impacts of USDOE's Plans (Combo Alt 2) – Radioactive Iodine 129

- Iodine in Groundwater in Year 7140
- Tank residues and leaks are **not cleaned up (landfill closure);** 200 East IDF landfill only
- Darkest red is >50x DWS
- Table 6-46



14

250-16 cont'd

CERCLA remedial actions must meet the applicable, relevant, and/or appropriate requirements of Federal and state laws and regulations governing such actions or can be waived by EPA.

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

The Risk of >17,000 Trucks of Waste

Cancer Risk from Trucks Even Without an Accident or Terrorist Attack:

- USDOE estimated 816 fatal cancers in ADULTS along truck route due to routine exposure if Spent Fuel shipped to Hanford for storage and reprocessing under GNEP
  - USDOE ignored children and NAS data
  - This is separate example of the immense impacts of shipping radioactive waste through Northwest communities
- GTCC wastes as radioactive as Spent Fuel, but USDOE failed to disclose that it is considering shipping GTCC and highly radioactive Plutonium to Hanford in the TCWMEIS.
- For 3 million cubic feet of offsite LLW and MW, TCWMEIS fails to disclose sources from new production to be disposed at Hanford, claims treatment for offsite waste that is not planned.

250-17

250-18

15

250-17 The value of 816 LCFs is from the results provided in the *GNEP PEIS* (DOE 2008b). This value represents the maximum impacts associated with 50 years of transportation activities supporting the operations of all existing U.S. commercial light-water reactors if they all were replaced with high-temperature, gas-cooled reactors. The *GNEP PEIS* was canceled by DOE on June 29, 2009 (74 FR 31017). As shown in the Summary of this *TC & WM EIS*, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that the estimated total public radiation exposures from transporting radioactive waste to Hanford for disposal would result in any additional LCFs.

There is no existing guidance that recommends dose coefficients for children's exposure to external radiation. DOE acknowledges that children have an elevated sensitivity to radiation exposure. The most recent guidance for use of exposure-to-dose coefficients related to external exposure (ionizing radiation) is used in the analysis. This guidance can be found in Federal Guidance Report No. 12, *External Exposure to Radionuclides in Air, Water, and Soil* (Eckerman and Ryman 1993). This guidance provides estimates for an adult, but not for children. For internal exposure to radiation through inhalation and ingestion, EPA currently recommends that assessors calculate chronic exposures by summing time-weighted exposures that occur at each stage of life (EPA 2009). Using this approach, exposure-to-dose coefficients for internal exposure could be determined; however, guidance that provides this information has yet to be developed.

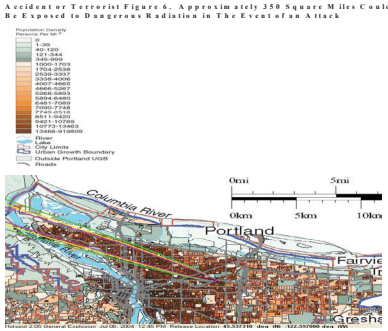
As stated in the National Research Council's Report in Brief on BEIR VII, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* (National Research Council 2006), BEIR VII estimates excess deaths for the sex and age distribution of the U.S. population in terms of the number of excess deaths per million people per absorbed dose, which supports the previously reported dose-to-risk conversion factor estimate for developing LCFs (DOE 2003a). The National Research Council report also shows that the maximum number of excess deaths would be 610 LCFs per million people per person-rem of dose, compared with about 42 out of 100 individuals that are expected to develop solid cancer or leukemia from other causes, assuming a sex and age distribution similar to that of the entire U.S. population. The BEIR VII dose-to-risk conversion factor is essentially equivalent to the estimate of 600 LCFs per million people per person-rem used in the transportation analysis in this *TC & WM EIS*. The health risk effect in the *Draft* and this *Final*

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

What if there is an accident or terrorist attack?

- HoA commissioned physicists to model impact of reasonably foreseeable accident with fire or terrorist attack on a truck at I-5 and I-205 in Portland, and on I-90 in Spokane
- Uses NRC model; was peer reviewed
- Over a thousand cancer deaths, hundreds of square miles contaminated and require evacuation. Decontamination on this scale never attempted.



250-19

16

TC & WM EIS transportation analysis is therefore consistent with BEIR VII in regard to determining the number of LCFs.

250-18 In Appendix S, Section S.3.6, Waste Inventories for Cumulative Impact Analyses, DOE does discuss Hanford's consideration as a candidate location for a new GTCC waste disposal site, but this waste inventory was not included in the *TC & WM EIS* groundwater analysis because the *GTCC EIS* was still under development. Regarding the commentor's concern about the inclusion of GTCC LLW in this *TC & WM EIS*, DOE has included information from the *Draft GTCC EIS* in the *Final TC & WM EIS* cumulative impacts analysis. For a more comprehensive discussion on GTCC LLW, see Sections 2.1 and 2.12 of this CRD.

250-19 Appendix H, Section H.6, and its subsections summarize the methodology and assumptions used for the transportation accident analysis. As indicated in the *TC & WM EIS* Summary, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that transportation of radioactive waste would cause an additional fatality as a result of radiation from either incident-free transportation or postulated transportation accidents. DOE considers, evaluates, and plans for potential terrorist attacks during transportation and storage of radioactive materials. The details of DOE's plans for terrorist countermeasures and the security of its facilities and transports are classified. DOE addresses acts of sabotage or terrorism related to the transport of radioactive materials and waste in this *TC & WM EIS*, Appendix H, Section H.6.6. DOE considers the analyses of sabotage events described in the *Yucca Mountain EIS* (DOE 2002) and its SEIS (DOE 2008a) to be enveloping analyses for this *TC & WM EIS*. The consequences of such acts were calculated to result in a dose to the MEI of 40 to 110 rem (at 140 meters [460 feet]) for events involving a truck- or rail-sized cask, respectively. These events would lead to an increase in the LCF risk to an MEI of about 2 to 7 percent, or from 2 in 100 to 7 in 100 (DOE 2002). Note that the *Yucca Mountain EIS* assesses the potential impacts associated with transportation of SNF and HLW along national transportation routes, whereas the scope of this *TC & WM EIS* is focused on transportation of LLW, MLLW, and TRU wastes.

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

Tank Closure Alternatives

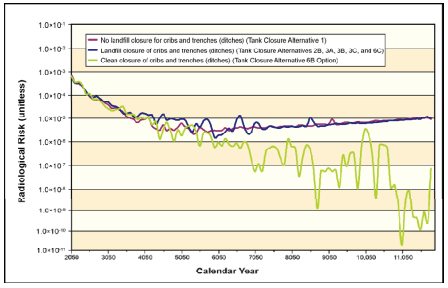
-linked in USDOE's alternatives to treatment alternatives without reason, which makes the alternatives confusing for the public

- "closure" is a legal term for what state tanks are left in and whether contamination and residues are cleaned up

Landfill closure:	Clean Closure:
Leave residues Leave contamination in soil and cap tank farms	Remove residues Remove tanks or pipes to extent practicable and based on risk Clean up tank leaks and massive contamination from billions of gallons of deliberate tank waste discharges to cribs to extent practicable

250-20

Using Caps (landfill closure) instead of cleaning up just 2 sets of cribs and trenches causes magnitudes higher risk (S-16):



250-21

17

250-20 The purpose of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve and treat the Hanford tank waste; close the Hanford SST system; store and/or dispose of the waste generated from these tank waste activities; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate environmental cleanup activities at Hanford and other DOE sites.

The alternatives presented in this *TC & WM EIS* were developed under NEPA (42 U.S.C. 4321 et seq.) to address the essential components of DOE's three sets of proposed actions (tank closure, FFTF decommissioning, and waste management) and to provide an understanding of the differences between the potential environmental impacts of the range of reasonable alternatives. Consistent with CEQ guidance, this EIS analyzes the range of reasonable alternatives that covers the full spectrum of potential combinations. The alternatives considered by DOE in this EIS are "reasonable" in the sense that they are practical or feasible from a technical and economic standpoint and meet the agency's purposes and needs. Potential conflicts with laws and regulations do not necessarily cause an alternative to be unreasonable, but additional mitigation commitments may be required if it is selected for implementation. For a more comprehensive discussion on compliance with regulatory requirements, see Section 2.7 of this CRD.

See response to comment 250-5 regarding factors influencing future DOE decisions.

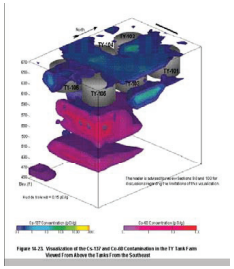
250-21 As discussed in Chapter 1 of this *TC & WM EIS*, Section 1.4.2, Decisions Not to Be Made, there are six sets of cribs and trenches (ditches) that are contiguous to the SSTs and would fall under the barriers placed over the SSTs during closure. These cribs and trenches (ditches) are CERCLA past-practice units and are evaluated in this EIS as part of a connected action because they would be influenced by barrier placement. However, closure of these CERCLA past-practice units is not part of the proposed actions evaluated in this EIS. Closure of these units will be addressed at a later date using the best-available information regarding those technologies that are both feasible and appropriate for these units. These six sets of cribs and trenches (ditches) are noted in Chapter 2 and are described in detail in Appendix D, Section D.1.5.

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

Example of rapid contamination TY Tank Farm

- Fifty fold increase, from 1996 to 2002, in contamination found in one borehole tested between Tanks TY-103 and TY-105.
  - Rise in ^{137}Cs concentration
  - One of the tanks had a substantial release; no reporting, a significant violation.
  - Depth of contamination shows source is likely a pipe or tank leak, … not borehole contamination.
- USDOE also failed to report a release from TY-102.
- Claimed TY farm to be "Controlled, Clean and Stable".



250-22

250-22 The *Draft TC & WM EIS* presented groundwater model predictions of current conditions for comparison with recent groundwater characterization data. This was intended to provide context for readers, stakeholders, and decisionmakers to help evaluate the accuracy and precision of the groundwater modeling system. In response to this comment and similar comments, an expanded discussion has been added to Appendix U of this *Final TC & WM EIS* comparing modeled current conditions against measured current conditions.

6 sets of High-Level Nuclear Waste Treatment Alternatives Presented

- Vitrification Plant (WTP) is $8 billion over budget and delayed 8 years to start up in 2019. It is only designed with capacity to treat half of the volume of "Low Activity Waste" from the tanks.
- "Supplemental" treatment refers to how to treat the other half of the waste.
- Only one alternative proposes to treat all waste with current roadmap of separating High Activity Waste (10% volume with 90% of radioactivity) from Low Activity Waste (LAW) (90% volume with 10% radioactivity), followed by a second LAW vitrification plant

250-23

250-23 See response to comment 250-20 for information regarding the alternatives analyzed in this *TC & WM EIS*.

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Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

Key Decisions USDOE Proposes to Issue Using TCWMEIS:

- How to treat the 50% of tank waste volume that the Vitrification Plant is not designed with capacity to treat in 50 years?
  - Vitrification Plant (WTP) is $8 billion over budget and delayed opening from 2011 to 2019. The High Activity Waste vitrification portion is designed to glassify the 10% of volume with highest radioactivity, but the Low Activity Waste (LAW) portion is only designed to glassify half of the remaining 90%.
  - The LAW glass is planned to be buried at Hanford, only the HAW glass is stored for disposal in a geologic repository.
- Options:
  - Build second LAW plant (WA State preference)
  - Use less effective thermal treatments (steam reforming or bulk vitrification) or, grouting; or, delay making a decision until after the year 2015
    - WA State agreed to delaying choice in settlement proposal

Key Decisions USDOE Proposes to Issue Using TCWMEIS:

- How to Dismantle the FFTF Nuclear Reactor?
- Decision to shut it down permanently was made 2001 after long battle. Sodium drained.
  - Nuclear proponents want USDOE to reopen
- Choices are to entomb or to remove structure above grade
  - USDOE prefers entomb; state reactor siting law says remove (removal chosen for reactors along River)
- Whether to truck radioactive sodium and highly radioactive components to Idaho National Lab or to treat at Hanford?

19

250-24 **250-24** The purpose of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve and treat the Hanford tank waste; close the Hanford SST system; store and/or dispose of the waste generated from these tank waste activities; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate environmental cleanup activities at Hanford and other DOE sites.

See response to comment 250-5 regarding factors influencing future DOE decisions.

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

Comment & Organizing around the TCWMEIS

- The large turnout at the public hearings and strong comments will send a message to USDOE
- Without public outcry, Hanford will be a national radioactive waste dump and the contamination of the Columbia River will grow as you have seen
- It is UP TO YOU to protect our environment and future generations
- Come to at least one hearing, plan to speak up for 2-3 minutes, send in more detailed comments (addresses on handouts). Great if you can attend two.
- Phone bank to urge others to come to hearings around region. Start tomorrow! Email all your friends.
  - Ask your City officials, State reps and Members of Congress to have statements opposing Hanford as national waste dump and opposing abandonment of wastes at the hearings, and to send letter to Secretary of Energy.

Heart of America Northwest's Key Points on the TCWMEIS:

1. Drop All Consideration of Using Hanford as a national radioactive waste dump
2. Existing wastes will create so much contamination that adding more waste is unconscionable
   - We are not falling for USDOE's ploy of saying that it won't start importing waste until Vit plant operates – that doesn't protect the River from contamination
3. There has to be an alternative sending more of Hanford's wastes to repositories that won't contaminate groundwater or a River
4. Dismantle FFTF reactor entirely

20

250-25

250-26

250-25 See response to comment 250-4 for a discussion on the transport and disposal of offsite waste.

The impacts of the offsite waste in terms of radiological risk are presented in the Summary, Section S.5.5.3, and Chapter 2, Section 2.10, Key Environmental Findings. These sections describe the radiological risk differences between including and not including offsite waste disposal at IDF-East.

The *TC & WM EIS* analysis shows that receipt of offsite waste streams that contain specific amounts of certain isotopes, specifically, iodine-129 and technetium-99, could cause an adverse impact on the environment. Therefore, one means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford. Other mitigation measures, such as recycling secondary-waste streams into the primary-waste-stream feeds within the WTP to increase iodine-129 capture in ILAW and bulk vitrification glass, are discussed in Chapter 7, Section 7.5, of this final EIS.

250-26 Regarding the commentor's concern about the disposition of HLW, the current Administration has established a Blue Ribbon Commission on America's Nuclear Future that has issued a report and recommendations for a path forward for managing the country's HLW. DOE's decisions regarding management of Hanford waste will be consistent with Administration policies. For a more comprehensive discussion of this topic, see Section 2.10 of this CRD.

Commentor No. 250 (cont'd): Heart of America Northwest

3/16/2010

Heart of America Northwest's Key Points on the TCWMEIS:

5. USDOE must cleanup the contamination from High-Level Nuclear Waste tank leaks and billions of gallons of discharges
6. "Clean Closure" is what USDOE should be doing for every tank farm, not covering the tanks and contamination under caps – which will allow unconscionable levels of contamination to spread
7. Empty the tanks to remove 99.9% of waste or the limits of technology and then remove any tank and all pipes with significant waste remaining or which is above contamination.

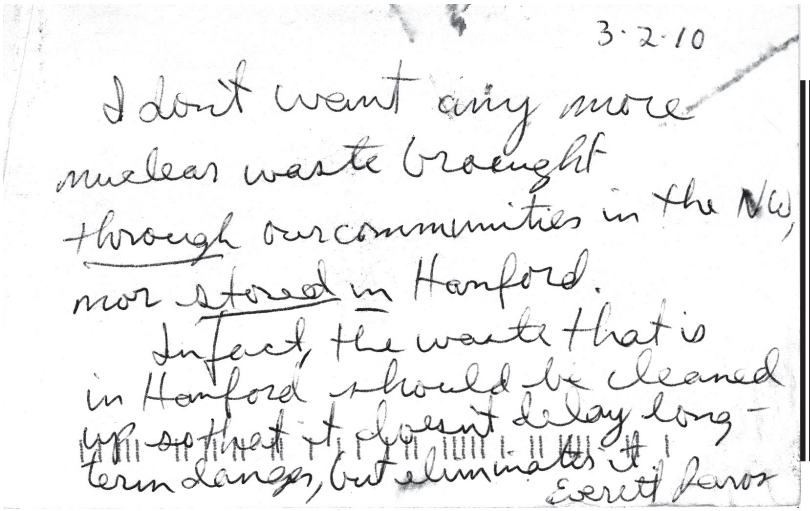
250-27 **250-27** The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 6A and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all of the SST system.

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

One of the purposes of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks.

See response to comment 250-5 regarding factors influencing DOE decisions.

Commentor No. 251: Everett Jaros



3·2·10

I don't want any more
nuclear waste brought
through our communities in the NW,
nor stored in Hanford.
In fact, the waste that is
in Hanford should be cleaned
up so that it doesn't delay long-
term danger, but eliminates it.

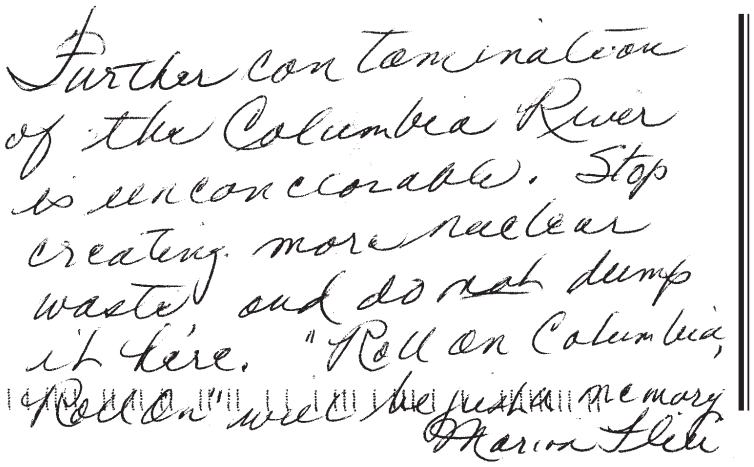
Everett Jaros

251-1

251-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

In general, the scope of this *TC & WM EIS* does not include groundwater remediation activity as part of the proposed actions evaluated. However, DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

Commentor No. 252: Marion Flier


Further contamination of the Columbia River is unconscionable. Stop creating more nuclear waste and do not dump it here. "Roll on Columbia, Roll on" will be the justified memory
Marion Flier

252-1

252-1 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

Commentor Number 253 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 513.

Commentor No. 254: Hoby Streich, Commission President, Port of Hood River

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March 17, 2010

Mary Beth Burandt, Document Manager
Office of River Protection
U.S. Department of Energy
PO Box 1178
Richland, WA 99352

Dear Ms. Burandt:

The Port of Hood River represents a large part of Hood River County and has significant recreational and industrial holdings along the Columbia River. All of our properties lie downstream from the Hanford Nuclear Reservation.

We write to express our concern that the recent Draft Tank Closure and Waste Management Environmental Impact Statement identifies the possibility of persistent environmental contamination of the Columbia River far into the future. This has far-reaching implications for the residents of our Port District.

We urge the Department of Energy to implement the highest level of cleanup possible at Hanford. We endorse the Oregon Department of Energy's proposed Alternative 7 making reasonable recommendations for tank waste storage, retrieval and treatment and remediation of the existing tank farms. We also ask you to rescind your February 2000 record of decision that opened up Hanford to offsite waste. We understand the desire to complete cleanup as quickly and cheaply as possible. However, there is no acceptable alternative to a thorough and complete removal and/or remediation of the existing contamination.

The possibility of long-term contamination of the Columbia River as foreseen in this EIS is unacceptable. Please take the steps suggested in the Oregon Proposal to preserve the health and safety of the Columbia River downstream from Hanford.

Sincerely,

Hoby Streich
Commission President

Cc: Senator Ron Wyden, Senator Jeff Merkley, Congressman Greg Walden
Port of Hood River Commissioners, Hood River City Council, Hood River County Commission

254-1

254-1 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*. Chapter 2 of this EIS has been revised to include a discussion of the Oregon Department of Energy's proposal in Section 2.6.4 and how DOE has addressed the range of reasonable alternatives for tank waste storage, retrieval, and treatment and remediation of the existing tank farms in its original Tank Closure alternatives in Section 2.5.2. DOE has carefully considered the Oregon proposal and, as explained in Section 2.6.4, has determined that it is not reasonable.

Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 255: Patricia A. Milliren

Milliren ①

1703 W. 8th St.
Port Angeles, WA 98363
March 17, 2010

U.S. Dept. of Energy
Tank Closure & Waste Management EIS
P.O. Box 1178
Richland, WA 99352

To the U.S. Department of Energy:

It is profoundly disturbing to me that my government continues to plan to use Hanford for our national nuclear waste dump in spite of the fact that it is located along the largest Pacific Northwest river, critical for drinking water, irrigation, food (fish), and navigation. What are You thinking? Is the Columbia River expendible to you? Is it OK with you to poison the water, the land, the food the people of the Pacific NW just because it's too expensive to figure out some other place? Is it OK with you that we become the national sacrifice area — the incredibly beautiful, amazingly diverse and interdependent ecosystems – this place is just not important to you? It is more important to dump nuclear wastes quick and cheap and keep dumping than to preserve a huge river system? **255-1**

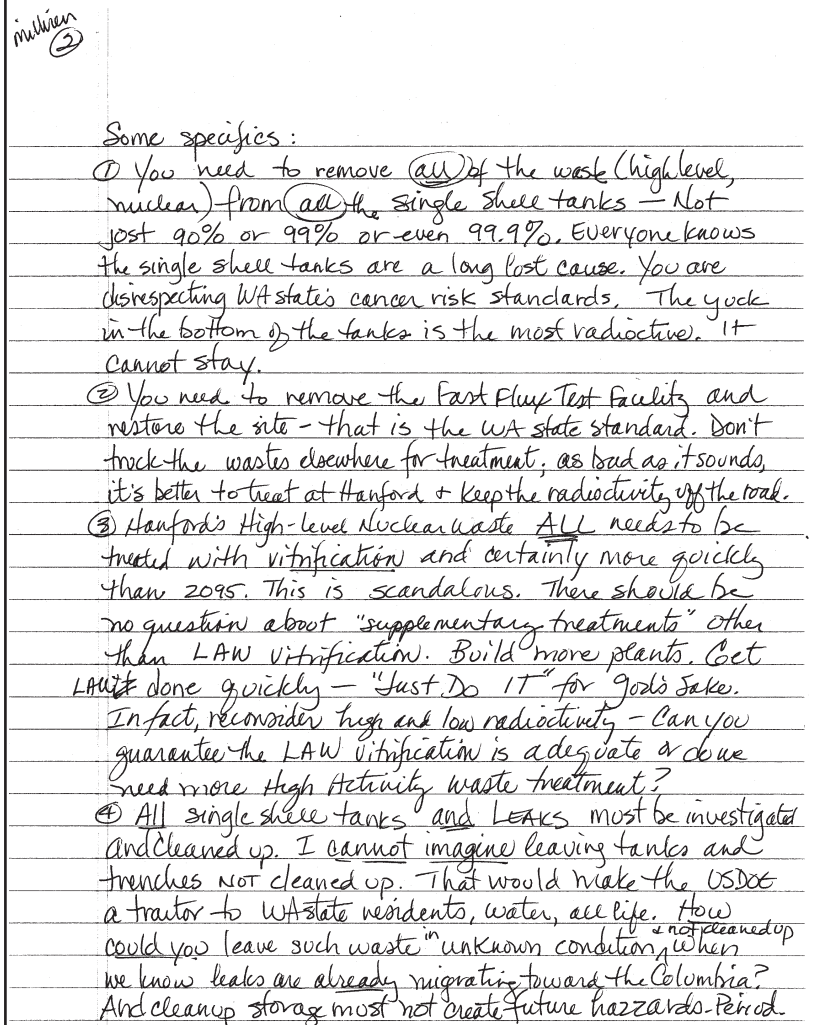
IN THE LONG RUN WE NEED TO STOP CREATING THE WASTE BECAUSE NO ONE WANTS IT – NO RIVER, NO FISH, NO LAND, NO PEOPLE DESERVE THIS WASTE. IN THE SHORT RUN WE NEVER HEAR ANYTHING ABOUT YOUR VITRIFICATION PLANT AND WHEN YOU ARE GOING TO BE READY TO DEAL WITH ALL THE WASTE YOU'VE ALREADY DUMPED UNSAFELY IN OUR BACKYARD. YOU CAN'T EVEN DEAL WITH THAT : NO TO MORE WASTE. **255-2**

255-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

255-2 Nuclear power and nuclear weapons production, as well as their resulting waste, are not within the scope of this EIS. The purpose of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve and treat the Hanford tank waste; close the Hanford SST system; store and/or dispose of the waste generated from these tank waste activities; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate cleanup at Hanford and other DOE sites.

In general, the scope of this *TC & WM EIS* does not include groundwater remediation activity as part of the proposed actions evaluated. However, DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

Commentor No. 255 (cont'd): Patricia A. Milliren



milliren (2)

Some specifics:

① You need to remove (all) of the waste (high level, nuclear) from (all) the single shell tanks — Not just 90% or 99% or even 99.9%. Everyone knows the single shell tanks are a long lost cause. You are disrespecting WA state's cancer risk standards. The yuck in the bottom of the tanks is the most radioactive. It cannot stay. — *255-3*

② You need to remove the Fast Flux Test Facility and restore the site - that is the WA state standard. Don't truck the wastes elsewhere for treatment; as bad as it sounds, it's better to treat at Hanford & keep the radioactivity off the road. — *255-4*

③ Hanford's High-level Nuclear waste ALL needs to be treated with vitrification and certainly more quickly than 2095. This is scandalous. There should be no question about "supplementary treatments" other than LAW vitrification. Build more plants. Get LAW done quickly — "Just Do IT" for God's Sake. In fact, reconsider high and low radioactivity - Can you guarantee the LAW vitrification is adequate or do we need more High Activity waste treatment? — *255-5*

④ All single shell tanks and LEAKS must be investigated and cleaned up. I cannot imagine leaving tanks and trenches NOT cleaned up. That would make the USDOE a traitor to WA state residents, water, all life. How could you leave such waste "unknown condition" when we know leaks are already migrating toward the Columbia? And cleanup storage must not create future hazards. Period. — *255-3 cont'd*

255-3 The decision to leave 0.1 percent, 1 percent, or more of the waste in the SSTs is one of the decisions supported by this *TC & WM EIS* (see Section S.1.3.1 of the Summary and Chapter 1, Section 1.4.1). With regard to the disproportionate amount of radioactivity in the residues at the bottom of the tanks, DOE currently does not have a technical basis for making more-specific assumptions about the expected compositions of the waste "heels" that would remain in the tanks after retrieval. Retrieval has been completed on only a small number of SSTs and not much is known about the behavior of, or ability to remove, small volumes of residual waste. However, the tank closure process, which includes detailed examinations of the tanks and residual waste, will require preparation of a performance assessment and a closure plan. These documents will provide the information and analysis necessary for DOE and the regulators to make specific decisions on what levels of residual tank waste are acceptable in terms of short- and long-term risks. For both Tank Closure Alternatives 6A and 6B, Base Cases, the assumption is that the SST system would be cleaned to levels that would allow for unrestricted use, which would involve removal of the tanks, ancillary equipment, and soils beneath the tanks (contaminated as a result of past leaks) down to the water table. The two Option Cases represent this type of clean closure along with removal of soils beneath the tank farms (contaminated as a result of infiltration from the contiguous cribs and trenches [ditches]). The analysis shows that the removal of the contaminants from the vadose zone does not capture the contaminants that may have already reached the groundwater table due to past practices (i.e., past leaks and contiguous cribs and trenches [ditches]).

DOE received comments on the potential impacts of future remediation activities that are in various stages of planning (which, given the inherent uncertainty, were not included in the cumulative impacts analysis). In response, DOE performed a sensitivity analysis to evaluate the potential impacts if certain remediation activities were conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. The goal of the sensitivity analysis is to help DOE, EPA, and Ecology prioritize cleanup efforts in the future. This analysis is provided in Appendix U of this EIS and is discussed further in Chapter 7, Section 7.5.

255-4 Under NEPA, agencies identify the laws, regulations, and requirements that may apply to the proposed action and alternatives and identify where standards may be exceeded. Chapter 8 of this *TC & WM EIS* provides both a listing and short

Commentor No. 255 (cont'd): Patricia A. Milliren

Milliren (3)

Future treated wastes must not endanger our rivers) or any others, must not endanger drinking water or the land through which water seeps + flows. **255-3 cont'd**

If we do not know how to store or treat these wastes, then it is high time we stop making them. Why is Hanford Cleanup so far behind and over budget? The priorities need to be cleanup/ treatment and safe storage — not giving nuclear power plants and weapons to the world. This is insane — taking wastes from other nations. We are dealing with thousands of years, millions of lives. **255-2 cont'd**

Sincerely,
Patricia A. Milliren

description of the laws, regulations, and requirements that may apply to the proposed actions, including FFTF decommissioning.

Radioactive waste is transported in DOT-certified containers that meet strenuous technical standards established by NRC. Under DOE's Preferred Alternative for FFTF decommissioning (Alternative 2), some below-grade structures would remain; however, these would be grouted in place to immobilize the hazardous constituents. The filled area would then be covered with a modified RCRA Subtitle C barrier to further isolate the entombed structures and prevent infiltration of water. These actions (grouting and barrier placement) would minimize the migration of any contaminants to the environment.

255-5 As discussed in the *TC & WM EIS* Summary, Chapter 1, and Chapter 2, this EIS analyzes additional waste treatment capability that includes expanding the vitrification process capability currently being constructed in the WTP or supplementing the WTP's capability with supplemental treatment technologies. In fact, several of the vitrification expansion alternatives analyze treating all of the tank waste inventory as HLW. Thus, decisions to be made by DOE regarding whether to treat all waste in the WTP, as is or expanded, or to supplement its capacity by adding new treatment capability depend on demonstrating the feasibility of supplemental treatment technologies. While DOE cannot guarantee the long-term performance of ILAW glass is "adequate" (nor can anyone else), both the Summary and Chapter 5 of this *TC & WM EIS* provide the long-term radiological risks estimated for ILAW glass.

Commentor No. 256: Karen Coulter, Director, Blue Mountains Biodiversity Project

From:
Karen Coulter, Director
Blue Mountains
Biodiversity Project
~~HCR 82~~ 27803 Williams Lane
Fossil, Oregon 97830
(541) 468-2028
(541) 385-9167 messages

March 17th, 2010

Comments on the Draft Tank Closure & Waste Management EIS
To: the U.S. Department of Energy
P.O. Box 1178
Richland, WA 99352

We are deeply concerned by the U.S. Department of Energy's preferred decisions in the Tank Closure & Waste Management EIS (aka EIS): to never clean up the millions of gallons of deadly, radioactive ~~wast~~ waste already leaked from the high level nuclear waste tanks - even though the contamination is rapidly moving toward the Columbia River -, to never clean up more than 40 miles of unlined soil trenches into which the U.S. DOE dumped huge amounts of chemical and highly radioactive wastes, including Plutonium - and to not ~~disinfect~~ dismantle the Fast Flux Test Facility, and accept adding even more nuclear waste from around the country to the already unsafe and contaminated Hanford reservation. These decisions can be expected to result in plutonium contamination reaching the Columbia River increasing to over 300 times the Drinking Water standards over the next thousand years - even before new waste is added if Hanford becomes a national radioactive waste dump - and an increased cancer risk from the ground water ten to 100 times Washington State's cleanup cancer risk standard, based on your own analysis. These are unacceptable risks to Northwest water ways, fisheries, lands, wildlife, and human health. It is also insanity to approve thousands of truckloads to travel hundred to thousands of miles to Hanford through relatively pristine areas and populated cities such as Portland and Spokane containing highly radioactive waste. Such long distance transport is sure to result in accidents, spreading radioactive contamination and risks.

Specifically, we ask that the following decisions be made:

* U.S. DOE should remove 99.9 % of the tank wastes (high level nuclear waste) from the aging underground and single shell tanks or up to the limits of technical capability for removal.
* U.S. DOE should remove the tanks ("clean closure") and investigate and remediate the soil contamination from tank leaks. Washington state

256-1

256-2

256-3

256-4

256-5

256-1 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

One of the purposes of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks.

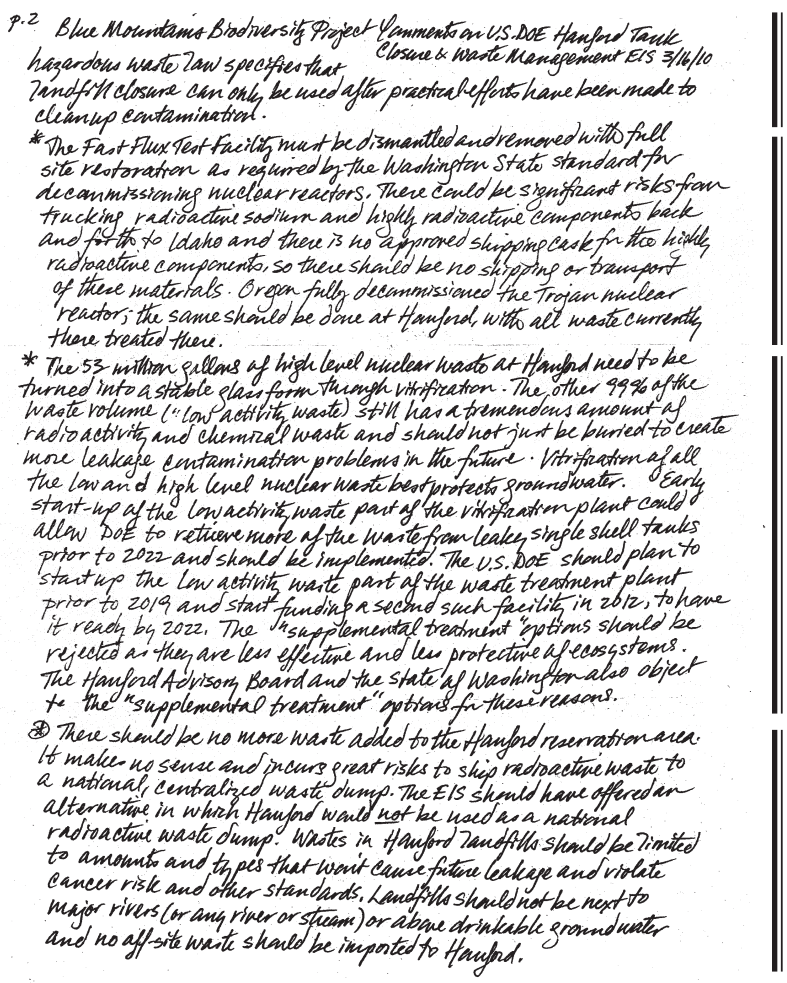
256-2 See response to comment 256-1 regarding groundwater contamination and potential remediation.

One of the sources identified in the *Draft TC & WM EIS* as a large contributor to plutonium contamination in the groundwater is a reverse well that resulted in direct injection of waste streams into the aquifer. Information regarding this reverse well and the potential behaviors of the contaminants (i.e., plutonium) is discussed in Appendix U of this *Final TC & WM EIS*. In addition, as reported in the *Draft TC & WM EIS*, DOE reexamined other sources that appeared to contribute to the plutonium plume and identified an overestimation of a plutonium source in the 300 Area. This overestimation has been corrected in this *Final TC & WM EIS*.

256-3 As shown in the Summary of this *TC & WM EIS*, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that the estimated total public radiation exposures from transporting radioactive waste to Hanford for disposal would result in any additional LCFs as a result of either incident-free operations or accidents.

256-4 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

Commentor No. 256 (cont'd): Karen Coulter, Director, Blue Mountains Biodiversity Project



p.2 Blue Mountains Biodiversity Project Comments on U.S. DOE Hanford Tank Closure & Waste Management EIS 3/16/10

hazardous waste law specifies that landfill closure can only be used after practical efforts have been made to cleanup contamination. 256-5 cont'd

* The Fast Flux Test Facility must be dismantled and removed with full site restoration as required by the Washington State standard for decommissioning nuclear reactors. There could be significant risks from trucking radioactive sodium and highly radioactive components back and forth to Idaho and there is no approved shipping cask for the highly radioactive components, so there should be no shipping or transport of these materials. Oregon fully decommissioned the Trojan nuclear reactor; the same should be done at Hanford, with all waste currently there treated there. 256-6

* The 53 million gallons of high level nuclear waste at Hanford need to be turned into a stable glass form through vitrification. The other 99% of the waste volume ("low activity waste") still has a tremendous amount of radioactivity and chemical waste and should not just be buried to create more leakage contamination problems in the future. Vitrification of all the low and high level nuclear waste best protects groundwater. Early start-up of the low activity waste part of the vitrification plant could allow DOE to retrieve more of the waste from leaky single shell tanks prior to 2022 and should be implemented. The U.S. DOE should plan to start up the low activity waste part of the waste treatment plant prior to 2019 and start funding a second such facility in 2012, to have it ready by 2022. The "supplemental treatment" options should be rejected as they are less effective and less protective of ecosystems. The Hanford Advisory Board and the state of Washington also object to the "supplemental treatment" options for these reasons. 256-7

* There should be no more waste added to the Hanford reservation area. It makes no sense and incurs great risks to ship radioactive waste to a national, centralized waste dump. The EIS should have offered an alternative in which Hanford would not be used as a national radioactive waste dump. Wastes in Hanford landfills should be limited to amounts and types that won't cause future leakage and violate cancer risk and other standards. Landfills should not be next to major rivers (or any river or stream) or above drinkable groundwater and no off-site waste should be imported to Hanford. 256-8

256-5 The clean closure alternatives considered for the SST system are represented by the Base and Option Cases of Tank Closure Alternatives 6A and 6B; selective clean closure is represented by Tank Closure Alternative 4. For both Base Cases, the assumption is that the SST system would be cleaned to levels that would allow for unrestricted use, which would involve removal of the tanks, ancillary equipment, and soils beneath the tanks (contaminated as a result of past leaks) down to the water table. The two Option Cases represent this type of clean closure along with removal of soils beneath the tank farms (contaminated as a result of infiltration from the contiguous cribs and trenches [ditches]). The analysis shows that removal of the contaminants from the vadose zone would not capture those contaminants that may have already reached the groundwater table due to past practices (i.e., past leaks and contiguous cribs and trenches [ditches]).

DOE received comments on the potential impacts of future remediation activities that are in various stages of planning (which, given the inherent uncertainty, were not included in the cumulative impacts analysis). In response, DOE performed a sensitivity analysis to evaluate the potential impacts if certain remediation activities were conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. The goal of the sensitivity analysis is to help DOE, EPA, and Ecology prioritize cleanup efforts in the future. This analysis is provided in Appendix U of this EIS and is discussed further in Chapter 7, Section 7.5.

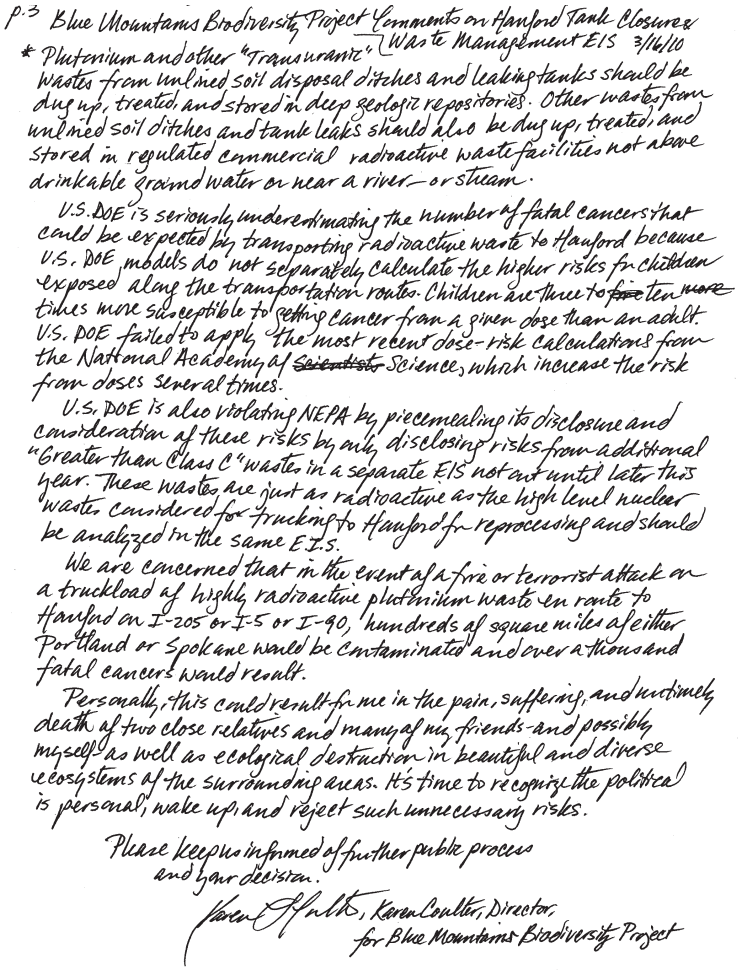
Chapter 8 identifies and discusses the laws and legal requirements that are potentially applicable to the proposed actions and alternatives and the permits and approvals DOE would need to obtain from Federal, state, and local agencies.

256-6 Under NEPA, agencies identify the laws, regulations, and requirements that may apply to the proposed action and alternatives and identify where standards may be exceeded. Chapter 8 of this *TC & WM EIS* provides both a listing and short description of the laws, regulations, and requirements that may apply to the proposed actions, including FFTF decommissioning.

Radioactive waste is transported in DOT-certified containers that meet strenuous technical standards established by NRC.

256-7 As discussed in the *TC & WM EIS* Summary, Chapter 1, and Chapter 2, this EIS analyzes additional waste treatment capability that includes expanding the vitrification process capability currently being constructed in the WTP or supplementing the WTP's capability with supplemental treatment technologies. Thus, decisions to be made by DOE regarding whether to treat all waste in the

Commentor No. 256 (cont'd): Karen Coulter, Director, Blue Mountains Biodiversity Project



p.3 Blue Mountains Biodiversity Project Comments on Hanford Tank Closure & Waste Management EIS 3/16/10

* Plutonium and other "Transuranic" wastes from unlined soil disposal ditches and leaking tanks should be dug up, treated, and stored in deep geologic repositories. Other wastes from unlined soil ditches and tank leaks should also be dug up, treated, and stored in regulated commercial radioactive waste facilities not above drinkable ground water or near a river or stream.

U.S. DOE is seriously underestimating the number of fatal cancers that could be expected by transporting radioactive waste to Hanford because U.S. DOE models do not separately calculate the higher risks for children exposed along the transportation routes. Children are three to ~~five~~ ten ~~more~~ times more susceptible to getting cancer from a given dose than an adult. U.S. DOE failed to apply the most recent dose-risk calculations from the National Academy of ~~Scientists~~ Sciences, which increase the risk from doses several times.

U.S. DOE is also violating NEPA by piecemealing its disclosure and consideration of these risks by only disclosing risks from additional "Greater than Class C" wastes in a separate EIS not out until later this year. These wastes are just as radioactive as the high level nuclear waste considered for trucking to Hanford for reprocessing and should be analyzed in the same E.I.S.

We are concerned that in the event of a fire or terrorist attack on a truckload of highly radioactive plutonium waste en route to Hanford on I-205 or I-5 or I-90, hundreds of square miles of either Portland or Spokane would be contaminated and over a thousand fatal cancers would result.

Personally, this could result for me in the pain, suffering, and untimely death of two close relatives and many of my friends and possibly myself as well as ecological destruction in beautiful and diverse ecosystems of the surrounding areas. It's time to recognize the political is personal, wake up, and reject such unnecessary risks.

Please keep us informed of further public process and your decision.

Karen J. Coulter, Karen Coulter, Director, for Blue Mountains Biodiversity Project

256-9

256-10

256-11

256-12

WTP, as is or expanded, or to supplement its capacity by adding new treatment capability depend on demonstrating the feasibility of supplemental treatment technologies, including supplemental treatment waste-form performance (durability) for long-term groundwater protection.

Appendix E, Section E.1.3.3.1, discusses the DOE Technology Readiness Assessment that included Business Case No. 7 (LAW First and Bulk Vitrification with Tank Farm Pretreatment), i.e., early startup of the LAW treatment process. However, at the time of the *Draft TC & WM EIS* preparation, DOE had not made a decision on whether to support implementation of this business case. Since then, DOE has commissioned an external technical review of the system planning for alternative supplemental treatment of LAW at Hanford (Kosson et al. 2008). The report (Kosson et al. 2008) from this review concluded that, although the current schedule for completion of the WTP LAW Vitrification Facility and supporting facilities could support early treatment of LAW in 2014, such early startup would require an interim pretreatment capability and the means for disposition of secondary waste. Since 2008, DOE has been evaluating the transition of the WTP from construction to commissioning. Information on this strategy is provided in Appendix E, Section E.1.3.3.2, of this *Final TC & WM EIS*. The *2020 Vision* (WRPS and BNI 2011) evaluates some of the elements identified in earlier DOE reports, but focuses on commissioning of the WTP project and activities essential to starting up the LAW Vitrification Facility, the Analytical Laboratory, the BOF, as well as the Pretreatment Facility and the HLW Vitrification Facility. For more information regarding the *2020 Vision*, please see Appendix E, Section E.1.3.3.2.

256-8 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Chapter 8 of this EIS identifies both Federal and state regulatory requirements that may apply to DOE's proposed actions in this EIS.

256-9 TRU waste, including waste contaminated with plutonium, in unlined soil disposal trenches is not within the scope of this EIS. However, information on this waste is included in Appendix S, "Waste Inventories for Cumulative Impact Analyses." The scope of this *TC & WM EIS* includes decisions on storage,

retrieval, treatment, and disposal of tank waste and closure of the SST system. This closure includes the tank system, along with the vadose zone as impacted by the tank farms (i.e., past leaks). Any LLW generated by the tank closure or FFTF decommissioning activities would be disposed of in the LLBGs, in one of the two active trenches (31 and 34); an IDF; and/or the RPPDF, all of which would have liners.

256-10 There is no existing guidance that recommends dose coefficients for children's exposure to external radiation. DOE acknowledges that children have an elevated sensitivity to radiation exposure. The most recent guidance for use of exposure-to-dose coefficients related to external exposure (ionizing radiation) is used in the analysis. This guidance can be found in Federal Guidance Report No. 12, *External Exposure to Radionuclides in Air, Water, and Soil* (Eckerman and Ryman 1993), which provides estimates for an adult, but not for children. For internal exposure to radiation through inhalation and ingestion, EPA currently recommends that assessors calculate chronic exposures by summing the time-weighted exposures that occur at each stage of life (EPA 2009). Using this approach, exposure-to-dose coefficients for internal exposure could be determined; however, guidance providing this information has yet to be developed.

As stated in the National Research Council's Report in Brief on BEIR VII, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* (National Research Council 2006), BEIR VII estimates excess deaths for the sex and age distribution of the U.S. population in terms of the number of excess deaths per million people per absorbed dose, which supports the dose-to-risk conversion factor estimate of 600 LCFs per million people per person-rem. The National Research Council report shows that the maximum number of excess deaths would be 610 LCFs per million people per person-rem of dose, compared with about 42 out of 100 individuals that are expected to develop solid cancer or leukemia from other causes, assuming a sex and age distribution similar to that of the entire U.S. population. The BEIR VII dose-to-risk conversion factor is essentially equivalent to the estimate of 600 LCFs per million people per person-rem used in the transportation analysis in this *TC & WM EIS*. The health risk effect in the transportation analysis is therefore consistent with BEIR VII in regard to determining the number of LCFs.

256-11 Regarding the commentor's concern about the inclusion of GTCC LLW in this *TC & WM EIS*, DOE has included information from the *Draft GTCC EIS* in the

Commentor No. 256 (cont'd): Karen Coulter, Director, Blue Mountains Biodiversity Project

Final TC & WM EIS cumulative impacts analysis. For a more comprehensive discussion on GTCC LLW, see Sections 2.1 and 2.12 of this CRD.

256-12 Based on the analysis summarized in Chapter 4, Section 4.3.12, Public and Occupational Health and Safety—Transportation, and Appendix H of the *Draft TC & WM EIS*, it is unlikely that additional LCFs would occur in the general population from truck transport of offsite radioactive waste to Hanford during either incident-free operations or accidents. Note that waste shipments would not use the Interstate 5 or Interstate 205 corridors to travel through or around Portland, Oregon. DOE considers the threat of terrorist attack to be credible and makes all efforts to reduce any vulnerability to this threat. DOE considers, evaluates, and plans for potential terrorist attacks that could occur during transportation and storage of radioactive materials. The details of DOE's plans for terrorist countermeasures and the security of its facilities and transports are classified. DOE addresses acts of sabotage or terrorism related to the transport of radioactive materials and waste in this *TC & WM EIS*, Appendix H, Section H.6.6. DOE considers the analyses of sabotage events described in the *Yucca Mountain EIS* (DOE 2002) and its SEIS (DOE 2008a) to be enveloping analyses for this *TC & WM EIS*. The consequences of such acts were calculated to result in a dose to the MEI of 40 to 110 rem (at 140 meters [460 feet]) for events involving a truck- or rail-sized cask, respectively. These events would lead to an increased LCF risk to an MEI of about 2 to 7 percent, or from 2 in 100 to 7 in 100 (DOE 2002).

Commentor Number 257 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 213.

Commentor No. 258: Victoria Haven

U. S. DEPARTMENT OF ENERGY

Comment Form
Formulario para comentarios

Thank you for your input
Gracias por su participación

Date/Fecha: March 17, 10

PLEASE PRINT / FAVOR DE ESCRIBIR CLARAMENTE

1. What comments do you have on the *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington (TC & WM EIS?)*
¿Que comentarios tiene usted sobre el *Borrador de la Declaración Sobre el Impacto Ambiental del Cierre de Contenedores y la Disposición de Desechos del Establecimiento de Hanford, Richland, Washington (TC & WM EIS?)*

Please clean up all radioactive wastes at Hanford to the highest possible standard before importing any more waste.

***** CONTINUE ON BACK FOR MORE SPACE *****
***** CONTINUAR AL DORSO PARA MÁS ESPACIO *****

Name/Nombre: Victoria Haven

Address/Dirección:

City, State, Zip Code/Ciudad, Estado, Zona Postal:

NOTE: Please do not include personal information (such as address or phone number) if you object to it being included in the *TC & WM EIS*. Comments received, including contact information, are published in the *TC & WM EIS* in their entirety.
NOTA: Favor de excluir información personal (dirección o número de teléfono) que desea que no aparezcan en el *TC & WM EIS*. Comentarios recibidos, incluyendo la información personal proporcionada, serán publicados en el *TC & WM EIS*.

For more information contact: Mary Beth Burandt, Document Manager,
TC & WM EIS, P.O. Box 1178, Richland, WA 99352
Toll-free Telephone: 1-888-829-6347 • Toll-free Fax: 1-888-785-2865
E-mail: TC&WMEIS@saic.com

258-1

258-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 259: Sylvia Haven

U. S. DEPARTMENT OF ENERGY

Comment Form
Formulario para comentarios

Thank you for your input
Gracias por su participación

PLEASE PRINT / FAVOR DE ESCRIBIR CLARAMENTE

Date/Fecha: 3/17/10

1. What comments do you have on the *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington (TC & WM EIS)*?
¿Que comentarios tiene usted sobre el *Borrador de la Declaración Sobre el Impacto Ambiental del Cierre de Contenedores y la Disposición de Desechos del Establecimiento de Hanford, Richland, Washington (TC & WM EIS)*?

It is a matter of security and safety of Northwest citizens that no additional waste be brought to Hanford until the present lethal danger is cleaned up. The USDOE should remove 99.9% of tank wastes or whatever is technologically possible. Then the treated waste needs to be placed in deep geological depositaries. *259-1*

It is a crime that radioactive wastes have been put in unlined ditches. It needs to be removed and treated. *259-2*

We want "Roll on Columbia, Roll on" to be a blessing and not a radioactive threat. *259-3*

259-4

** CONTINUE ON BACK FOR MORE SPACE **
** CONTINUAR AL DORSO PARA MÁS ESPACIO **

Name/Nombre: Sylvia Haven

Address/Dirección: 10418 12th Ave NE

City, State, Zip Code/Ciudad, Estado, Zona Postal: Seattle WA 98125

NOTE: Please do not include personal information (such as address or phone number) if you object to it being included in the *TC & WM EIS*. Comments received, including contact information, are published in the *TC & WM EIS* in their entirety.
NOTA: Favor de excluir información personal (dirección o número de teléfono) que desea que no aparezcan en el *TC & WM EIS*. Comentarios recibidos, incluyendo la información personal proporcionada, serán publicados en el *TC & WM EIS*.

For more information contact: Mary Beth Burandt, Document Manager,
TC & WM EIS, P.O. Box 1178, Richland, WA 99352
Toll-free Telephone: 1-888-829-6347 • Toll-free Fax: 1-888-785-2865
E-mail: TC&WMEIS@saic.com

259-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

259-2 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

259-3 Regarding the commentor's concern about the disposition of HLW, the current Administration has established a Blue Ribbon Commission on America's Nuclear Future that has issued a report and recommendations for a path forward for managing the country's HLW. DOE's decisions regarding management of Hanford waste will be consistent with Administration policies. For a more comprehensive discussion of this topic, see Section 2.10 of this CRD.

259-4 Since 2004, DOE has buried all LLW in lined trenches (see Appendix E, Section E.3.3, for a description of the evolution of past waste-disposal practices). DOE continues to strictly limit the amount of waste Hanford can accept, and ensures that disposal activities are protective of the environment and meet regulatory requirements. Previous use of unlined trenches for disposal was a big concern to stakeholders and Washington and Oregon States; DOE heard and addressed those concerns and is using lined trenches.

Commentor No. 260: Daniel E. Peterson

Tank Closure and
Waste Management
Environmental Impact
Statement

March 15, 2010
3025 N.E. 137th St
Apt. #05
Seattle, Washington
98125

Dear Sirs

On behalf of our 22 year old son, who died in 1975, and his brothers and sister as well as his parents we urge an end to downwinders deaths. This means continued and expanded clean up of the Hanford site that will reduce contamination of the Columbia River and all of the downwind and downstream populations.

As one who has worked as a Columbia River historian for over 400 days (70 7 day trips) from Astoria to Hells Canyon and return between 2001 and 2008, I can testify to the major concern of those citizens downstream from the Hanford site.

Please expand the clean up effort and stop continually post-poning clean up goals.

Sincerely Dan Peterson
for Siri, Brad, Kevin
and Sharon Peterson

P.S. As a Tax payer I am willing to pay for clean-up. I worked on the Grand Coulee Dam which provided the cheap block of power that made the Hanford project possible. That dam continues to pay for taxes so we are some of Hanford clean up.

260-1 **260-1** Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

Commentor No. 261: Michael P. McNamara, President, THOR Treatment Technologies, LLC

THOR Treatment Technologies

MICHAEL P. MCNAMARA
President

106 Newberry Street, SW
Aiken, South Carolina 29801
Phone: (803) 502-5729
mike.mcnamara@wsms.com

March 18, 2010

Mary Beth Burandt
EIS Document Manager
Department of Energy
Office of River Protection
PO Box 1178
Richland WA 99352

Subject: Draft Tank Closure and Waste Management (TC & WM) Environmental Impact Statement (EIS) for the Hanford Site, Richland, Washington, (DOE/EIS-0391)

Dear Ms. Burandt,

Please find enclosed comments submitted by THOR Treatment Technologies, LLC concerning the subject document. We appreciate the opportunity to participate in the development of environmental analyses affecting the future of cleanup at Hanford and look forward to consideration of our submittal.

Please do not hesitate to contact Mr. Phillip Staats at (509) 528-7542 or myself should you have questions or require further information.

Sincerely,

Michael P. McNamara
President
THOR Treatment Technologies, LLC

Enclosures

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Commentor No. 261 (cont'd): Michael P. McNamara, President, THOR Treatment Technologies, LLC

THOR Treatment Technologies

General Comments

The National Environmental Policy Act (NEPA) requires an Environmental Impact Statement (EIS) to evaluate alternatives for treating and disposing of Hanford waste and closing the tanks and associated facilities. In order to meet that requirement, the Department of Energy has prepared the *Draft Tank Closure and Waste Management (TC & WM) Environmental Impact Statement (EIS) for the Hanford Site*, Richland, Washington, (DOE/EIS-0391.

The EIS Tank Closure Activity comprises five components: Storage, Retrieval, Treatment, Disposal, and SST Closure. Although the EIS covers all wastes in both SST's and DST's, it just covers SST closure and defers DST closure to a future EIS. The draft EIS includes Performance Assessments (PA) for the Tank Closure Activity for each of 11 Alternatives and featured a set of 7 Preferred Alternatives. The Final TC & WM EIS will present a single preferred alternative that is likely to be among one of the 7 Preferred Alternatives of the Draft EIS. Clearly, it is in the best interest of the EIS to have accurate and well documented data to support their PA.

In particular, we believe that for the Tank Closure Treatment component of Alternative 3C the data supporting the impact evaluation of Fluidized Bed Steam Reformer should be improved. The EIS analysis of groundwater impacts from disposal of FBSR granules under Alternative 3C appears to be based on unnecessarily conservative assumptions about the solubility of FBSR Constituents of Potential Concern (COPC) in long-term porewater flow.

There are a series of reports cited by the EIS [Lorier, Pareizs, and Jantzen 2005; McGrail et al. 2003a, 2003b] that focused exclusively on FBSR durability under a standard battery of EPA, ANSI, and DOE waste form qualification standards such as TCLP, PCT, PUF, and SPFT. These durability tests showed superior FBSR performance that not only met the minimum goals for borosilicate glass, FBSR product met or exceeded the long-term performance of glass for the same tests. Unfortunately, these FBSR reports do not seem to have communicated the durability of FBSR encapsulated COPC's very well.

261-1

The EIS PA derived a set of parameters for their FBSR product that were not provided by these reports. For example, the EIS chose a granulated FBSR form and derived a nepheline solubility that seems to be four orders of magnitude greater than that reported in the literature. That nepheline solubility then implied an accelerated release of all COPC's to the porewater far in excess of what the durability testing showed.

There is much information about the durability of FBSR granules that shows excellent COPC retention. If the matrix solubility limited model is to be used, TTT requests that the EIS team updates the FBSR data given a more realistic and well documented nepheline solubility. Furthermore, TTT has now determined that a monolithic form of the FBSR granules better meets the projected IDF disposal requirements detailed below. Therefore, TTT asks that the EIS team consider incorporating the FBSR monolithic waste form instead of the granulated form that was originally slated for disposal.

The following comments are segregated into four areas: Administrative, technical, approach recommendations, and submittal of information previously provided along with updated test results in Appendices A and B respectively.

Administrative Comments

The Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 CFR 1500) and CEQ Guidance (*Recommendations for the Preparation of Environmental*

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261-1 Durability test results of fluidized-bed steam reforming (FBSR) product useful in developing estimates of long-term performance are limited to the identification of parameters in expressions for the undisturbed forward rate of reaction of that product. When applied to particles of the size of those produced in the bed and offgas of the FBSR, high rates of dissolution are predicted. Reported rates of the dissolution of crystalline (Tole et al. 1986, Table 2) and glassy nepheline (Hamilton et al. 2001, Table 2), when used with particles of the size of FBSR product, are comparable to those derived using the FBSR forward reaction expression. The current database does not identify alteration product or precipitates, or support the projection of decreases in the rate of reaction of such compounds. The analysis for this *TC & WM EIS* has been supplemented by development of estimates of a range of solubility of nepheline dependent on reaction conditions and the nature of the precipitation products assumed to appear. Specification of the physical form of the FBSR product is established by DOE; it currently remains that of the bed and offgas particulate.

261-2 DOE is familiar with all of the cited requirements and does not agree with the commentor's assertion that CEQ requirements and recommendations were not met and followed in the preparation and development of the *Draft TC & WM EIS*. In addition to the description contained in Chapter 2, Section 2.2.2.2, of the *Draft TC & WM EIS*, Appendix E, Section E.1.2.3.8, provides a detailed discussion of the steam reforming process, which is one of the supplemental treatment processes considered and evaluated in this EIS. This section includes a discussion and description of the technology description, technology process and facilities, waste form/disposal package, and assumptions and uncertainties related to this treatment process. NEPA requires information used in EIS analyses to be referenced and publicly available. Additional waste-form performance assessment analysis information has been included in Chapter 7, Section 7.5, and Appendix M, Section M.5, of this *Final TC & WM EIS*, including information regarding the performance of steam reforming.

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Assessments and Environmental Impact Statements, Second Edition, DOE 2004) provides guidance for the preparation and development of alternative analysis. Our examination of DOE/EIS-0391 indicates the following areas were not addressed with regard to the Fluidized Bed Steam Reformer, Alternative 3C.

Incomplete or Unavailable Information (40 CFR 1502.22) relevant to significant impacts essential to choice among alternatives:
•If the cost of obtaining the information is not exorbitant – include the information in the EIS
•If the cost of obtaining the information is exorbitant -- include in the EIS:
- A statement that information is incomplete or unavailable
- A statement of the relevance of the incomplete or unavailable information to evaluating adverse impacts
- A summary of existing credible scientific evidence
- The agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community.

Areas of scientific disagreement over methods or interpretation (*Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements*, DOE 2004) the Agency must:
•Identify responsible opposing views regarding how to conduct impacts analysis or interpret conclusions.
•Explain the basis for DOE's choice of methodology in a manner that demonstrates that the analysis is technically sound and provides a sufficient basis for decision making.
•Consider explaining how use of the different methodology would affect the conclusions.
•Consider presenting the results of using the alternative data, assumptions, or methodologies.

When **employing a methodology to analyze impacts** in the EIS the Agency must:
•Identify any methodologies used (40 CFR 1502.24)
•Make explicit reference to the scientific and other sources relied upon for conclusions (40 CFR 1502.24)
•Provide data and references to allow review of the validity of analytical methods and results. (DOE 2004)
•When using a bounding analysis identify the range of potential impacts (DOE 2004)

It is also recommended 1) the final EIS include a detailed discussion of the technical maturation process that will be used to support the M-62-45 Supplemental Treatment Decision Milestone. This draft milestone requires a one-time supplemental treatment selection no later than April 30, 2015, and 2) defer the ROD selection of supplemental treatment technology until a determination can be made based on data and analysis provided to support the M-062-40 Supplemental Technology Report due October 31, 2014.

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261-2 cont'd

261-3

261-3 The purpose of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve and treat the Hanford tank waste; close the Hanford SST system; store and/or dispose of the waste generated from these tank waste activities; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate cleanup at Hanford and other DOE sites. Implementation of the selected actions following issuance of DOE's ROD would be subject to more-detailed evaluations and processes required under RCRA, the Washington State Hazardous Waste Management Act, CERCLA, and the TPA, as applicable, including obtaining appropriate treatment and closure permits from Ecology. Appendix E of this *TC & WM EIS* discusses the technologies and their assumptions and uncertainties. In addition, Appendix E, Section E.1.3.3.1, discusses the technology readiness assessment process.

Commentor No. 261 (cont'd): Michael P. McNamara, President, THOR Treatment Technologies, LLC

THOR Treatment Technologies

Technical Comments

1) DOE/EIS-0391, Vol .2, App. M, p. M-16, M.2.2.2 defines the release model used for the FBSR waste product as: *The primary application of the matrix solubility limited-release model is for releases from salt cake in high-level radioactive waste (HLW) tanks under Tank Closure Alternatives 1 and 2A and from steam reforming solids under Tank Closure Alternative 3C. Primary parameters of the model are rate of infiltration, mass of the waste matrix, solubility of the waste matrix, and concentration of hazardous constituents in the waste matrix.*

DOE/EIS-0391, Vol. 2, App. M, p. M-18 adopted very conservative values for nepheline solubility and a congruent Tc dissolution but does not specify the reaction and gives no reference for the solubility limit used.

Sections M.2 and M.3.1.2 cite numerous documents for characterization of release rate mechanisms, [Lorier, Pareizs, and Jantzen 2005; McGrail et al. 2003a, 2003b]. These models were not used and instead the matrix solubility limited release model in a porous media was used with ~50% porosity at 0.9 mm pore water flow rate. In addition, a very conservative "effective" nepheline solubility, 3.95e6 g/m3 in pore water flow, was used evidently based on two waters per nepheline instead of using a literature value for FBSR nepheline ($NaAlSiO_4$) solubility.

It is recommended the solubility be revised to reflect the literature values reported by Hamilton et al. 2001 and Tole et al. 1986. The appropriate model input parameter for the equilibrium solubility of nepheline from FBSR should be revised to 104 g/m3 given Log (K_{eq}) = -9.39 at 17 C and pH = 10.9. This assumes that the dissolution reaction is

$NaAlSiO_4 + 2\ H_2O \rightarrow Na^+ + Al(OH)_4^- + SiO_2$

and that all species remain in solution with no secondary mineral formation.

The EIS nepheline solubility therefore seems to be about 40,000 times greater than the literature reports and as a result, the EIS FBSR fractional release per year was effectively 2.8e-3 g/g. The EIS Alternative 3C FBSR risk calculations are not consistent with previous calculations [Mann et al. 2003 and McGrail et al. 2003] for the performance characteristics of the THOR® alkali-aluminosilicate (mineral) matrix under long-term disposal conditions. These previous studies indicated the FBSR product durability to be equal to or greater than borosilicate glass, which is also consistent with past FBSR durabilities [Bryant 1987, WSRC-TR-2005-00124 2005], all based on a granular product.

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261-4

261-4 As reflected in the comment, the *Draft TC & WM EIS* analysis did assume consumption of two moles of water for the dissolution of one mole of nepheline. In the documents cited in the comment, the durability test results of FBSR product useful in developing estimates of long-term performance are limited to the identification of parameters in expressions for the undisturbed forward rate of reaction of that product. When applied to particles of the size of those produced in the bed and offgas of the FBSR, high rates of dissolution are predicted. Reported rates of dissolution of crystalline (Tole et al. 1986, Table 2) and glassy nepheline (Hamilton et al. 2001, Table 2), when used with particles of the size of FBSR product, are comparable to those derived using the FBSR forward reaction expression. These cited references do not contain estimates of the equilibrium solubility of nepheline. The current database does not identify alteration product or precipitates, and thus cannot support the projection of decreases in the rate of reaction of such compounds. The analysis for this *TC & WM EIS* has been supplemented by the development of estimates of a range of solubility of nepheline dependent on reaction conditions and the nature of precipitation products assumed to appear.

Commentor No. 261 (cont'd): Michael P. McNamara, President, THOR Treatment Technologies, LLC

THOR Treatment Technologies

2) DOE/EIS-0391, Vol. 2, App. E, p. E-90 states the FBSR waste disposal form as "free-form granulated material" packaged in steel containers. For Alternative 3C, TTT has concluded that a monolithic form of the FBSR granules is a better option and recommends that the EIS update Alternative 3C to reflect the monolithic waste form.

If the EIS chooses the monolithic waste form, the Diffusion Limited-Release Model described in M.2.2.4 should then be used for FBSR product. The diffusion-controlled release model applies to grout or cement waste forms, such as grouted HLW tanks or cast stone. As opposed to solubility, the primary parameters of this model are dimensions, porosity, and tortuosity of the waste form as well as the COPC diffusivities and Kd's, all at the disposal temperature.

RT-21-002, Rev.1, Section 10.2 states: *"The purpose of the final waste form (monolith) testing is to determine the suitability of a number of candidate binder materials for the production of monolithic solid waste forms from the NAS mineralized products generated by the treatment of Hanford LAW and WTP SW simulants. The Hanford IDF has requirements that apply to all waste forms to be disposed of at the facility. These requirements include minimum acceptable limits on leach resistance, compressive strength, free liquids, dispersible fines, and waste loading. Risk scenario pathways must also be considered. The NAS mineralized product will easily meet all of the known IDF disposal requirements except for compressive strength and dispersibility. Therefore, the binding of the NAS product solids into a final monolithic waste form will be required prior to disposal at the IDF to eliminate dispersibility and to provide a waste form that has compressive strength greater than 500 psi."*

Recommendations

The following recommendations are provided for consideration as a means to present current technical information and an approach consistent with recently negotiated Tri-party Agreement and Consent Order Milestones.

- If the Matrix Limited Solubility model remains favored for FBSR Alternative 3C, update the nepheline solubility to literature value.
- If the EIS chooses to adopt a FBSR monolith, the Diffusion Limited-Release Model would be more appropriate for FBSR monolith and a different set of parameters will be needed and nepheline solubility will not be among them.
- Include in the Final EIS a detailed discussion of the technical maturation process that will be used to support the M-62-45 Supplemental Treatment Decision Milestone
- Defer ROD selection of supplemental treatment technology until a determination can be made based on data and analysis provided to support the M-062-40 Supplemental Technology Report

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261-5

261-6

261-5 Specification of the physical form of the FBSR product as granular or monolithic is established by DOE; it currently remains that of the bed and offgas particulate.

261-6 In response to this and similar comments, this *Final TC & WM EIS* has been revised to include: (1) an analysis of the performance of steam reforming solids based on solid-phase solubility controls, (2) a discussion of the technical information regarding the characterization and performance of steam reforming solids that has been developed between 2006 (the *Draft TC & WM EIS* data cutoff date) and 2010, and (3) an analysis of the performance of steam reforming solids that would have to be achieved (in the context of Tank Closure Alternative 3C, with an IDF in the 200-East Area) to result in groundwater concentrations at the Core Zone Boundary below benchmark standards. This additional material can be found in Chapter 7, Section 7.5, and Appendix M, Section M.5, of this *Final TC & WM EIS*.

Commentor No. 261 (cont'd): Michael P. McNamara, President, THOR Treatment Technologies, LLC

THOR Treatment Technologies

References

Jantzen, Carol M., Pareizs, John M., Lorier, Troy H., and Marra, James C., *Durability Testing of Fluidized Bed Steam Reforming (FBSR) Products (U)*, WSRC-MS-2005-00214, Rev. 0, Savannah River National Laboratory, Aiken, SC 29808

DOE 2004, Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 CFR 1500) and CEQ Guidance (*Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements*, Second Edition, DOE 2004)

J.P. Hamilton, S.L. Brantley, C.G. Pantano, L.J. Criscenti, J.D. Kubicki, *Dissolution of Nepheline, Jadeite and Albite Glasses: Toward Better models for Aluminosilicate Dissolution*, Geochim. Cosmochim. Acta, 65, 3683-702, 2001.

Lorier, T.H., J.M. Pareizs, and C.M. Jantzen, 2005, *Single-Pass Flow Through (SPFT) Testing of Fluidized-Bed Stream Reforming (FBSR) Waste Forms*, WSRC-TR-2005-00124, Rev. 0, Savannah River National Laboratory, Aiken, South Carolina, August.

Mann, F.M., R.J. Puigh, R. Khaleel, S. Finfrock, B.P. McGrail, D.H. Bacon, and R.J. Serne, 2003, *Risk Assessment Supporting the Decision on the Initial Selection of Supplemental ILAW Technologies*, RPP-17675, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington, September 2003.

McGrail, B.P., H.T. Schaef, P.F. Martin, D.H. Bacon, E.A. Rodriguez, D.E. McCready, A.N. Primak, and R.D. Orr, 2003a, *Initial Suitability Evaluation of Steam-Reformed Low Activity Waste for Direct Land Disposal*, WTP-RPT-097, Rev. 0, Bechtel National, Inc., Richland, Washington, January 2003.

Olson, A, et. al., *Report for Treating Hanford LAW and WTP SW Simulants: Pilot Plant Mineralizing Flowsheet*, RT-21-002, Rev.1, THOR Treatment Technologies, LLC, Denver, Coloardo, April 2009.

M.P. Tole, A.C. Lasaga, C.G. Pantano, W.B. White, *The Kinetics of Dissolution of Nepheline (NaAlSiO4)*, Geochim. Cosmochim. Acta, 30, 379-92, 1986.

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Commentor No. 261 (cont'd): Michael P. McNamara, President, THOR Treatment Technologies, LLC

THOR Treatment Technologies

Appendix A
Previously Submitted Test Report Summaries

FBSR Update provided August 4, 2006

OBJECTIVE
This response provides information which may be used to update technical data presented in the Supplemental Treatment Data Package (DOE/ORP-2003-07) and evaluated in New or Changed Data Form 60 on the THOR® Fluidized Bed Steam Reforming (FBSR) process. Significant testing, including pilot scale operations, has been conducted, which provides an expanded database on waste form performance, air emissions, and accident analysis. In addition, reports currently being prepared will further document pilot scale results in areas of interest.

METHODOLOGY

The available documents applicable to THOR® steam reforming data that have been issued since those referenced in *Waste Treatment and Supplemental Technology Data Package* (DOE/ORP-2003-07) were reviewed for consistency with Data Set 60. The following documents provide additional information which may be used to update Data Set 60:

- ***Evaluation of Fluidized Bed Steam Reforming (FBSR) Technology for Sodium Bearing Wastes from Idaho and Hanford using the Bench Top Steam Reformer (BSR)*, (WSRC-TR-2004-00560)**. This document presents the results of testing performed on process effluents generated from the treatment of simulants representing INL sodium bearing waste and Hanford low activity wastes. A statistically designed test matrix was conducted to analyze the waste form and emissions, which confirmed data generated from pilot scale runs at the SAIC STAR and Hazen Research facilities.

- ***Fluidized Bed Steam Reforming of Hanford LAW Using THOR Mineralizing Technology*, (INEEL/EXT-04-2492)**. A pilot scale demonstration of the technology was completed in a 15-cm-diameter reactor vessel August 2–5, 2004, at the STAR facility in Idaho. The test was conducted using an HLAW Envelope A simulant and produced both waste form and air emissions data.

- ***Idaho High-Level Waste & Facilities Disposition, Final Environmental Impact Statement*, (DOE/EIS-0287)**. This document evaluated the impact of alternatives for the treatment of sodium bearing wastes at INL. Alternatives evaluated included technologies under consideration at Hanford.

- ***Record of Decision for the Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement*, (70FR75165, December 19, 2005)**. This document provided DOE's final decision to select steam reforming as the treatment process for sodium bearing waste at INL. The State of Idaho concurred with the DOE's decision to select steam reforming as the preferred treatment process.

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Commentor No. 261 (cont'd): Michael P. McNamara, President, THOR Treatment Technologies, LLC

THOR Treatment Technologies

- ***Laboratory Testing of Bulk Vitrified and Steam, Reformed Low Activity Forms to Support a Preliminary Assessment for an Integrated Disposal Facility*, (PNNL-14414).** The purpose of this report was to document the laboratory testing that was conducted on bulk vitrification and steam reforming waste forms to supply the input parameters needed for reactive chemical transport calculations with the Subsurface Transport Over Reactive Multiphases (STORM) code. This same code was used to conduct the 2001 ILAW performance assessment.

- ***Risk Assessment Supporting the Decision on the Initial Selection of Supplemental ILAW Technologies*, (RPP-17675, Rev. 0).** This document evaluated the data developed in PNNL-14414 for potential impacts on groundwater from the radionuclides in the waste form. The FBSR waste form demonstrated the lowest environmental impacts when compared with other technology waste forms evaluated.

- ***Characterization and Performance of Fluidized Bed Steam Reforming (FBSR) Product as a Final Waste Form (U)*, (WSRC, MS, 2003, 00595, Revision 0).** This document reports the results of testing the FBSR waste form product generated from the treatment of a HLAW Envelope C simulant. The FBSR mineral waste form exhibited favorable, incongruent leaching characteristics during Product Consistency Testing (PCT or ASTM C1285). The radionuclides (Cs and Re as simulants for Cs137 and Tc99) are released in significantly lower concentrations than Na. In addition, the Na release is less than the 2 g/m^2 Hanford contract requirement for vitrified LAW. FBSR mineral waste forms are EPA regulatory compliant at the Universal Treatment Standard (UTS) making delisting an option for this waste form.

- ***Hazards Analysis for the Pilot Plant for Treating Sodium-Bearing Waste and Pyrolysis of Simulated TRU Waste in Drums using the THOR Steam Reforming Process*, (HAZ 1.1, Rev.1).** This document provides analysis of potential accidents and associated mitigation measures for the operation of the pilot scale unit during testing at the Hazen Research facility. This is a CWI/IWTU project document.

- ***Fluidized Bed Steam Reformer (FBSR) Product: Monolith Formation and Characterization*, (WSRC-STI-2006-00033 Revision 0).** The test report documents the results of FBSR mineralized product monoliths. The product used for the test was a mixture of available FBSR bed product made from mineralized SBW surrogate waste and mineralized Hanford Low Activity Waste (LAW) surrogate. The strength standard for this test was a compressive strength of >500 psi as compared to WTP glass requirements. In addition to the WTP glass compressive strength requirement, there is a waste loading minimum of 67 wt% solids and several chemical durability standards. All samples were tested using ASTM C 109-02 and the Ceramicrete cylinders were compression tested using ASTM C39-04A.

  Five concrete monoliths were formed with the FBSR product at a waste loading of 80-87 wt% dry solids. The concrete monoliths were fabricated from Type II Portland Cement. Four of the five cement monoliths tested had compressive strengths ~1397 psi after 7 days.

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One Ceramicrete® monolith with a waste loading of 35.7 wt% solids was tested. Ceramicrete® is a blend of MgO and monpotassium phosphate, which was mixed with a stoichiometric amount of water. The compressive strength achieved after 7 days was ~4300 psi.

Three sets of hydroceramic monoliths with waste loadings between 50-80 wt% were fabricated. The Pennsylvania State University hydroceramic monoliths are made by the solidification of NaOH or denitrated high sodium waste with NaOH and metakaolin clay. The monoliths are 50% FBSR product with 50% metakaolin and enough 4M NaOH to form a thick paste. The densest and highest waste loaded hydroceramic cured at 90°C for 1 week had a compressive strength of 1540 psi.

Three of the cement formulations and one hydroceramic formulations/curing temperatures met all of the monolith development criteria including waste loading for Hanford LAW. Ceramicrete® met strength and chemical durability standards. Waste loading will be maximized for all feasible formulations in follow-on testing.

The chemical durability of the steam reformer pilot scale products was determined using ASTM procedure C 1285-02 (PCT). The PCT leachate analyses for elements Al, Si, S, Cs, Na and Re indicates that all of the elements leach at <2 g/m^2 (2000 x 10-3 except for those of one formulation. Whereas the leaching trends of the alkali (Na and Cs) in the bed products was highly correlated with the Al release suggesting an aluminosilicate buffering mechanism was occurring, these trends were not observed when the same bed products were embedded in the monolithing binders tested in this study. In addition, before being monolithed the Re, S, and Si in the bed products were a strong function of solution pH and the leaching trends of Re with S appeared to track each other. These trends are not observed in the monolith leach results. This is likely due to interactions of the binder phases (calcium silicates in cement, magnesium phosphates in Ceramicrete, and zeolites in hydroceramics) with the leachate which complicates the interpretation of the leachate analyses. Of great importance is the durability of the monolithed FBSR in terms of the Hanford specification for Na release (<2 g/m^2) which ensures that the Tc99 release is <2 g/m^2 in a congruently dissolving glass. In the FBSR product Re was used as a simulant for Tc99 and results indicate that the Na and Re are not released congruently, e.g. Re is released at lower rates than Na except for Cement D. This type of incongruent leaching behavior has been widely observed for multiphase ceramic and mineral waste forms.

Other: Pilot scale testing of the FBSR was conducted November 2005 thru February 2006, and June 2006, at the Hazen Research facility using sodium bearing waste simulant. During production testing, which followed scoping tests, the system operated 289hrs with 249hrs of on-line feed time, resulting in an 86% TOE. During the production tests, 60,837 lbs of waste feed were treated to produce 10,965 lbs of waste product. Samples collected using EPA Methods during the demonstration included air emissions for MACT compliance, NO_x/SO_x, and waste product samples to verify chemical compatibility for WIPP disposal. A full report of the test is due by August 2006. Further pilot scale tests are scheduled for 2006, including a mineralized product run with a factory acceptance test of the full scale unit for INL deployment mid-2008.

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SUMMARY OF CHANGES TO STEAM REFORMING DATA

New data and information available can support a revision to the Supplemental Treatment Data Package and Data Set 60 regarding waste form performance. The following reports provide updated information:

Evaluation of Fluidized Bed Steam Reforming (FBSR) Technology for Sodium Bearing Wastes from Idaho and Hanford using the Bench Top Steam Reformer (BSR), (WSRC-TR-2004-00560) reports the results of producing a waste form using a Hanford AN-107 LAW simulant. Operating temperatures of 650-725^{0}C and additives of clay and BB carbon produced a waste form consistent with testing at the Hazen Research facility.

Fluidized Bed Steam Reforming of Hanford LAW Using THOR Mineralizing Technology, (INEEL/EXT-04-2492) document the results of testing at the STAR facility. Tables 4.4-2 and 4.4-3 provide mass balance data on the retention heavy metals and radioactive simulants in the waste product.

Idaho High-Level Waste & Facilities Disposition, Final Environmental Impact Statement, (DOE/EIS-0287) presents the evaluation of alternatives for processing Sodium Bearing Wastes at INL. Appendix C.10 reports the environmental consequences of implementing each alternative.

Laboratory Testing of Bulk Vitrified and Steam, Reformed Low Activity Forms to Support a Preliminary Assessment for an Integrated Disposal Facility, (PNNL-14414). The SR product SCT02-098 was subjected to detailed characterization of its physical, bulk chemical and mineralogical properties using a variety of methods. The results were used to determine the release rates of Al, Si, Na, S, and Re from the waste product. Section 3.1 of the report documents the rates which provided input to *Risk Assessment Supporting the Decision on the Initial Selection of Supplemental ILAW Technologies*, (RPP-17675, Rev. 0).

Risk Assessment Supporting the Decision on the Initial Selection of Supplemental ILAW Technologies, (RPP-17675, Rev. 0) provides potential Tc99 release data on supplemental technology waste forms over time. Table ES-1 reports the FBSR waste form exhibited a Tc99 release rate at 10,000 years of 7.05×10^{-10} compared with WTP glass Tc99 release rate of 2.81×10^{-8}.

Characterization and Performance of Fluidized Bed Steam Reforming (FBSR) Product as a Final Waste Form (U), (WSRC, MS, 2003, 00595, Revision 0) reports the results of leaching characteristics of FBSR waste forms made from Hanford AN-107 LAW simulant. The radionuclide Tc99 was simulated with Re while Cs137 was simulated with stable cesium (Cs133). The normalized Na release rate was 1.74 g/m^2. The release rate for Re was 0.29 g/m^2 with Cs133 at 0.16 g/m^2. In the FBSR final waste form the radionuclide release (Cs and Re) is retarded preferentially to the matrix element, Na, release (Table V) or conversely, Na is released from one of the phases preferentially compared to the nosean phase which retains the Re. This finding is noteworthy because the Hanford specification for Na release for vitrified waste forms is an indicator for the congruent release of Tc99 since Na and B and Tc99 are all released at similar stoichiometric rates (congruently) from vitrified waste forms [10, 11, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24]. Further, TCLP analyses conducted on the waste form indicate heavy metals (Table VI) were retained in the waste form at levels below UTS standards.

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The air emissions data presented in Table 2 of Data Set 60 can be revised with the emissions data provided in *Fluidized Bed Steam Reforming of Hanford LAW Using THOR Mineralizing Technology*, (INEEL/EXT-04-2492), *Evaluation of Fluidized Bed Steam Reforming (FBSR) Technology for Sodium Bearing Wastes from Idaho and Hanford using the Bench Top Steam Reformer (BSR)*, (WSRC-TR-2004-00560), *Idaho High-Level Waste & Facilities Disposition, Final Environmental Impact Statement (*DOE/EIS-0287), and the pilot scale test report due August 2006.

Table 2 of Data Set 60 presents emissions data in tons and refers to "WHC-SD-WM-EV-104" as the basis for the data. This document is not readily available; therefore, a direct update of Data Set 60 cannot be made. Included in the table below are available constituent concentrations.

	INEEL/EXT-04-2492[1]	WSRC-TR-2004-00560[2]	DOE/EIS-0287[3] (Studsvik 2002)
Particulates (PM_{10})	-	-	-
VOC	-	-	-
NO_X	80	>98% DRE	100-450 (max 1050)
SO_X	-0.5-	-	29-60 (max 100)
CO	-2.5	-	-
Hydrocarbons	-	-	-

1) Table 4-3-2. – Results are the average ppm concentration of 11 test runs.
2) Table 20. – Results were determined from 8 sample runs using color analysis (Beer's Law)
3) Appendix C.2, Table C.2-13, re: Studsvik 2002 as the basis document. Studsvik 2002 reports the results of testing conducted using a HLAW simulant. Results are ppm.

Data Set 60 may be revised to include accident analysis data using information contained in *Hazards Analysis for the Pilot Plant for Treating Sodium-Bearing Waste and Pyrolysis of Simulated TRU Waste in Drums using the THOR Steam Reforming Process*, (HAZ 1.1, Rev.1).

Fluidized Bed Steam Reformer (FBSR) Product: Monolith Formation and Characterization, (WSRC-STI-2006-00033 Revision 0) presents new information on waste form durability characteristics based on Hanford criteria.

REFERENCES

WSRC-TR-2004-00560 Rev. 0, 2005, *Evaluation of Fluidized Bed Steam Reforming (FBSR) Technology for Sodium Bearing Wastes from Idaho and Hanford using the Bench Top Steam Reformer (BSR) (U)*, Westinghouse Savannah River Company, Aiken, South Carolina.

INEEL/EXT-04-2492, 2004, *Fluidized Bed Steam Reforming of Hanford LAW Using THOR Mineralizing Technology*, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho

DOE/EIS-0287; 2002, *Idaho High-Level Waste & Facilities Disposition, Final Environmental Impact Statement*, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho

70FR75165, December 19, 2005, *Record of Decision for the Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement*, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho

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PNNL, 14414, 2003, *Laboratory Testing of Bulk Vitrified and Steam, Reformed Low, Activity Forms to Support a Preliminary Assessment for an Integrated Disposal Facility*, Pacific Northwest National Laboratory

RPP-17675, Rev. 0, 2003, *Risk Assessment Supporting the Decision on the Initial Selection of Supplemental ILAW Technologies*, CH2MHILL Hanford Group, Inc.

WSRC, MS, 2003, 00595, Revision 0, 2003, *Characterization and Performance of Fluidized Bed Steam Reforming (FBSR) Product as a Final Waste Form (U)*, Savannah River National Laboratory

HAZ 1.1, Rev.1, 2005, *Hazards Analysis for the Pilot Plant for Treating Sodium-Bearing Waste and Pyrolysis of Simulated TRU Waste in Drums using the THOR Steam Reforming Process*, CWI, Inc.

WSRC-STI-2006-00033 Revision 0, July 2006, *Fluidized Bed Steam Reformer (FBSR) Product: Monolith Formation and Characterization*, Savannah River National Laboratory

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Summary - Draft Report for Treating Hanford LAW and LAW Recycle Simulants:
Pilot Plant Mineralizing Flowsheet, RT-21-001, Rev. 0, September 2008

This summary document provides information which may be used to update technical data presented in the Supplemental Treatment Data Package (DOE/ORP-2003-07) and evaluated in New or Changed Data Form 60 on the THOR® Fluidized Bed Steam Reforming (FBSR) Process. Significant testing, including pilot scale operation, has been conducted, which provides an expanded database on waste form performance and air emissions.

As part of the Advanced Remediation Technologies (ART) program, the Department of Energy has chosen to demonstrate the capabilities of the THOR® steam reforming process as a potential means to treat and prepare the Hanford LAW and LAWR wastes for disposal at the IDF. An Engineering Scale Technology Demonstration (ESTD) test of the mineralization process was recently completed at the Hazen Research facility in Golden, CO.

The testing program processed a Hanford LAW waste simulant and a LAW Recycle (LAWR) stream simulant through a dual fluidized bed steam reformer system to produce leach-resistant, solid products and environmentally compliant gaseous effluents. The solid products incorporated normally soluble ions into an alkali alumino-silicate (NAS) mineral matrix that inhibits the leaching of those ions into the environment.

The non-radioactive simulants consisted of alkaline aqueous solution whose principal constituents were sodium nitrate and sodium hydroxide. Minor constituent cations included aluminum, antimony, arsenic, barium, cadmium, calcium, cesium, chromium, lead, nickel, potassium, selenium, silver, and thallium. Rhenium was also added as a non-radioactive surrogate for technetium. Minor anionic constituents included acetate, oxalate, carbonate, chloride, fluoride, iodide, nitrite, phosphate, and sulfate ions. A Principal Organic Hazardous Constituent (POHC) in the form of benzene was added to the feed stream in order to determine the Destruction Removal Efficiency (DRE) for organics in the process. The mineralizing agent was a form of finely divided clay that has been demonstrated in past testing programs to immobilize the soluble components of the feed simulant into a leach-resistant matrix. The elemental constituents of the clay included mainly aluminum, silicon, and oxygen.

Testing was accomplished in two phases. The first phase consisted of parametric scoping tests in which optimum process temperatures and simulant-to-clay ratios were determined. The scoping tests were followed by two LAW and two LAWR production runs in which the process was operated for an extended period of time in order to demonstrate long-term system operability, process stability, and to generate an adequate inventory of product for subsequent monolith testing and laboratory analytical evaluation.

Following the production run tests, the mineralized products underwent bench-scale testing in which the NAS material was formed into monolith samples using various binders and waste loading levels. Monolith performance testing includes Toxicity Characteristic Leaching Procedure (TCLP), Product Consistency Testing (PCT), and compressibility testing. The monolith preparation and analytical work are being performed by the Savannah River National Laboratory (SRNL). This white paper provides a summary of information found in the test report, *Draft Report for Treating Hanford LAW and LAW Recycle Simulants: Pilot Plant Mineralizing Flowsheet*, RT-21-001, Rev. 0, September 2008. The final report is scheduled to be issued in late September 2008.

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Pilot scale demonstration testing of the FBSR process was conducted in April and May of 2008, at the Hazen Research facility. Aqueous solutions of various metal salts in combination with organic constituents were prepared for use in the pilot plant test program. Non-radioactive constituents were utilized as surrogates for radiological components for the purpose of this test. The composition of the simulant used for the ESTD LAW testing program was derived from a recommended Hanford LAW composition (S. D. Rassat, et al., "Cold Dissolved Saltcake Simulant Development, Preparation, and Analysis," PNNL-14194, Rev. 1, May 2003, Table 3.1). The determination of the appropriate metal concentrations was based on an evaluation of the anticipated feed composition and an evaluation of the Hanford Tank Waste Envelope A, B, and C (see 24590-WTP-PT-02-005: Flowsheet Bases, Assumptions, and Requirements).

The projected LAWR effluent stream composition was based on predictions of the composition of three streams from the WTP; the Submerged Bed Scrubber (SBS) condensate, the Wet Electrostatic Precipitator (WESP) drainage, and the Caustic Scrubber effluent. This combined LAWR effluent prediction was based on an Excel spreadsheet mass balance that calculated the performance of major operations of the LAW systems in the WTP. The target concentrations of the LAW and LAWR simulants are listed in Table 4-2 of the *Draft Report for Treating Hanford LAW and LAW Recycle Simulants: Pilot Plant Mineralizing Flowsheet*, RT-21-001, Rev. 0, September 2008. The analyzed concentration of each constituent in the simulants is found in Appendix C of the test report. A kaolin clay was added to this simulated waste prior to being fed to the THOR® process to create a NAS mineralized granular solid product. An organic POHC, benzene, was also added to the waste stream in order to determine the organic destruction removal efficiency of the system.

During the LAW simulant production tests (P-1A and P-1B), 1,193 gallons of LAW simulant were processed into ~7,395 pounds of granular solid product during 101.5 hours of "feed-on" operation which was achieved during a total of 102.25 hr of operation, for a feed on-line factor of 99.3%. During the LAWR simulant production tests (P-2A and P-2B), 1,223 gallons of LAWR simulant were processed into ~5,127 pounds of granular solid product during 102 hours of "feed-on" operation which was achieved during a total of 104.48 hr of operation, for a feed on-line factor of 97.6%. There was no liquid effluent generated as a result of the treatment. The key results from the production tests was that steady-state operation of the process and key components were demonstrated for each simulant. The test performance objectives including air emissions standards, waste form performance characteristics, process stability, and results achieved are included in Section 11 of the test report. The durability and leach performance of the FBSR granular product was superior to the Environmental Assessment (EA) and LAW glass standards for sodium and silicon. Normalized release rates for cesium and rhenium (used as a surrogate for technetium) were much less than that of sodium in the EA and LAW glass standards.

The nominal feedrate of the surrogate to the Demineralization and Mineralization Reformer (DMR) was 0.2 gpm for both LAW and LAWR treatment. The overall mass balances for both the LAW and LAWR tests met the performance objective of 10% specified in the Quality Assurance Project Plan with a difference of 5% and 6%, respectively, between input and output masses for major constituents. After adjustment of CRR ATG gas flows and OGC cooling flow to match high fidelity off-gas measurements, the overall balances for both tests were within 1% for both tests. Mass balance information for test phases is presented in Section 9.0 of the test report.

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The Carbon Reduction Reformer (CRR) was operated to oxidize the H_2, CO, and THC in the DMR process gas to CO_2 and H_2O and meet air emission regulations. The stack gas contained mainly H_2O vapor (averaging about 50% wet basis) and N_2, with smaller amounts of CO_2 and O_2, and trace amounts of other gas species, including smaller amounts of NO_x, CO, THC, and SO_2.

- Based on off-gas sampling results, cesium and rhenium were captured in the mineralized product with system removal efficiencies of 99.999% and 99.998%, respectively (no HEPA filtration was used for engineering scale testing). The overall system removal efficiency for iodine from the LAW simulant was 94.4%. Since the THOR® process does not use wet or dry scrubbers, the calculated system removal efficiencies reflect capture in the product because there are no secondary liquid or solid process waste streams that could contain Cs, I, and Re.
- The HCl/Cl_2 off-gas concentration for the production tests averaged 13.5 ppm, or 64% of the Hazardous Waste Combustor (HWC) MACT standard of 21ppmv. During the production runs, Cl from NaCl in the feed was captured in the solid products, with an average removal efficiency of over 92%. In addition, flouride was captured with 78% efficiency.
- The stack gas particulate matter (PM) concentrations during the production tests were much lower than during the scoping tests, and averaged only 18% of the MACT standard. A full-scale production facility will include a HEPA filter, resulting in significantly reduced PM releases.
- Hazardous metals were included in the simulant feed. System removal efficiencies were calculated using the stack gas emission rates for hazardous metals and input feed rates of those metals. Concentrations of semi-volatile metals (SVM) and low volatility metals (LVM) measured during the LAW production tests were within the HWC MACT standards. LVM emissions during the LAWR production test, ART-P2, exceeded the HWC MACT standard by 5%. The Hazen facility is not HEPA filtered, like a full-scale facility would be. With more effective filtration such as would be seen in a full-scale facility, typically two HEPA filters in series each with an efficiency of 99.97% at 0.3µm, it could reasonably be expected that LVMs resulting from the LAW recycle stream would be well below the MACT standard.
- The system NO_x destruction from test averages ranged from 91% to 97%. Test-average stack NO_x concentrations ranged from 572 to 726 ppmv (dry basis), well below the desired performance level of <1,500 ppmv (dry basis).
- Stack gas SO_2 levels ranged from 11 to 67 ppm (dry basis), well under the desired performance level of <100 ppm (dry basis).
- The CO levels measured during production testing were essentially non-detectable (dry basis), well below the HWC MACT value of <100 ppmv (dry basis).
- The THC levels measured during production testing ranged from 0.0 to 0.4ppmv (dry basis), well below the HWC MACT level of <10 ppmv (dry basis).

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- The Principal Organic Hazardous Constituent (POHC), benzene, was destroyed in the process at high efficiencies. The benzene destruction efficiency averaged 99.99989% for all tests. For production tests P-1A and P-1B the benzene destruction and removal efficiencies (DRE) were 99.99968% and 99.99986% respectively, averaging out to 99.99977% for both tests. These results are well below the HWC MACT requirement of 99.99% DRE.
- No dioxins or furans were detected in any samples above the reporting limit. All dioxin and furan values, and the concentrations as percentages of the HWC MACT standard, were less than the reportable values.

Samples of the products produced from the LAW and LAWR production runs were sent to SRNL for final waste form testing and analysis. The purpose of the final waste form (monolith) testing was to determine the suitability of a number of candidate binder materials for the production of monolithic solid waste forms from the NAS mineralized product generated by the treatment of Hanford LAW and LAWR simulants with the THOR® steam reforming process. The Hanford IDF has requirements that apply to all waste forms to be disposed of at the facility. These requirements include minimum acceptable limits on leach resistance, compressive strength, free liquids, dispersible fines, and waste loading. Risk scenario pathways must also be considered. The NAS mineralized product easily meets all of the known IDF disposal requirements except for compressive strength and dispersibility. Therefore, the binding of the NAS product solids into a final monolithic waste form will be required prior to disposal at the IDF to eliminate dispersibility and to provide a waste form that has compressive strength greater than 500 psi.

For burial at the Hanford Site in the State of Washington, the Hanford contract and the ILAW Product Compliance Plan specify the following:

- The mean compressive strength of the waste form shall be at least 3.45E6Pa when tested in accordance with ASTM C39/C39M-99 or an equivalent testing method.
- The normalized mass loss of elements of concern shall be less than 2.0 grams/m^2 when tested by ASTM C1285-98 or equivalent. This is the Product Consistency Test (PCT) A, which uses a glass-to-water ratio of 1 gram of -100 to +200 mesh glass to 10 milliliters of ASTM Type I water for 7 days at 90°C.

To that end, the objectives of the monolith testing phase of this program are:

- Determine optimal waste loadings of the NAS product in the monolith matrix.
- Determine the optimal binder materials.
- Analyze monolith properties to ensure adherence to regulatory requirements.

The table below presents the preliminary PCT results of the High Temperature Filter (HTF, fines) and Product Receiver (PR, bed material) samples. The durability and leach performance of the FBSR granular products was found to be superior to the EA and LAW glass standards for sodium and silicon by one to three orders of magnitude. Normalized release rates for cesium and rhenium (used as a surrogate for technetium) were two orders of magnitude less than that of sodium in the EA glass standards, and 44 and 37 times, respectively, less than sodium in the LAW glass standard. As can be observed in the table, all results are well below the release rate of 2.0 grams/m^2.

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Normalized constituent release data for LAW and LAWR FBSR products.

Sample	Date/Time	Normalized Release (g/m^2)							
		Al	B	Cs	K	Na	Re	S	Si
P-1A 5274 PR	4/28/2008 5:15	0.0020		0.0135	0.0003	0.0103	0.0083	0.125	0.00065
P-1A 5280 HTF	4/27/2008 21:42	0.0019		0.0054	0.0002	0.0145	0.0309	0.203	0.00047
P-1A 5297 HTF	4/28/2008 17:28	0.0024		0.0066	0.0001	0.0133	0.0239	0.185	0.00032
P-1A 5316 PR	4/29/2008 3:54	0.0017		0.0123	0.0002	0.0115	0.0091	0.101	0.0006
P-1B 5351 HTF	4/30/2008 12:00	0.0019		0.0098	0.0002	0.0142	0.0069	0.131	0.00063
P-1B 5357 HTF	4/30/2008 19:44	0.0021		0.008	0.0002	0.0162	0.0333	0.233	0.00056
P-1B 5359 PR	4/30/2008 22:55	0.0019		0.0178	0.0003	0.0145	0.0051	0.106	0.00063
P-1B 5372 PR	5/1/2008 7:00	0.0019		0.0106	0.0003	0.0143	0.0048	0.092	0.00066
P-2A 5471 HTF	5/5/2008 0:20	0.0029	0.083	0.0122	0.0001	0.0134	0.0153	0.146	0.00011
P-2A 5475 PR	5/5/2008 4:00	0.0034	0.150	0.0157	0.0001	0.0132	0.006	0.083	0.00014
P-2B 5520 HTF	5/6/2008 10:00	0.0032	0.091	0.0143	0.0001	0.0155	0.0221	0.152	0.00011
P-2B 5522 PR	5/6/2008 10:00	0.0040	0.183	0.0188	0.0001	0.0126	0.0082	0.068	0.00019
EA Reference						6.67			1.96
LAW Reference						0.54			0.16

Note: LAW = P1A and P1B. LAWR = P2A and P2B.

Other analyses such as TCLP and compressive strength on the product samples, or those same analyses including PCT analysis on the monolith samples produced from the products have not yet been completed. Once all analyses are complete and verified, this summary will be updated.

References:

RT-21-001, Draft Report for Treating Hanford LAW and LAW Recycle Simulants: Pilot Plant Mineralizing Flowsheet, RT-21-001, Rev. 0, September 2008

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Appendix B
New Information – Test Report Summary

Summary - Report for Treating Hanford LAW and LAW Recycle Simulants:
Pilot Plant Mineralizing Flowsheet, RT-21-002, Rev. 1, April 2009

Background
Fluidized Bed Steam Reforming is a process that treats nitrate wastes containing organic carbon along with a mineral fraction in a two stage process. The FBSR process has been used for many commercial waste applications with high organic content like bio-mass gasification. Notably a plant in Erwin, TN, has processed high activity organic ion exchange resins for over ten years. The DOE is evaluating FBSR for treatment of low-activity waste (LAW) streams that are largely decontaminated caustic sodium nitrate and nitrite liquids. By adding carbon particles to the FBSR bed and a clay mineral fraction to a Hanford LAW simulant feed, previous tests have shown that a very stable mineralized solid results that appears to be suitable for direct encapsulation and disposal.

Treatment and disposal of Hanford Low Activity Waste (LAW) liquids will be extremely challenging. The LAW mission at Hanford involves treating and disposing anywhere from 60,000 to 100,000 MT of sodium in liquids, about one-half of which will need an as yet undefined process. For a twenty year mission, current plans at Hanford include an ILAW plant capacity of 45 MT/d (2x30 MT/d at 75% TOE is 74-120 MT ILAW/d for 15 wt% Na_2O loading and a 20 year mission). The DOE has committed to providing a solution for the remainder of the ILAW mission, 15-55 MT/d, by 2014.

The FBSR "reforms" carbon into water gas, CO + H_2 and water gas shift, CO_2 +H_2, with process heat provided by partial oxidation of coal as $CH_{0.5}$ + 1.125 O_2 –> CO_2 + ¼ H_2O. During this reformation plus oxidation, dewatering occurs, nitrate reduction occurs and a mineralized product forms while the residual vapor stream reacts in a second stage to N_2, CO_2 and H_2O. A pilot test in April and May 2008 showed FBSR operability and capability for Hanford LAW treatment. The test report detailed this ART (Advanced Remediation Technology) project that culminated several years of successful FBSR demonstrations for Hanford simulants at the Hazen facility in Golden, CO, and elsewhere [Olson 2004]. This is the most complete two-stage pilot test to date and includes for the first time all FBSR product solids and stack emission in a mass balance that comprises the entire FBSR process.

This demonstration showed hundreds of hours of plant operability at ~1.0 MT/d encapsulated product including efficient capture and handling of solids and fines as well as critical radionuclide surrogates with >99.99% mineral retention for Cs and Re (Re for Tc-99) and 94% capture of I in the mineral product as well.

The final FBSR product is a nepheline and nepheline-like mineral solid encapsulated with a GEO-7 binder at an overall 14 wt% simulant Na_2O (assuming no other sodium sources in feed). The PCT and TCLP leach characteristics of this product exceed Hanford disposal requirements. The FBSR product easily met required PCT leach resistance by an order of magnitude, 0.20 versus 2.0 g Na /m^2 and was actually superior to ILAW glass, 0.20 versus 0.38 g Na /m^2 [Vienna 2000].

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Moreover, the highly crystalline nature of the nepheline FBSR matrix as well as its larger Al/Na ratio, 1:1 versus 0.45:1 compared to borosilicate glass both suggest that FBSR long term performance will actually be better than glass by a much wider margin.

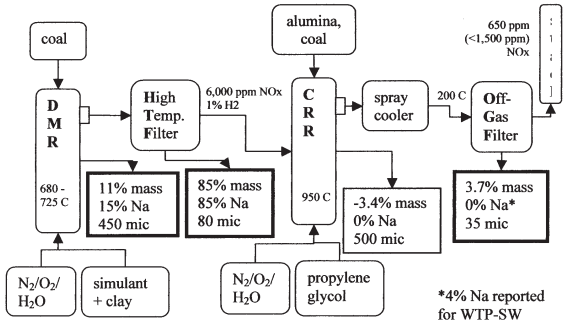
There were a series of seven objectives that covered process operability, process efficiency, and waste form qualification. This test met all its major objectives and has shown enough information to address the few non-radioactive semi-volatile metal emissions that appear slightly greater than MACT limits at the stack.

Process Description

The FBSR process consists of two steam-fluidized solids stages shown in Fig. 1. Hanford LAW (Low Activity Waste) Simulant mixed with clay and injected into the first FBSR, the DMR (Denitration Mineralizer Reformer), at 700-725ºC, resulted in two product fractions, DMR and HTF (High Temperature Filter). Then residual NO_x, CO, H_2, and other species pass to the CRR (Carbon Reduction Reformer) with a final solids fraction, OGF (Off-Gas Filter).

The FBSR process addresses three key aspects of LAW treatment. First, FBSR dewaters the liquid. Second, FBSR denitrates LAW (nominally 5 M NaNO3) to N_2. Finally, FBSR encapsulates all radionuclides and F, Cl, SO_4 into very stable sodium minerals, nepheline and others, that have very low leachability in soil disposal environments.

Initial scoping tests lasted 169 hours and resulted in 70 hours of operation at 0.2 gal/min feed rate that found optimal parameters. Then there were production runs with two simulants, an LAW 5 M Na and a WTP-SW at 2.7 M Na, each lasting 102 hours at ~0.2 gal/min feed.



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Commentor No. 261 (cont'd): Michael P. McNamara, President, THOR Treatment Technologies, LLC

THOR Treatment Technologies

Fig. 1. Schematic of two-stage Fluidized Bed Steam Reformer (FBSR) process showing Denitration Mineralization Reformer (DMR) and Carbon Reduction Reformer (CRR). Feeds were Hanford LAW (shown splits) and WTP-SW (similar splits) and three mineral products. Oxidation of coal and glycol provided 50-80 kW heat per stage.

The DMR and HTF solids represent the bulk of the FBSR product, 96%. The high temperature vapor stream further reacts in CRR to remove residual solids, H_2, CO, and NO_x, which has a base alumina loading to begin with, and attriting a solid to the OGF that is 3.7% and has some small amount of surrogate, ~0.4 wt%.

The test resulted in three solids fractions, two from the DMR and one from the OGF. The LAW test produced 6,932 lbs. among three solids as indicated in Fig. 1: 11% DMR, 85% HTF, -3.3% CRR, and 3.7% OGF. The main product was DMR + HTF, 96%, which occurred at 0.20 gal/min and 68.6 lbs/hr, or 0.75 MT/d. The theoretical Na_2O loading for nepheline is 20 wt%, the DMR + HTF product was 17% and the surrogate Na_2O was 15 wt% due to other sodium sources in the feed. The final monolith was 68.8 wt% solids product (GEO-7) meaning that surrogate was 10.3 wt% Na_2O from surrogate in the final form.

The DMR reductant was coal particles while the CRR reductant was propylene glycol with a small amount of coal. In the DMR, 78% of coal reacted with about 10% of that reacted coal enthalpy passing as water gas to CRR. The rough stoichiometry of the DMR reaction is:

$NaNO_3/NO_2$ + 6 $CH_{0.5}$ (coal) + 4.375 O_2 + ½ $Al_2O_3.2SiO_2.2H_2O$ (clay)
–> $NaAlSiO_4$ (nepheline) + ½ N_2 + 2.25 H_2O + 5 CO_2 + $CH_{0.5}$

Although DMR steam reforming produces some H_2 and CO, these are fully oxidized in the CRR and residual NO_x is nearly reduced in the CRR, and so are not shown in this balance. (Amount of NO_2^- is 16 mol% of NO_3^- in this LAW simulant, not shown in reaction, but nitrite can be much greater in other LAW.)

The main solids fraction (DMR + HTF) showed a mean particle size of 85 microns (Fig. 2). A 37 vol% cut between 75 and 150 microns showed 5.0 m^2/g BET surface area and a PCT of 0.10 g $Na/m^2/d$. The PCT goal is 2.0 g $Na/m^2/d$ and many borosilicate ILAW glasses show ~0.3 g $Na/m^2/d$ for the same particle size.

Products from the HTF and DMR were mixed, combined with a binder, and evaluated for PCT and TCLP. These materials showed PCT on the order of 0.2 g $Na/m^2/d$, once again, better than the glass criterion and slightly better than ILAW glass.

The FBSR treatment for Hanford LAW has evolved significantly over the past 7 years. The FBSR process results in a highly crystalline mineral product with a moderate BET porosity of ~5 m^2/g at 100 microns. After encapsulation with a binder, the bulk density is ~1.8 g/cm^3. The ILAW vitrification process, on the other hand, results in a non-crystalline glass with very low porosity, on the order of the geometric 0.16 m^2/g for 100 micron spherical particles at 2.65 g/cm^3. However, the relative long-term stability of these materials is related to this and many other factors at the ground disposal site [Mann 2003].

Highly crystalline materials are thermodynamically more stable against dissolution as has been demonstrated for albite, $NaAlSi_3O_8$. Crystalline albite shows over an order of magnitude lower dissolution rate as compared to albite glass [Jantzen 2008].

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Commentor No. 261 (cont'd): Michael P. McNamara, President, THOR Treatment Technologies, LLC

THOR Treatment Technologies

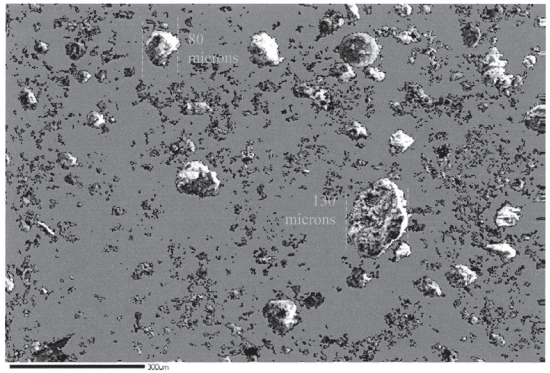

Fig. 2. Micrograph of HTF solids. A fraction between 75 and 150 microns is 37 vol% is often used in the PCT, but the entire FBSR solids was encapsulated and evaluated as PCT and TCLP.

Furthermore, dissolution of sodium can result in increasing porewater pH, which further accelerates leaching. Due to the greater FBSR nepheline Al content, alumina dissolved with Na buffers this effect and thereby enhancing the long term stability for FBSR nepheline with a mol ratio 1:1 Al:Na relative to borosilicate where the mol ratio is 0.45 Al:Na.

The vitreous state is unstable on the geologic time scale. This is well recognized and is taken into account for performance assessment modeling. The crystalline state is correspondingly more stable by its very nature and there are many more natural analogs as a result. Therefore, crystalline encapsulation is more desirable for long-term disposal.

The binder is very important for final disposal and there are many optimizations possible that would better facilitate direct disposal, including vitrification. The final Geo-7 encapsulation did meet or exceed all performance specifications.

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Commentor No. 261 (cont'd): Michael P. McNamara, President, THOR Treatment Technologies, LLC

THOR Treatment Technologies

References

A. Olson and B. Mason, *Report for Treating Hanford LAW and WTP SW Simulants: Pilot Mineralizing Flowsheet*, RT-21-002, Rev. 1, April 2009.

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J.D. Vienna, B.M. Jorgensen, A. Juricka, D.E. Smith, B.P.McGrail, B.R. Allen, J.C. Marra, K.G. Brown, D.K. Peeler, I.A. Reamer, W.L. Ebert, *Hanford Immobilized LAW Product Acceptance: Initial Tanks Focus Area Testing Data Package*, PNNL-13101, February 2000.

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Commentoror Number 262 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 231.

Commentor No. 263: Phyllis I. Clausen

March 18, 2010

TC & WM EIS
P.O. Box 1178
Richland, WA 99352

Re: Draft Tank Closure & Waste Management EIS

Gentlemen:

I am writing to comment on the draft Tank Closure & Waste Management EIS. There are two main points I wish to make: USDOE needs to clean up 99.9% of the tank wastes and it must not add more radioactive waste to Hanford landfills. Hanford must not be made a national nuclear waste dump. The citizens of Washington state strongly oppose any attempt to circumvent our wishes, and we have made this clear time and time again. We wish to eliminate threats to the Columbia River and major cancer threats. *263-1*

Thank you for considering my comments.

Sincerely,

Phyllis I. Clausen

Phyllis I. Clausen
2804 S.E. Baypoint Drive
Vancouver, WA 98683

Tel: (■■) ■■-■■■■

263-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor Number 264 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 240.

Commentor No. 265: Robert Macdonald

U.S. DEPARTMENT OF ENERGY

TC & WM EIS

Comment Form
Formulario para comentarios

Thank you for your input
Gracias por su participación

Date/Fecha: 03-16-2010

PLEASE PRINT / FAVOR DE ESCRIBIR CLARAMENTE

1. What comments do you have on the *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington (TC & WM EIS)*?
¿Que comentarios tiene usted sobre el *Borrador de la Declaración Sobre el Impacto Ambiental del Cierre de Contenedores y la Disposición de Desechos del Establecimiento de Hanford, Richland, Washington (TC & WM EIS)*?

Please treat the Hanford Site as a model nuclear waste repository. Clean up all existing nuclear contamination to 99.9%. Begin the vitrification process immediatly and take care of our ground water, value the Columbia River and the people of Washington State. My name is Robert Macdonald; I'm a 21 year old student studying Society, Ethics and Human Behavior at the University of Washington, Bothell, I am concerned with issues of social justice and the ethical treatment of the environment. Based on my research, the Washington State Department of Ecology estimates many millions of gallons of water is contaminated with nuclear waste. The tanks that have leaked need to be closed and all leaks into the soil and groundwater need to be fully investigated. I deeply care about the Hanford site, because I enjoy the majesty of the Columbia River and the idea of Chinook salmon contaminated with nuclear waste is deeply disturbing. I also recognize the problem of water shortage; if humans consume water contaminated with radiation in the future it will be unacceptable and morally deplorable. Make Hanford an example of anthropogenic uses of nuclear energy handled well. I will continue to discuss this issue in my public sphere, I will demand media coverage of the Hanford site and I will continue to request the proper treatment of the Hanford site by cleaning up the Hazards that pose a significant threat to humans.

265-1
265-2
265-3
265-4

** CONTINUE ON BACK FOR MORE SPACE **
** CONTINUAR AL DORSO PARA MÁS ESPACIO **

Name/Nombre: Robert Macdonald

Address/Dirección: 15738 Simonds Rd NE

City, State, Zip Code/Ciudad, Estado, Zona Postal: Kenmore, WA 98028

NOTE: Please do not include personal information (such as address or phone number) if you object to it being included in the *TC & WM EIS*. Comments received, including contact information, are published in the *TC & WM EIS* in their entirety.
NOTA: Favor de excluir información personal (dirección o número de teléfono) que desea que no aparezcan en el *TC & WM EIS*. Comentarios recibidos, incluyendo la información personal proporcionada, serán publicados en el *TC & WM EIS*.

For more information contact: Mary Beth Burandt, Document Manager,
TC & WM EIS, P.O. Box 1178, Richland, WA 99352
Toll-free Telephone: 1-888-829-6347 • Toll-free Fax: 1-888-785-2865
E-mail: TC&WMEIS@saic.com

TANK CLOSURE AND WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

265-1 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

265-2 DOE has made significant progress on the design and construction of the vitrification plant. More than 80 percent of WTP design and more than 62 percent of construction are complete.

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

265-3 The purpose of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve and treat the Hanford tank waste; close the Hanford SST system; store and/or dispose of the waste generated from these tank waste activities; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate cleanup at Hanford and other DOE sites. The results of the risk analyses for air and groundwater releases to the Columbia River under the various alternatives are presented in Appendix P, Section P.3, Impacts on Columbia River Aquatic and Riparian Resources Resulting from Future Contaminant Releases.

265-4 This *TC & WM EIS* is an assessment of potential impacts of a variety of alternatives. Based upon this EIS and other appropriate factors, DOE will select an approach to cleanup of the site that is designed to protect public health and safety.

Additionally, DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and

Commentor No. 265 (cont'd): Robert MacDonald

schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

Commentor No. 266: W. L. (Walt) Hampson

"Draft TC&WM EIS Comments"

The schedule for eliminating ALL SSTs should be accelerated, if at all possible, thus eliminating the major source of leaks into non-Hanford environs. Uncertainties need to be minimized to improve credibility of future planning. Priorities for project execution need to reflect more urgency on those projects that prevent further adverse effects on the no-Hanford environment i.e. a prime example of this would be elimination of ALL SSTs and soil cleanup from previous leaks as soon as possible. *266-1*

Additional waste management from off-site nuclear-waste sources should be seriously considered since Hanford has the expertise and infrastructure to handle it safely without further pollution to the non-Hanford environment. *266-2*

I appreciated the opportunity to review this document and consider it to be very well done i.e. thorough and descriptive.

Sincerely, W. L. (Walt) Hampson
8145 Roe Ln
Boise, Idaho 83714-2566
Ph: [redacted]
Email: whampson4@hotmail.com

266-1 As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities downriver from Hanford. One of the purposes of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms by landfill closure, selective clean closure, or clean closure. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks, including remediation of the contamination in the vadose zone.

266-2 Comment noted.

Commentor No. 267: Jim Cavin

From: James Cavin [jrcavin@gmail.com]
Sent: Friday, March 26, 2010 11:00 AM
To: tc&wmeis@saic.com
Subject: Hanford Cleanup

I am opposed to using Hanford as a place to bring in and treat nuclear waste from outside sources. Waste storage at Hanford up to this point has created more than enough groundwater pollution with increased risk of cancer. The existing high level nuclear waste tanks need to be totally cleaned up and the leaks, whether accidental or planned from those tanks also need to be cleaned up. *267-1*

Thanks,

Jim Cavin

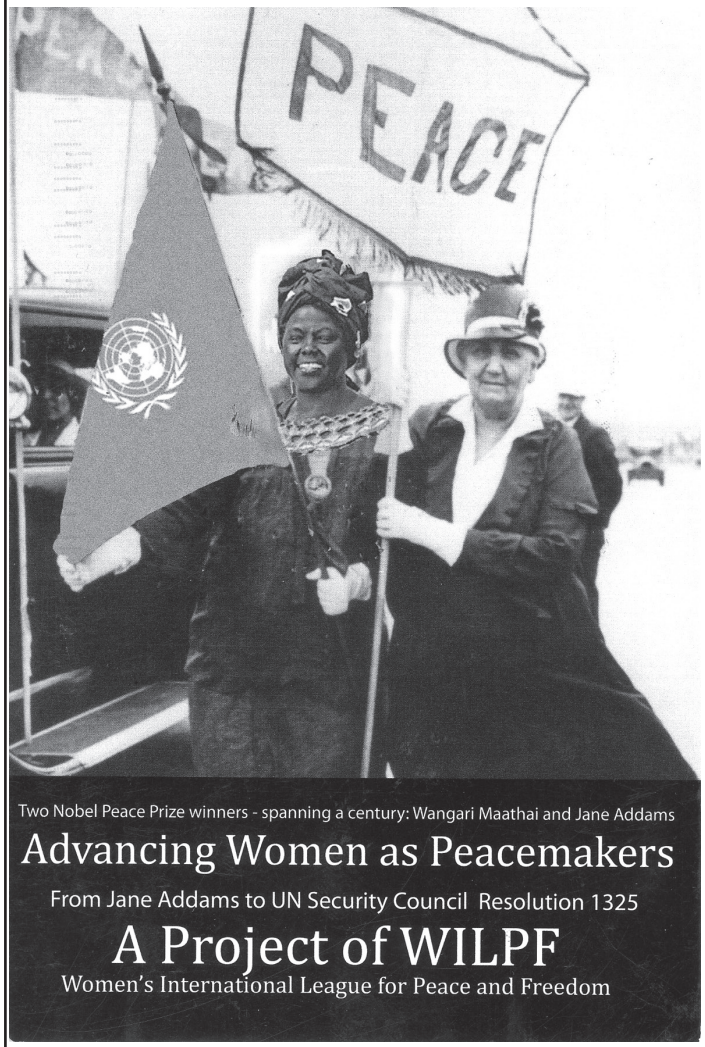
267-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

DOE appreciates the commentor's support for a complete tank cleanup, including past leaks. As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities downriver from Hanford.

One of the purposes of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms by landfill closure, selective clean closure, or clean closure. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks, including remediation of the contamination in the vadose zone.

Commentor No. 268: D. Freeborn



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I support "The People's Preferred Alternative(s)
clean it up
dumping of waste!!
The Columbia River is
too big A Treasure - As
well as a vital resource - to
be endangered by Hanford's
nuclear waste - A U.S.
dump site is morbid!
Sincerely, D. Freeborn

PORTLAND OR 972
11 MAR 2010 PM 3 T

Mary Burandt
DOE Draft TC&WM EIS
Office of River Protection
P.O. Box 1178
Richland, WA
99352

Nobel Peace Prize recipient Wangari Maathai (b. 1940), holding the UN flag, joins WILPF founder and Nobel Peace Prize recipient Jane Addams (b. 1860-d.1935) in this composite photo, in recognition of women's historic and continuing commitment to peace.

6625 SW Whitaker Ct
Bvtn. OR 97223

To learn more visit ADVANCING WOMEN AS PEACEMAKERS
www.ja1325.org, an initiative of the
Women's International League for Peace and Freedom
565 Boylston St., 2nd floor, Boston, MA 02116
(p) 617-266-0999. www.wilpf.org
Photo courtesy of the Chicago History Museum

268-1

268-1 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

One of the purposes of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks.

Commentor No. 269: Ellen Gray

From: Ellen Gray [askellengray@gmail.com]
Sent: Friday, March 26, 2010 9:31 PM
To: tc&wmeis@saic.com
Subject: Hanford waste

Dear Mary Beth Burandt, Document Manager

My name is Ellen Gray and I am a resident of Washington State. I have four children and three grandchildren.

Our environmental health is our responsibility and I urge you to Please consider: no addition ofoff site waste and don't stop cleaning up until future generations will be fully protected from the legacy of Hanford's plutonium production. *269-1*

Sincerely,

Ellen Gray

269-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

This *TC & WM EIS* addresses proposed actions to retrieve and treat the Hanford tank waste; close the Hanford SST system; store and/or dispose of the waste generated from these tank waste activities; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate cleanup at Hanford and other DOE sites.

Commentor No. 270: Karen Mitzner

From: Karen [co-create@comcast.net]
Sent: Sunday, March 28, 2010 11:24 PM
To: tc&wmeis@saic.com
Subject: Hanford nuclear Reservation

The plans the DOE have for Hanford clean up are grossly inadequate. All remaining waste must be dealt with so that contamination of groundwater no longer occurs; the FFTF reactor must be dismantled; clean closure of high level nuclear waste tanks must be accomplished. *270-1*

The Hanford Nuclear Reservation is already the most contaminated site in the Western Hemisphere. Please, please, we Oregonians beg you not to continue your plans to make Hanford a national site for dumping nuclear waste. Not only would the trucks bearing these wastes on our highways pose immediate hazards merely through their presence to adults and, especially, children, the potential long-term consequences of an accident or terrorist incident are horrible. Not only would the survivors have no place to live in the area surrounding the accident, the area would be uninhabitable for thousands and thousands of years. *270-2*

We refuse to accept your levels of "acceptable risk" for the Hanford Nuclear Reservation's waste-leakage problems! We refuse to accept the passage of trucks bearing even more waste on our highways!

We take this position not for ourselves alone, but for all who live here now and who will live here in the future and for all the life in this region.

Karen Mitzner

136 SE 63rd Ave
Portland, OR 97215
co-create@comcast.net

270-1 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. This closure includes the tank system, along with the vadose zone as impacted by the tank farms (i.e., past leaks). However, as discussed in the Summary, Section S.1.3.2, and Chapter 1, Section 1.4.2, of this *TC & WM EIS*, DOE will not make decisions on groundwater remediation, including the remediation of groundwater contamination resulting from non-tank-farm areas in the 200 Areas, because that is being addressed under the CERCLA (42 U.S.C. 9601 et seq.) process. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

Regarding FFTF, the commentor's preference for totally dismantling FFTF (essentially FFTF Decommissioning Alternative 3) is noted. However, although nearly all elements of FFTF and the two adjacent support facilities would be removed under this alternative, the lower portion of the RCB concrete shell would remain. This would be backfilled with either soil or grout to minimize void space. The area would be regraded and revegetated, with no need for a barrier. DOE's preference is for FFTF Decommissioning Alternative 2, under which some below-grade structures would remain; however, these would be grouted in place to immobilize the hazardous constituents. The filled area would then be covered with a modified RCRA Subtitle C barrier to further isolate the entombed structures and prevent infiltration of water. These actions (grouting and barrier placement) would minimize the migration of any contaminants to the environment.

270-2 This EIS addresses the environmental impacts of retrieval, treatment, and disposal of tank waste and final closure of the SST system. It also evaluates the impacts of FFTF decommissioning, including management of waste generated by the decommissioning process. Finally, this *TC & WM EIS* evaluates the potential environmental impacts of ongoing solid-waste management operations at Hanford, as well as the proposed disposal of Hanford LLW and MLLW and a limited volume of offsite LLW and MLLW.

Commentor No. 270 (cont'd): Karen Mitzner

The transportation of radioactive materials and waste, both coming to and leaving Hanford, must comply with DOT and NRC regulations that promote the protection of human health and the environment. This includes requiring the use of certified packaging that minimizes the radiation dose rate outside the transportation package. As indicated in the *TC & WM EIS* Summary, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that transportation of radioactive waste would cause an additional fatality as a result of radiation from either incident-free transportation or postulated transportation accidents.

Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 271: Cherie Eichholz, Executive Director, Washington Physicians for Social Responsibility

From: Cherie Eichholz [wpsr.cherie@gmail.com]
Sent: Monday, March 29, 2010 3:09 PM
To: tc&wmeis@saic.com
Subject: Comments regarding EIS
Attachments: EIS Written Comments - 032010.doc

Please see attached and confirm receipt.

Thank you.

Cherie Eichholz, Executive Director
Washington Physicians for Social Responsibility
www.wpsr.org ~ XXX.XXX.XXXX

Please consider the environment before printing this email!

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Commentor No. 271 (cont'd): Cherie Eichholz, Executive Director, Washington Physicians for Social Responsibility

Washington Physicians for Social Responsibility

Engaging the community to create a healthy, peaceful and sustainable world.

29 March 2010

Mary Beth Burandt, Document Manager
US Department of Energy, Office of River Protection
PO Box 450, Mail Stop H6-60
Richland, WA 99353
Comments submitted via TC&WMEIS@saic.com
Comment deadline 19 March 2010

Dear Ms. Burandt:

We appreciate the opportunity to submit comments regarding the Draft Environmental Impact Statement (EIS) concerning Tank Farm Closure & Waste Management. We also appreciate the measures taken by the Department of Energy (DOE) to facilitate public comments, by allowing electronic submittal and by placing relevant documents on a publicly available web site. Following are comments on behalf of the Washington State Chapter of Physicians for Social Responsibility. In addition, the Oregon State Chapter of Physicians for Social Responsibility concurs with our sentiments and supports our comments.

DOE process for decision

We note that "a January 9, 2006, legal settlement required USDOE to prepare the *Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*. The intent of the EIS is to provide a comprehensive and integrated look at near-term waste management and tank waste cleanup actions at Hanford" (http://www.hanford.gov/orp/?page=146&parent=0) as part of the EIS process, in person and written comments have been sought by USDOE from Washington and Oregon stake holders.

Hanford is not a suitable site for becoming a national repository for waste

Remediation at Hanford is far from complete, including for the major identified risk from approximately 50 million gallons of liquid high level radioactive wastes, still temporarily stored in aging tanks that have exceeded their design life spans and have leaked in the past. A DOE facility to immobilize those wastes in a stable glass form is about eight years behind schedule and about $8 billion over budget. Further, DOE is decades behind on its obligation to retrieve tank wastes; with millions of gallons of waste having seeped into the soil and groundwater, enormous areas of the region are contaminated, which affects not only ours, but future generations as well. *271-1*

Bearing this in mind, in 2004 Washington State voters passed the Cleanup Priority Act with 69% approval, a record margin for Washington State initiatives. We recognize that DOE succeeded in overturning this measure in the courts, but nonetheless, voters made clear their preference that DOE clean up all wastes at Hanford, including the tank wastes, and fully comply with environmental requirements before any new waste is imported to Hanford. DOE should recognize reality and respect this clear sentiment in determining where to send waste.

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271-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

DOE recognizes the potential negative impacts on Hanford groundwater that the offsite waste poses. The *TC & WM EIS* analysis shows that receipt of offsite waste streams that contain specific amounts of certain isotopes, specifically, iodine-129 and technetium-99, could cause an adverse impact on the environment. Therefore, one means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford. Other mitigation measures, such as recycling secondary-waste streams into the primary-waste-stream feeds within the WTP to increase iodine-129 capture in ILAW and bulk vitrification, are discussed in Chapter 7, Section 7.5, of this final EIS.

271-2 The decision to leave 0.1 percent, 1 percent, or more of the waste in the SSTs is one of the decisions supported by this *TC & WM EIS* (see Section S.1.3.1 of the Summary and Chapter 1, Section 1.4.1). With regard to the disproportionate amount of radioactivity in the residues at the bottom of the tanks, DOE currently does not have a technical basis for making more-specific assumptions about the expected compositions of the waste "heels" that would remain in the tanks after retrieval. Retrieval has been completed for only a small number of SSTs, and not much is known about the behavior of, or ability to remove, small volumes of residual waste. However, the tank closure process, which includes detailed examinations of the tanks, residual waste, and surrounding waste in the soil, requires preparation of detailed performance assessments and a closure plan. These documents will provide the information and analysis necessary for DOE and the regulators to make specific decisions on what levels of residual tank waste are acceptable in terms of short- and long-term risks.

271-3 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. This closure includes the tank system, along with the vadose zone as impacted by the tank farms (i.e., past leaks). Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national

Commentor No. 271 (cont'd): Cherie Eichholz, Executive Director, Washington Physicians for Social Responsibility

This Draft TC & WM EIS proposes two "waste management" alternatives for waste generated from on-site cleanup activities, both of which include using Hanford as a national waste repository. An alternative in which Hanford is not used as a national repository is not proposed. As the Draft TC & WM EIS shows, offsite waste will contribute significantly to potential onsite inventories of iodine-129 (I-129) and technetium-99 (Tc-99) and will ultimately affect Hanford's groundwater. The end result is that groundwater would become contaminated to levels that are far beyond acceptable. Further, USDOE's analysis demonstrates that using either alternative will cause increased cancer risks for thousands of years. *271-1 cont'd*

Given these realities, Washington Physicians for Social Responsibility supports the State of Washington in recommending a "no offsite waste disposal" alternative for the Final TC & WM EIS (Draft Tank Farm Closure & Waste Management Environmental Impact Statement Summary, page 8).

Clean up standard

This Draft TC & WM EIS evaluates several technologies for waste retrieval and retrieval benchmarks, in addition to no tank waste retrieval. The four waste retrieval benchmarks which were considered are: 0%, 90%, 99%, and 99.9%. USDOE's preferred alternative would be to retrieve 99% of waste.

Using any alternative (i.e. 0%, 90%, 99%, or 99.9%), this Draft TC & WM EIS demonstrates substantial increases in radioactive contamination of groundwater over thousands of years. However, removing 99.9% of tank wastes decreases contamination significantly compared to removing of 99% or 90%. Studies have demonstrated that the residue at the bottom of the tanks – in some cases hard to remove - has a disproportionate amount of radioactivity. Using the alternative which calls for removing 99% of waste would limit the amount of this bottom dwelling waste retrieved while working to retrieve 99.9% of waste will retrieve significantly more of the most dangerous waste. *271-2*

In addition, if the 99% alternative is chosen, USDOE's own study illustrates that the cancer risk from drinking well water miles away from the tank farms would be approximately 50 times Washington State's cancer risk cleanup standard in the year 3600. If 99.9% of the wastes are removed and two tanks farms are cleaned up, the cancer risk from the well water is still nearly 10 times Washington State's cancer risk standard. Regardless, while cleaning up 99.9% of the waste will not eliminate the hazards, this alternative is far superior to the others offered.

Permitting anything less than 99.9% of the tank wastes to be removed would be a danger to public health and unconscionable. In addition, Washington Physicians for Social Responsibility finds it wholly reprehensible that the US government would knowingly seek anything except the most effective clean-up. If USDOE proceeds with the 99% standard or knowingly leaving as much as one million gallons or more of high-level nuclear waste in the soil, in effect USDOE is saying that the value of life is different for different people, with some people worth more than others. Already, far too many have been poisoned after working at Hanford or living in its path; considering anything but the most effective, safe and timely clean-up is utterly irresponsible. *271-3*

Clean closure

"Clean closure refers to closure activities that result in full removal of all waste and full removal or decontamination of all structures, equipment, debris, environmental media (such as soil and ground water), and other materials affected by releases from a unit" (http://www.ecy.wa.gov/pubs/94111.pdf).

USDOE's preferred alternative still reflects the belief that tank leaks do not pose a significant risk. USDOE's preferred alternative in the TC & WM EIS is to cap the tank farm wastes in cribs and trenches with dirt, simply covering up the contamination. Using this method would allow continued contamination of the groundwater and the risk of developing cancer would be extraordinarily high for thousands of years. *271-4*

Washington Physicians for Social Responsibility cannot and does not support anything except cleaning up Hanford using the "clean closure" method.

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policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*. In all cases, DOE will select an approach to cleanup of the site that reflects a commitment to protection of public health and safety.

271-4 With respect to the cribs and trenches (ditches), as noted in Chapter 1, Section 1.4.2, the six sets of cribs and trenches (ditches) that are contiguous to the SSTs are CERCLA past-practice units. These would fall under the barriers placed over the SSTs during closure. They are evaluated in this EIS as part of a connected action because they would be influenced by barrier placement. However, closure of these CERCLA past-practice units is not part of the proposed actions for this EIS. Closure of these units will be addressed at a later date.

See response to comment 271-3 regarding future DOE decisions. The commentor is directed to Chapter 4, Section 4.1.10, for a discussion of cancer risks associated with each of the Tank Closure alternatives.

271-5 To assist the public in navigating through the information presented in this *TC & WM EIS*, DOE issued a Reader's Guide. This guide serves as an introduction and guide to the contents of this EIS, highlights the key features of the reasonable alternatives, and provides references to specific sections of the document to assist the reader in reviewing the technical analyses presented. Recognizing that many people may not read beyond the EIS Summary, the information presented in both the Summary and the Reader's Guide attempts to strike a balance between those readers interested in the technical details regarding DOE's proposed actions and alternatives and readers seeking a simple overview. In addition, DOE held a 1-hour open house prior to each public hearing to allow the public to meet informally with members of the *TC & WM EIS* team, ask questions, and learn more about this EIS. Informative factsheets were provided at these open houses.

271-6 DOE sought input throughout the *TC & WM EIS* development process and worked with numerous stakeholders, including HAB, during development of the draft EIS. In addition, the groundwater flow model used in this EIS went through a rigorous technical review process that included review and comment by three groups: (1) Ecology, a cooperating agency on this EIS; (2) a Local Users' Group consisting of hydrogeologists and geologists from the Hanford community; and (3) a Technical Review Group of four experts with commercial, governmental, and academic experience in groundwater modeling and/or environmental

Commentor No. 271 (cont'd): Cherie Eichholz, Executive Director, Washington Physicians for Social Responsibility

Additional comments regarding the Draft TC & WM EIS

First, as was eloquently pointed out at the Seattle Public Hearing on 8 March 2010, the Draft TC & WM EIS, including the summary, is far from comprehensible for the lay citizen. If USDOE is truly seeking public comment, it would behoove you to consider a more understandable approach. In doing this, we believe the public would be significantly more inclined to get involved in this process. *271-5*

Second, independent consultants hired by the Hanford Advisory Board found a number of inconsistencies in USDOE's analysis. The discovery of even one of these errors should be cause for a total and complete review of the process and report. Without this review and the correction of errors, we cannot accurately understand the findings and recommendations or proceed with any semblance of fully understanding the picture. *271-6*

Third, as a public health voice for the residents of Washington State, Washington Physicians for Social Responsibility would be negligent if it did not point out one glaring issue with this Draft TC & WM EIS and the clean up of the Hanford Nuclear Reservation in general. Over the course of time, the US government has shelled out $5.5 trillion for our nuclear weapons program.

The result of this today, is nearly 10,000 nuclear weapons in the possession of our government, one quarter of them sitting in Poulsbo, Washington, ever ready for loading onto Trident Submarines. Each submarine cost approximately $3 billion to build. To operate, US taxpayers contribute $77 million per year per submarine (nearly $1.4 billion per year for all Trident Submarines). And when we need a new Trident II D-5 missile, $60 million is handed over. *271-7*

Approximately $30 billion has been spent at Hanford since 1989 (20+ years). Costs may reach the $120 billion mark. Again, costs MAY reach $120 billion.

Washington Physicians for Social Responsibility believes that money spent on Hanford clean up is money well spent and if we can find billions of dollars every year for our nuclear weapons complex, there is no reason why we cannot find the money to clean up Hanford.

Sincerely,

Karen Bowman, MN, RN, COHN-S, Hanford Advisory Board Member

Steven Gilbert, PhD, DABT, Board President, Washington Physicians for Social Responsibility

Cherie Eichholz, MA, Executive Director, Washington Physicians for Social Responsibility

Marylou Noble, MA, LPC, Board President, Oregon Physicians for Social Responsibility

Kelly Campbell, Executive Director, Oregon Physicians for Social Responsibility

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engineering. In addition, internal technical reviews by qualified professionals were conducted on each part of the draft EIS. In response to comments received on the *Draft TC & WM EIS*, DOE re-reviewed portions of the draft EIS to ensure it correctly states the results of DOE's analyses. During this review, inconsistencies (i.e., incorrect conversions of units and errors in the text as noted by the HAB independent consultant) were corrected. Chapter 1, Section 1.8.3.2, of this *Final TC & WM EIS* notes this as a change from draft to final. In addition, a note was added to the Measurement Units Metric Conversion Chart section of the *Final TC & WM EIS* to explain conversion from one measure of unit to another and how this may result in some conversions to appear to be incorrect.

271-7 Nuclear weapons production and its costs are not within the scope of this EIS. Chapter 2, Section 2.11, of this EIS, however, summarizes and compares the relative estimated costs of the proposed alternatives.

Commentor Number 272 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 201.

Commentor No. 273: Lynnette Eldredge

Lynnette Eldredge
141 Riverview Dr.
Sequim, WA 98382
[redacted]

Mary Beth Burandt, Document Manager
US Department of Energy, Office of River Protection
PO Box 450, Mail Stop Richland, WA 99353

March 22, 2010

To Whom It May Concern,

I have recently become aware of the DOE's EIS re: waste management/cleanup plans for the Hanford site, and I have grave concerns that financial expediency will trump common sense with regard to tank closure, vitrification, and especially the disposal of radioactive/chemical wastes from other sites at Hanford. *273-1*

I have read the Oregon State proposal, drafted in response to the EIS, and I urge you to adopt their guidelines, specifically: that ***at least 99%*** of tank waste be removed from each tank and vitrified at an expanded Waste Treatment Plant at Hanford, and that no other, less effective "supplemental technologies" be utilized; that high- and low-level vitrified waste be stored on-site, at least until high level waste can be deposited in a deep repository; and that DOE takes a tank-by-tank approach to removal and decontamination of seeped contaminants underneath. *273-2*

I especially urge the DOE to honor the wishes of Washington State voters (2004 initiative 297), and abandon any plan to accept off-site radioactive contaminants for disposal at Hanford. *273-3*

Thank you for your consideration of my comments in this matter.

Sincerely,
Lynnette Eldredge
Lynnette Eldredge

273-1 Both DOE and Congress are committed to the cleanup efforts at Hanford, and DOE continues to seek funding for these efforts.

273-2 Chapter 2 of this *Final TC & WM EIS* has been revised to include a discussion of the Oregon Department of Energy's proposal in Section 2.6.4 and how DOE has addressed the range of reasonable alternatives for tank waste retrieval, treatment, and storage and remediation of the existing tank farms in its original Tank Closure alternatives in Section 2.5.2. DOE has carefully considered the Oregon proposal and, as explained in Section 2.6.4, has determined that it is not reasonable.

273-3 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor numbers 274 through 442 are found in the Hood River, Oregon; Portland, Oregon; La Grande, Oregon; Spokane, Washington; Eugene, Oregon; and Seattle, Washington, public meeting transcripts. These transcripts can be found in the second book of this Comment-Response Document (all campaigns and public meeting transcripts).

Commentor No. 443: Gabi Diane

From: Gabi Diane [gaianagram@gmail.com]
Sent: Friday, April 02, 2010 4:05 PM
To: tc&wmeis@saic.com
Subject: hanford - waterspot show - 4/1/10 - hoanw.org

i watched your discussion on 'waterspot' regarding hanford and am going to contact people per your suggestion - one thing that i would like clarification on, if you can help, is why more attention is not being given to 'transmutation' and 'phytoremediation' as possible methods for cleaning up the mess already there (and i do agree that we should focus on cleanup of present contamination and not proposing to add more). the DOE obviously does not know (no one seems to) what to do with the waste (and of course it would, therefore, be wise to diligently pursue alternative, cleaner sources of energy - so we don't keep 'overfilling the garbage truck', so to speak), but i have not heard anyone mentioning any alternative methods of dealing with this waste - are there problems with the these two alternatives (transmutation and phytoremediation), and what are they. these are the only other methods i have ever heard of (yet no one mentions them currently), and perhaps addressing them would facilitate their being viable solutions in the future. *443-1*

also, per your request for comments on the issue of the DOE's proposal, here are some that i have:

1. proposing to make a site that is not many miles away from a tectonic plate earthquake fault zone (washington/oregon/california coastline) THE 'national radioactive waste dumpsite' for the entire nation, and then proposing to 'monitor' it for thousands of years into the future, when seismologists themselves are unsure of the timeline for a future quake, is ludicrous - we should be hurrrying to clean up what is already there - and fast - to minimize the impact of the environmental damage from that site alone. *443-2*

2. to ignore the current contamination and leakage (both into groundwater and columbia river), and pretend that 'capping' it with fill dirt will actually prevent any future risks (even in 'lined'

ditches, which will apparently only be effective for 50 years or so) is, again, not only ludicrous but blatently irresponsible in its 'passing the buck' mentality. If both oregon and washington state plan to take water from the columbia river for aquifer storage (due to expected future water shortages), we should be focusing on making that water as pure as possible, not adding to its contamination. *443-3*

443-1 As discussed in Appendix E, Section E.1.2.3.5.1, DOE conducted a number of systematic reviews of possible technologies to support the treatment technologies analyzed in this *TC & WM EIS*. Vendors, national laboratories, and universities were consulted regarding such additional technologies for the purpose of establishing a list of possible LAW treatment technologies. Only technologies that could meet the criterion of closing the LAW treatment gap by accelerating cleanup and reducing risk while maintaining cleanup quality were retained for further characterization. Furthermore, Section E.1.3 discusses technology options that were initially considered, but were not analyzed in detail, as well as the rationale for selecting the technologies that were analyzed. The former are technologies that, due to their lack of maturity, cannot be analyzed in detail at this time using reasonable and conservative engineering estimates of the construction, operations, and decommissioning impacts.

Should continued R&D indicate additional benefits over the technologies analyzed in detail, these maturing technologies can then be analyzed in further detail and incorporated into the tank closure program. Transmutation and phytoremediation are technologies that are currently insufficiently mature to be analyzed further and, therefore, were not analyzed in this EIS. Section E.1.2.3.5.1 also states that those technologies that were not analyzed in detail in this EIS are not precluded from consideration as supplemental treatment technologies to treat tank waste. As related information matures, these candidate technologies can be evaluated by the decisionmakers in relative parity with the technologies analyzed in this EIS, and technologies other than those analyzed in detail in this EIS may be chosen for use. The known impacts of any candidate treatment technology can be evaluated against the impacts of the technologies analyzed in detail in this EIS. The impacts of that candidate technology would be evaluated relative to the impacts analyzed in this EIS; however, additional NEPA analysis would be required before selection of that treatment technology.

443-2 A discussion of the potential short-term impacts of seismic activity is in Appendix K, Section K.3, of this *TC & WM EIS*. The long-term groundwater analysis does not take credit for waste form container integrity.

443-3 As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities

Commentor No. 443 (cont'd): Gabi Diane

3. to ignore (or apparently minimize concern about) the risks involved in transporting these wastes to the site (only I-5, 84, 205 and 90 were mentioned as routes affected - what about routes in the rest of the country - if this were a 'national' dumpsite, wouldn't these trucks be travelling through many other states?), indicates a rather superficial regard for the issue of safety of the population in general.

443-4

While i could go on with reasons for not going ahead with the proposed plans (but these alone should indicate a wiser course, at least, of 'going back to the drawing board' for now), i myself cannot offer any alternative solution as to what to do with nuclear waste, other than 1/ reduce our dependence on nuclear energy (and its radioactive

wastes) as much as possible and more aggresively take steps necessary to implement cleaner energy production and, 2/ look into developing methods (like transmutation and phytoremediation) to clear up the waste already generated.

thank you for your work and caring regard.

downriver from Hanford. One of the purposes of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms by landfill closure, selective clean closure, or clean closure. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks. In addition, this EIS analyzes the potential impacts of DOE's proposed actions to store and/or dispose of the waste generated from these tank waste activities; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate cleanup at Hanford and other DOE sites. For analysis purposes, it was assumed that the modified RCRA Subtitle C barrier would be effective for 500 years, and the Hanford barrier would be effective for 1,000 years. Appendix E, Section E.1.2.5.4.1, of this *TC & WM EIS* provides additional information on these two barrier types.

443-4 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 444: Jan Gordon

From: Jan Gordon [janimals1@yahoo.com]
Sent: Monday, April 05, 2010 4:03 PM
To: tc&wmeis@saic.com
Subject: comment Hanford

I am not an expert but I am a resident of Wa. and I vote and am educated.

From what i understand there has been money allocated to cleanup of hanford and yet that is not happening , or not happening at the necessary timeline to prevent tragedy. Also, you want to bring truckloads of hazardous waste from the whole country to further contaminate this site without taking care of existing dangers. ***444-1***

I keep hearing that this is or that is too expensive, yet we keep having to pay for cost cutting, Katrina, oil spills, landslides due to clearcutting, people dying from hazardous waste, ecosystems destroyed, cultures destroyed.

When do we learn to do it right first?

The unlined pits need to be cleaned up for forever. The reactor needs to be dismantled safely. I don't know how trucks could transport waste safely. Each one is a great terrorist target, particularly in urban areas. ***444-2*** ***444-3***

Washingtonians voted to clean up hanford and not bring in more waste.

Once the columbia is contaminated with radioactive waste, there is no more opportunity to cleanup, it's too late.

Does it have to be your child who gets cancer before you care?

Sincerely
Jan Gordon
16544 colony Rd
Bow, Wa. 98232

444-1 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

444-2 Cleanup of Hanford is a major goal of implementing the Preferred Alternatives presented in this *TC & WM EIS*. While implementation of the Preferred Alternatives would go a long way toward achieving cleanup of the site, not all actions related to cleanup are addressed in this *TC & WM EIS*. As stated in Chapter 1, Section 1.4.2, of this EIS, the groundwater contamination in the non-tank-farm areas in the 200 Areas (including the burial grounds, cribs, and trenches [ditches]) is being addressed under CERCLA, which will also satisfy substantive RCRA and Washington State Hazardous Waste Management Act corrective action requirements.

Although nearly all elements of FFTF and the two adjacent support facilities would be removed under FFTF Decommissioning Alternative 3, the lower portion of the RCB concrete shell would remain. This would be backfilled with either soil or grout to minimize void space. The area would be regraded and revegetated, with no need for a barrier. DOE's preference is for FFTF Decommissioning Alternative 2, under which some below-grade structures would remain; however, these would be grouted in place to immobilize the hazardous constituents. The filled area would then be covered with a modified RCRA Subtitle C barrier to further isolate the entombed structures and prevent infiltration of water. These actions (grouting and barrier placement) would minimize the migration of any contaminants to the environment.

444-3 As shown in the Summary of this *TC & WM EIS*, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that the estimated total public radiation exposures from transporting radioactive waste to Hanford for disposal would result in any additional LCFs.

Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 445: Carol McDonald

From: c mcdonald [cikim62@clearwire.net]
Sent: Wednesday, April 07, 2010 3:54 PM
To: tc&wmeis@saic.com
Subject: draft EIS comments

April 7, 2010
Mary Beth Burandt
DOE Draft TC&WM EIS Comments
Office of River Protection
P.O. Box 1178
Richland, WA 99352
Subject: Draft TC&WM EIS comments

I am opposed to using Hanford for a National radioactive waste dump and to the transporting of that waste material over our roads to Hanford.

For many years we've been promised cleanup at Hanford. During that time the cleanup has been delayed and funds cut or diverted while the hazards from contamination of groundwater and ultimately the Columbia River remain.

To add more high level waste before the cleanup is complete would be irresponsible and would increase health risks, especially from cancer.

The risks of transporting wastes over busy roadways is unacceptable, especially these days when terrorism is a real threat!

USDOE's "preferred alternatives" are unacceptable!

Please do not add to the waste at Hanford.

Thank you for this opportunity to comment.

Sincerely,

Carol McDonald
7709 28th St. SE
Everett, WA 98205

445-1

445-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

Commentor No. 446: Wayne Ross

From: Wayne Ross [wadross@yahoo.com]
Sent: Friday, April 09, 2010 9:02 AM
To: tc&wmeis@saic.com
Subject: Comments on EIS

The selection of preferred alternatives and directions in the waste management activities has been directed by minor risks and political pressures. With the current and projected national financial problems, more emphasis needs to be given to the costs of the alternatives. The cost benefit ratios need to be looked at and utilized in the decision process. Large costs should not be undertaken without significant reductions to risk. The levels of natural contamination in the Columbia River from uranium and its daughters upstream and down stream needs to be considered in comparison to levels of contamination from waste management activities from the Hanford site. The balance in the decision process needs to recognize that funding will become more restricted during the coming years with the need to reduce Federal expenditures. In order to complete the waste management activities less expensive alternatives will need to be selected. *446-1* *446-2* *446-1 cont'd*

Wayne Ross
1955 Pine Street
Richland, WA 99354

446-1 Chapter 2, Section 2.11, of this *TC & WM EIS* summarizes and compares the relative costs of the alternatives. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

446-2 For current operations, the annual Hanford Site environmental report (Poston, Duncan, and Dirkes 2011) present data from environmental monitoring on and around the site. The report for 2010, Tables C.3 and C.4, show that the average concentration of uranium in river water samples collected in Richland, Washington, downstream from Hanford over a 6-year period (2005 through 20010) are higher than concentrations collected at Priest Rapids Dam upstream from the site. The long-term impacts analysis in Chapter 5 of this *TC & WM EIS* indicates that, over time, uranium would be released to the river, the rate of release being controlled by migration from release locations through the vadose zone and groundwater.

Commentor No. 447: Susan K. Godfrey

From: S.K. Godfrey [gonzogodfrey@hotmail.com]
Sent: Saturday, April 10, 2010 2:32 PM
To: tc&wmeis@saic.com
Subject: Comment on Nuke Waste Disposal

Greetings:

I was raised in Eastern Washington and have a number of relatives living there. One was a cousin who lived in Richland, WA for many years and hunted and fished in the outflow from the Hanford, WA "nuclear reservation". He died from leukemia at a young age, with no histories of cancer in our family. His family chose not to be involved in one epidemiological study which was conducted in those years, as apparently there were a number of similar cases.

About that time I became involved in a WA statewide "Nuclear Safeguards Initiative" asking Hanford representatives to explain/be responsible for choosing a technology for safely disposing of the nuclear waste created at that plant, and to discourage new dumping of nuclear waste there until a good plan for disposal of current waste was tested and demonstrated. However, our Governor, Dixy Lee Ray advocated bringing all the nuclear waste throughout the nation to Hanford.

The engineers there, a number of whom I met and attempted discussion with, could not come up with a viable solution for that waste disposal and to my knowledge have not yet done so.

For that reason President Obama's recent comments that nuclear power can be added to the mix of domestic energy production are deeply disturbing. Lacking clear means to safely dispose of these wastes coupled with the abundance of safe and renewable energy sources makes reviving nuclear production a risky business proposition. ***447-1***

I ask the industry spokespeople to step up and explain the "putting the dangerous wastes into glass/vitrification" technology being discussed and tell where they are putting the glass: back into Richland where there may be earthquake potential to release those poisons into the earth environment, blasting them into outer space or where? And at what cost? ***447-2***

Nukes are just an expensive and dangerous way to boil water, so when there are other alternatives, why waste money on this one?

Please feel free to contact me if a formal statement is needed.

Sincerely,
Susan K. Godfrey
Seattle
Seattle, WA

447-1 Nuclear energy production and its resulting waste and the use of renewable energy sources are not within the scope of this *TC & WM EIS*. Regarding the safe disposal of waste generated from nuclear energy production, the current Administration has established a Blue Ribbon Commission on America's Nuclear Future that has issued a report and recommendations for a path forward for managing the country's HLW. DOE's decisions regarding management of Hanford waste will be consistent with Administration policies. For a more comprehensive discussion of this topic, see Section 2.10 of this CRD.

447-2 Regarding the vitrified HLW, DOE is committed to meeting its obligations to manage and ultimately dispose of Hanford waste, including the HLW, HLW melters taken out of service, and selected tank closure waste (highly contaminated tank debris, equipment, soils, and rubble), which were analyzed in this *TC & WM EIS*.

See response to comment 447-1 regarding the Yucca Mountain program and the Blue Ribbon Commission.

Regarding vitrified LAW, this *TC & WM EIS* offers two alternatives, onsite disposal in an IDF or offsite disposal. Onsite disposal of the ILAW is analyzed under a number of Tank Closure alternatives, including Tank Closure Alternatives 2A, 2B, 3A, 3B, 3C, 4, 5, and 6C. Tank Closure Alternative 6B analyzes the impacts of disposing of the ILAW glass off site because the ILAW is assumed to be managed as IHLW. The long-term impacts on groundwater from disposing of ILAW glass on site are summarized in the Summary, Section S.5.5, and Chapter 2, Section 2.10, Key Environmental Findings. The estimated costs of each of these alternatives are presented in Chapter 2, Section 2.11. Appendix F, Section F.5, describes the measures DOE has taken to ensure the WTP and all Hanford waste facilities protect the public, workers, and environment from the adverse impacts of natural phenomena hazards, including earthquakes.

Appendix K analyzes and provides the results of a number of accident scenarios that could be caused by seismic events at Hanford. The accidents analyzed cover a wide range, including failure of the HLW melters in the WTP, complete collapse of the WTP during operations, and IHLW and ILAW glass canister drops during storage. As discussed in Appendix K, Section K.3, the impacts of these low-probability events would be small in terms of additional radiation dose and the LCFs that could result. As there would be no immediate release of (solidified) ILAW glass in a disposal facility such as an IDF during a seismic

Commentor No. 447 (cont'd): Susan K. Godfrey

event, no such event is analyzed in Appendix K. However, short- and long-term releases from the solidified waste forms, including ILAW glass, are analyzed in detail in Chapters 4 and 5, respectively, of this EIS and are summarized in the Summary, Sections S.5.3 and S.5.4, respectively.

Commentor No. 448: Carole Nervig

From: Carole [carolenervig@mac.com]
Sent: Sunday, April 11, 2010 1:12 PM
To: tc&wmeis@saic.com
Subject: Unacceptable dangers at Hanford and the Columbia River

I was shocked to read information about the current state of danger at the Hanford nuclear waste site and its environs, especially the Columbia River.

Even though we are in the midst of a funding crisis, what could be more essential than the immediate cleanup of Hanford? *448-1*

It is also unthinkable that additional nuclear waste could be shipped to Hanford.

We need JOBS, so why not use stimulus money to fund the vitrification program back on track and on schedule.

Regards,

Carole Nervig

448-1 Both DOE and Congress are committed to the cleanup efforts at Hanford, and DOE continues to seek funding for these efforts. However, in general, the scope of this *TC & WM EIS* does not include groundwater remediation activity or cleanup costs as part of the proposed actions evaluated. DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 449: Richard I. Smith

From: Richard I Smith [mailto:ri_smith@verizon.net]
Sent: Friday, April 09, 2010 4:24 PM
To: Burandt, Mary E
Cc: Gamache, Lori M
Subject: RE: EIS Comments

My comments are attached. I tried to send these to your comments address again later in the week and failed to get through again. I also gave a hard copy to Lori Gamache while in Portland to give to you, if all else failed. Let me know if you have received this copy. Thanks.

Dick Smith

From: Burandt, Mary E [mailto:Mary_E_Burandt@RL.gov]
Sent: Friday, April 09, 2010 2:51 PM
To: 'Richard I Smith'
Subject:

Dick,

I received your message on Monday that you tried to send your comments to the TC&WM EIS website. I am making sure we do not have any issues since it would not accept them. Please send your comments to me at this e-mail.

Mary Beth Burandt
Office of River Protection
NEPA Document Manager
TC&WM EIS
(509) 372-7772

Response side of this page intentionally left blank.

Commentor No. 449 (cont'd): Richard I. Smith

Comments on the Draft TC & WM EIS
Richard I Smith, P.E.
April 4, 2010

General Comments

I was frankly overwhelmed by the number and complexity of the alternatives examined. I have to assume that this large number of variations incorporated into the family of alternatives arose from the desire of DOE to have NEPA coverage for that large group of possibilities in order to increase their flexibility in selecting a preferred path for closing the tanks, treating the wastes, and disposing of the treated wastes. The proposed plans for retrieving, treating, and disposing of the tanks and their contained wastes at Hanford have changed somewhat since work on the EIS began. The inclusion of supplemental treatment processes that have since been essentially ruled out for application to tank (LAW) wastes at Hanford (bulk vit, cast stone, steam reforming) caused a lot of space being taken up by discussions and analyses of the use of those processes for LAW materials. Removing those supplemental treatment processes from the EIS could help reduce the confusion and complexity, and would allow evaluation of more realistic alternatives. *449-1*

None of the alternatives presented a scenario that represented reality. The many possibilities for action were distributed across the various alternatives in such a manner as to make it impossible to directly compare the effects of implementing or not implementing any given remedial action. For example, there is no way to directly compare the effects of clean closure to landfill closure, for the same tank residual levels. A direct comparison of the effects removing or not removing Tc-99 from the waste stream prior to vitrification (2B and 6C) is confused by assigning ILAW to be high-level waste in 6C. A presentation of the effect on residual risk produced by implementing a given remedial action should be provided for each of the proposed actions, to facilitate an understanding of which actions are more effective for reducing risk. *449-2*

It took a while to realize that none of the alternative results included any vadose zone or groundwater remediation. Because all of the resultant groundwater contaminants appeared to exceed allowable levels, it did not seem like any of the alternatives could be acceptable. The point needs to be clearly made in the summary that no vadose zone or groundwater remediation is included in the analyses. The reasons for excluding vadose zone and groundwater remediation from the analyses, should also be explained. Some discussion of whether any of the likely vadose zone and groundwater remediation processes could be expected to bring the contaminant levels into compliance, and how long it might take to achieve compliance, would also be appropriate. *449-3*

It is clear from the studies that the principal contaminants of concern are Technetium-99, Iodine-129, and Uranium. It is also obvious that the treatment processes in WTP have not been optimized to assure maximum capture of those contaminants in glass. Assumptions about partitioning factors and mass balances in the melter facilities and subsequently in the treatment facilities at ETF, are very important to the analytical *449-4*

449-1 The alternatives presented in this *TC & WM EIS* were developed under NEPA (42 U.S.C. 4321 et seq.) to address the essential components of DOE's three sets of proposed actions (tank closure, FFTF decommissioning, and waste management) and to provide an understanding of the differences between the potential environmental impacts of the range of reasonable alternatives. Consistent with CEQ guidance, this EIS analyzes the range of reasonable alternatives that covers the full spectrum of potential combinations. The alternatives considered by DOE in this EIS are "reasonable" in the sense that they are practical or feasible from a technical and economic standpoint and meet the agency's purposes and needs. Potential conflicts with laws and regulations do not necessarily cause an alternative to be unreasonable, but additional mitigation commitments may be required if it is selected for implementation. For a more comprehensive discussion on compliance with regulatory requirements, see Section 2.7 of this CRD.

449-2 DOE disagrees with the commentor's assertion that it is impossible to assess impacts of various options against each other. The alternatives presented in the *Draft TC & WM EIS* were developed under NEPA to address the essential components of DOE's three sets of proposed actions (tank closure, FFTF decommissioning, and waste management), and to provide an understanding of the differences among the potential environmental impacts and the range of reasonable alternatives. Because several hundred impact scenarios could result from the potential combinations of the 11 Tank Closure, 3 FFTF Decommissioning, and 3 Waste Management alternatives, DOE analyzed a reasonable number of combinations of alternatives to represent key points covering the full spectrum of potential actions and associated overall impacts that could result from full implementation.

The analyses of potential environmental impacts are presented in detail in Chapters 4 ("Short-Term Environmental Consequences") and 5 ("Long-Term Environmental Consequences") of this *TC & WM EIS*, allowing an indepth comparison of the alternatives by resource area. The impact analyses presented in Chapter 2, Sections 2.8 and 2.9, are summaries of the short-term and long-term impacts presented in Chapters 4 and 5, respectively. In addition, Chapter 2, Section 2.10, presents an overview of the key environmental findings associated with the Tank Closure, FFTF Decommissioning, and Waste Management alternatives and discusses the key drivers contributing to these impacts. In particular, this section discusses the key findings associated with technetium-99

Commentor No. 449 (cont'd): Richard I. Smith

results. In particular, the current treatment processes at ETF are not likely to be able to immobilize the highly mobile Tc-99 and I-129 in any waste form other than glass, and the quantities of those contaminants arriving at ETF may be considerably greater than presently assumed. Thus, the analytical results for release of Tc-99 and I-129 from land disposal facilities such as IDF may significantly underestimate the risk to the environment arising from releases of these contaminants. ***449-4 cont'd***

It was not immediately obvious how the cumulative concentrations of contaminants in the groundwater that arose from co-located or adjacent sources were developed. For example, the source from an emptied tank, plus the source from a leak at that tank, plus any nearby waste sites, etc., all contribute. Was each source location evaluated separately, and the individual source results summed to arrive at the total? If so, those individual source results and their risk implications should be presented somewhere in tables and figures, so that the reader could reach some conclusions about which sources are the most ones important to deal with during cleanup. These individual source results could also be useful when selecting the most viable remediation approaches for a given problem area, e.g., tank landfill closure with and without a cap, or clean closure versus landfill closure. ***449-5***

Comments on the Adequacy of the Draft TC & WM EIS

Does the current draft adequately identify and evaluate most of the likely alternatives for Tank Closure and Waste Management?
YES (However, soil remediation activities for tank closure only considered Capping or deep excavation and soil washing. Future developments in treatment and removal technologies should not be excluded from consideration if shown to be beneficial.) ***449-6***

Are the evaluations of the selected alternatives and their many individual actions carried out in a consistent and evenhanded manner?
YES (The analysis methodology was applied uniformly across the various actions. However, the actions that made up a given alternative seemed to be somewhat randomly assembled.)

Are the alternative scenarios assembled in a manner that facilitates easy comparison of impacts arising from the various parts of the rather complicated sets of possible actions?
NO (Each alternative is comprised of a number of individual actions. It is difficult, if not impossible, to directly compare the effects of implementing or not implementing single actions, e.g., attempting to evaluate the benefits of removing Tc-99 from the waste stream early in the pretreatment process.) ***449-7***

Do the evaluated alternatives result in acceptable groundwater contamination levels?
APPARENTLY NOT (Because all of the curves of risk vs. time had no units on the risk axis, it was not possible to determine whether existing risk limits were met or exceeded.) ***449-8***

Are any direct groundwater remediation actions evaluated for the alternatives?
NO (The evaluations did not include any analyses of groundwater remediation.) ***449-9***

removal and different closure scenarios (i.e., landfill closure, selective clean closure, and clean closure).

449-3 Chapter 7, Sections 7.1 and 7.5, discuss potential mitigation measures that could be used to avoid or reduce adverse environmental impacts associated with implementation of the alternatives. As discussed in Chapter 5 of this *TC & WM EIS*, DOE acknowledges that benchmark standards could be exceeded in groundwater at the Core Zone Boundary and/or at the Columbia River nearshore at various dates. The term "benchmark standards" as used in this *TC & WM EIS* represents dose or concentration levels that correspond to known or established human health effects. For groundwater, the benchmark is the MCL, provided an MCL is available. This *TC & WM EIS* incorporates vadose zone remediation in some of the Tank Closure alternatives, which indicates improvement in the vadose zone and groundwater modeling results: Alternative 4 includes deep soil remediation beneath two tank farms, and Alternatives 6A and 6B include deep soil remediation beneath the tank farms and cribs and trenches (ditches).

449-4 Appendix E, Section E.1.2.3.3.1, describes the ETF process. The ETF currently produces two waste streams: the primary liquid waste stream, which is verified in the verification tanks and sent to the State-Approved Land Disposal Site for final disposition, and the secondary-waste stream, which is a solid-waste stream generated from the thin-film dryer. The powder and/or sludge solid-waste stream is packaged in 208-liter (55-gallon) drums and is directed to final disposition, depending on the source of the effluent that was processed. Waste from effluent that results from CERCLA remedial actions is sent to the ERDF for disposal. LLW and MLLW from ongoing site activities would be sent to the currently operational lined trenches 31 and 34 in LLBG 218-W-5 or an IDF for disposal. The ETF does not produce a glass waste form such as mentioned in the comment.

As discussed in Chapter 7, Section 7.1.6, of this EIS, this is a particular area of focus for DOE, especially with regard to partitioning and capture of iodine-129, a conservative tracer, in secondary-waste forms. Additional sensitivity analyses have been added to this *Final TC & WM EIS*. These additional analyses evaluate what changes in potential impacts might occur if partitioning of contaminants could be increased in primary-waste forms and/or if secondary-waste-form performance could be improved. The discussion found in Section 7.5 was added to summarize these results. The results of these analyses will aid DOE in formulating appropriate performance targets for secondary-waste forms. As referenced in the Section 7.5.2.8 discussion, DOE has drafted a roadmap that

Commentor No. 449 (cont'd): Richard I. Smith

Is the question of receiving DOE-owned wastes from other sites adequately evaluated? YES (Clearly, unless treated to meet ILAW standards, adding untreated wastes bearing Tc-99 and I-129 to IDF would result in a large long-term impact to groundwater. Any such additions to the Hanford site inventory should be prevented.)

449-10

Can DOE proceed from this draft EIS to the development of appropriate Records of Decision covering the actions needed to accomplish site cleanup related to the tank wastes, the associated facilities, and the disposition of existing buried wastes? MAYBE (However, careful stakeholder attention will be needed to insure that the final decisions encompass the best combinations of the remediation possibilities. Careful stakeholder scrutiny of the evaluations developed in the subsequent Remedial Investigation / Feasibility Study {RI/FS} and associated Work Plans will be needed to assure that the best combinations of solutions are selected.)

449-11

implements a strategy for development of better-performing secondary-waste forms.

Finally, DOE is currently studying the addition of a solidification capability to the ETF, but there was no "downselect" of a technology at the time of publication of this *Final TC & WM EIS*. Appendix E, Section E.1.2.3.3.4, has additional information on this subject. In lieu of a new solidification capability that is currently too immature for evaluation in this EIS, this final EIS bounds the potential impacts of this enhancement by including at least one full replacement of the current ETF under each of the Tank Closure alternatives. Due to their lengthy duration, under some of the alternatives, multiple ETF replacements are included.

449-5 To the extent possible, each source location was modeled separately and the results combined for the comparison of the alternatives. There are two exceptions to this general statement: (1) Retrieval losses (4,000 gallons per SST), releases from ancillary equipment, and releases from tank residuals were modeled together (on a tank-farm-by-tank-farm basis) for computational efficiency for the draft EIS. However, for this final EIS, these sources were modeled separately (on a tank-farm-by-tank-farm basis); and (2) Moderate- to high-discharge sources that are located reasonably close together were combined into a single model (e.g., the seven cribs in the group called the BY Cribs). The reason for this is that the moisture movement in the vadose zone for the combined system is not equivalent to a linear combination of the individual sources. DOE agrees with the commentor's view that there is utility in the superposition approach to combining sources; this discussion has been expanded in Appendices N and O in this *Final TC & WM EIS*.

449-6 As discussed in Chapter 2, Section 2.2.2.4, and Appendix E, Section E.1.2.5, landfill closure and clean closure, along with a hybrid combination of selective clean closure/landfill closure, were analyzed to provide DOE with the information necessary to determine the benefits of each and to envelope the closure options that are currently available. However, DOE is committed to continuing its support of R&D activities for new technologies and to monitoring their benefits compared with the technologies analyzed in detail in this EIS. If these technologies mature, they will be analyzed in further detail to determine their applicability to the River Protection Project (RPP) at Hanford.

449-7 The alternatives presented in the *Draft TC & WM EIS* were developed/assembled under NEPA to address the essential components of DOE's three sets of proposed

Commentor No. 449 (cont'd): Richard I. Smith

actions (tank closure, FFTF decommissioning, and waste management), and to provide an understanding of the differences between the potential environmental impacts and the range of reasonable alternatives. Because several hundred impact scenarios could result from the potential combinations of the 11 Tank Closure, 3 FFTF Decommissioning, and 3 Waste Management alternatives, DOE analyzed a reasonable number of combinations of alternatives to represent key points covering the full spectrum of potential actions and associated overall impacts that could result from full implementation.

The analyses of potential environmental impacts are presented in detail in Chapters 4 ("Short-Term Environmental Consequences") and 5 ("Long-Term Environmental Consequences") of this *TC & WM EIS*, allowing an indepth comparison of the alternatives by resource area. The impacts analysis presented in Chapter 2, Sections 2.8 and 2.9 (in tabular form for ease of comparison), is a summary of the short- and long-term impacts presented in Chapters 4 and 5, respectively.

449-8 The "benchmark standards" used in this *TC & WM EIS* represent dose or concentration levels that correspond to known or established human-health effects. For groundwater, the benchmark is the MCL if an MCL is available. For example, the benchmark for iodine-129 is 1 picocurie per liter; for technetium-99, it is 900 picocuries per liter. These benchmark standards for groundwater impacts analysis were agreed upon by both DOE and Ecology as the basis for comparing the alternatives and representing the potential groundwater impacts. In addition, this approach is also consistent with the MTCA standards Method A, which was used to establish cleanup levels under the separate CERCLA and RCRA processes established by the TPA. Method A draws from current Federal and state standards, including the MCLs listed in the MTCA, Table 720–1. In this *Final TC & WM EIS*, DOE revised the graphs from the *Draft TC & WM EIS* to clarify the confusion readers and commentors seemed to have regarding the use of term "unitless" for the radiological risk depiction in the graphs located in the Summary, Section S.5.5, and Chapter 5, as well as other locations within this EIS.

449-9 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

449-10 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

The impacts of the offsite waste in terms of radiological risk are presented in the Summary, Section S.5.5.3, and Chapter 2, Section 2.10, Key Environmental Findings. These sections describe the radiological risk differences between including and not including offsite waste disposal at IDF-East.

The *TC & WM EIS* analysis shows that receipt of offsite waste streams that contain specific amounts of certain isotopes, specifically, iodine-129 and technetium-99, could cause an adverse impact on the environment. Therefore, one means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford. Other mitigation measures, such as recycling secondary-waste streams into the primary-waste-stream feeds within the WTP to increase iodine-129 capture in ILAW and bulk vitrification glass, are discussed in Chapter 7, Section 7.5, of this final EIS.

449-11 Chapter 7, Sections 7.1 and 7.5, discuss potential mitigation measures that may be needed and are feasible for DOE to implement to offset the potential impacts that might result from implementing an alternative. While DOE's Preferred Alternatives for tank closure, FFTF decommissioning, and waste management in this *TC & WM EIS* may not necessarily represent the most environmentally preferred alternatives, the ROD issued by DOE will identify any additional mitigation and monitoring commitments adopted by DOE and specify other factors considered by DOE in reaching its decision, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. In announcing its decision in the ROD based on the EIS analyses, DOE will be obligated to carry out the decision consistent with the requirements identified in this EIS. These requirements will be interpreted and applied by Federal, state, and local regulatory agencies through their independent authorities. These agencies may also impose additional mitigation measures through future permitting processes or remedial actions under the scope of the TPA, which would include additional opportunities for public comment.

Commentor No. 450: Martha Tofferi

From: martha tofferi [mk_98199@yahoo.com]
Sent: Monday, April 12, 2010 1:37 PM
To: tc&wmeis@saic.com
Subject: Hanford Proposal

Until we are much closer to containing the atomic refuse at Hanford, we should not even consider adding more contaminated refuse. Hanford may look desolate and therefore inviting, but it is leeching 'bad stuff' into the Columbia which spreads it through southern Washington, northern Oregon, and the Pacific Ocean. *450-1*

It just does not make sense to add more contamination.

martha tofferi
seattle, wa

450-1 See Section 2.1 of this CRD, a volume of this *TC & WM EIS*, for more information regarding offsite waste.

DOE recognizes that groundwater contamination is a concern at Hanford and its potential impact on the Columbia River. See Sections 2.3 and 2.11 of this CRD for more information regarding remediation and mitigation activities at Hanford.

Commentor No. 451: Larissa Freier

From: Larissa Freier [larissa_freier25@hotmail.com]
Sent: Tuesday, April 13, 2010 10:55 PM
To: tc&wmeis@saic.com
Subject: NO MORE NUCLEAR WASTE!!!

It's hard to imagine that there is so much nuclear and radioactive waste polluting all this plant and animal life. Adding even more nuclear waste would be a huge mistake. It seems like the easy thing to do now but then later it will create an even bigger problem without an easy solution. The Columbia River and the surrounding environment is in danger and they should not pollute it any more! *451-1*

451-1 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

Commentor No. 452: Rinnah Becker

From: Rinnah Becker [Rin.RosaliLane@olympus.net]
Sent: Wednesday, April 14, 2010 1:00 AM
To: tc&wmeis@saic.com
Subject: no more nuclear waste in Hanford! (or anywhere)!

Dear U.S. DOE, Washington State Department of Ecology, and all involved in TC & WM EIS,

I am a 14-year-old living in Port Townsend, Washington. I am emailing regarding Hanford and the DOE's preferred alternatives for cleaning it up. I do not think the country should be allowed to dump more nuclear waste at Hanford. I admit that if we make nuclear waste, we do have to figure out how to deal with it responsibly. It is not responsible to leave it where it will leak into the Columbia River. The Columbia River flows through Hanford for 50 miles. The Columbia is highly important, not only as an energy source, but also as a major water source for people and irrigation (irrigating the fruit orchards of Eastern Washington). There are also the salmon to worry about! I, for one, do not want to eat a radioactive apple or risk drinking radioactive water. *452-1*

Nobody should have to risk this. We need to clean up the waste that is at Hanford. We should not make more waste and put it there. If all we can do with waste is let it sit, we should not be making any more. It is irresponsible and a hazard to my health and the health of all other Washingtonians to ignore this problem.

I would also like to point out that initiative 297 (to clean up Hanford before any other waste is put there) passed by almost 70%. The federal government did not allow this initiative to be implemented. It seems as though the federal government is ignoring what the people want. 70% of us want Hanford cleaned up (and this does not even count the kids who really, really, really don't want to deal with nuclear waste in their futures).

I hope you seriously consider not following your preferred alternative and decide to clean up Hanford. *452-2*

Sincerely,

Rinnah Becker
9th grader at Port Townsend High School

452-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

452-2 Cleanup of Hanford is a major goal of implementing the Preferred Alternatives presented in this *TC & WM EIS*. The commentor is referred to Chapter 2, Section 2.12, for a discussion of the Preferred Alternatives for tank closure, FFTF decommissioning, and waste management. While implementation of the Preferred Alternatives would go a long way toward achieving cleanup of the site, not all actions related to cleanup are addressed in this *TC & WM EIS*. For example, as noted in Chapter 1, Section 1.4.2, the six sets of cribs and trenches (ditches) that are contiguous to the SSTs are CERCLA past-practice units. While these would fall under the barriers placed over the SSTs during closure, they are not a part of the proposed actions of this EIS. Closure of these units will be addressed at a later date. Other cleanup actions not covered in this EIS are discussed in Chapter 1, Section 1.4.2.

Commentor No. 453: Katherine Weybright

From: Katherine Weybright [kweybright@gmail.com]
Sent: Wednesday, April 14, 2010 10:41 AM
To: tc&wmeis@saic.com
Subject: Public Comment Period -- Hanford Draft Tank Closure

Hello -

I am a citizen of the great state of Washington. I am writing to express my extreme opposition to using Hanford as a national radioactive waste dump. The US Department of Energy's *own* analysis shows that using either landfill (existing 200 East or proposed 200 West) will cause HIGH contamination and cancer risks for thousands of years. Do you want this on your conscience? I sure don't. Please do not add any more waste to the Hanford site (we have enough to deal with already without taking waste from elsewhere!). Please complete the clean up of the high level nuclear waste tanks at Hanford. *453-1* *453-2* *453-1 cont'd*

Sincerely,

Katherine Weybright
Seattle, WA

453-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

453-2 DOE recognizes the potential negative impacts on Hanford groundwater that shipment of offsite waste to the site could pose. The *TC & WM EIS* analysis showed that receipt of offsite waste streams that contain specific amounts of certain isotopes, specifically, iodine-129 and technetium-99, could cause an adverse impact on the environment. One means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford. Other mitigation measures, such as recycling secondary-waste streams into the primary-waste-stream feeds within the WTP to increase iodine-129 capture in ILAW and bulk vitrification, are discussed in Chapter 7, Section 7.5, of this final EIS.

Commentor No. 454: Polly Thurston

From: Polly Thurston [ptravennest@hotmail.com]
Sent: Thursday, April 15, 2010 7:35 PM
To: tc&wmeis@saic.com
Subject: Time to clean up Hanford

I would like to urge the powers that be to CLEAN UP HANFORD NOW and NO MORE WASTE dumped there. This is long overdue. Yes, we need more research to figure how best to clean it up and YES we need to start cleaning it up now. I used to swim in the Columbia River and now i hear it's contaminated with the Hanford waste. These are important issues for people NOW and for future generations. Please urge the federal government to start cleanup now and to not bring any more - enough damage has been done. *454-1*

As well - Time to stop creating the stuff. We have to consider the health and security of future generation, not the profits of corporations.

Polly

454-1 This *TC & WM EIS* addresses the environmental impacts of proposed actions to retrieve, treat, and dispose of Hanford tank waste; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate environmental cleanup activities at Hanford and other DOE sites.

Commentor No. 455: Michael J. Chappell, Gonzaga Environmental Law Clinic

From: shackett@gonzaga.edu on behalf of Hackett, Sean [shackett@lawschool.gonzaga.edu]
Sent: Friday, April 16, 2010 3:55 PM
To: tc&wmeis@saic.com
Cc: chappell.law@comcast.net
Subject: TC&WMEIS Public Comments
Attachments: Hanford Comments.pdf

Dear Ms. Burandy,

Please accept these comments regarding DOE's EIS on Tank Closure and Waste Management at Hanford. These comments are submitted on behalf of the Gonzaga Environmental Law Clinic, The Lands Council, Kootenai Environmental Alliance, and the Spokane Riverkeeper. Please contact me if you have any questions.

Thank You,

Sean Hackett
Gonzaga University Legal Assistance
Environmental Law Clinic Intern
xxx-xxx-xxxx
shackett@lawschool.gonzaga.edu

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Commentor No. 455 (cont'd): Michael J. Chappell, Gonzaga Environmental Law Clinic

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April 16, 2010

Mary Beth Burandy, Document Manager
Office of River Protection
Department of Energy
PO Box 1178
Richland, WA 99352
Attention: TC & WM EIS

Re: Tank Closure and Waste Management Draft EIS ("Draft EIS")

To Whom It May Concern:

I am writing on behalf of the Gonzaga University Environmental Law Clinic, the Spokane Riverkeeper, Kootenai Environmental Alliance, and The Lands Council.

The Gonzaga Environmental Law Clinic provides legal representation to not-for-profit environmental programs in the Inland Northwest, and strives to protect and restore the quality and integrity of the region's waters through advocacy and public interest litigation.

The Spokane Riverkeeper ("Riverkeeper") is a program of the Center for Justice ("CFJ"). CFJ is a not-for-profit legal organization which provides legal services to individuals and public interest organizations in the Inland Northwest. CFJ works to ensure that all individuals and public interest organizations of limited means have access to justice, including a clean and healthy environment. Riverkeeper conducts surveillance of the Spokane River and its tributaries and reaches out to river users who share its commitment to a river that is swimmable, fishable, and properly regulated. To further these goals, Riverkeeper actively seeks Federal and State agency implementation of the Clean Water Act and, when necessary, directly initiates enforcement actions on behalf of itself and the public. The Riverkeeper may be contacted at:

Rick Eichstaedt, Spokane Riverkeeper
Center for Justice
35 West Main, Suite 300
Spokane, Washington 99201
Phone: (509) 835-5211

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Commentor No. 455 (cont'd): Michael J. Chappell, Gonzaga Environmental Law Clinic

The Kootenai Environmental Alliance ("KEA") is a non-profit conservation organization located in Coeur d'Alene, Idaho. KEA's mission is to conserve, protect and restore the environment with particular emphasis on the Idaho Panhandle and the Coeur d'Alene Basin. KEA has been working to protect and restore the environment of the Idaho Panhandle and the Coeur d'Alene River Basin since 1972. To further these goals, KEA uses a grassroots collaborative approach; actively seeks Federal and State agency implementation of the Clean Water Act; and, where necessary, directly initiates enforcement actions on behalf of itself and its members. KEA may be contacted at:

Terry Harris, Executive Director
408 Sherman Avenue, Suite 301
Coeur d'Alene, ID 83814
(208) 667-9093

The Lands Council preserves and revitalizes Inland Northwest forests, water, and wildlife through advocacy, education, effective action, and community engagement. To achieve this goal, The Lands Council collaborates with a broad range of interested parties to seek smart and mutually respectful solutions to environment and health issues. The Lands Council may be contacted at:

Mike Petersen, Executive Director
25 W Maine, Suite 222
Spokane, WA 99201
(509) 838-4912

Members of the Environmental Law Clinic, Riverkeeper, Kootenai Environmental Alliance, and the Lands Council reside and recreate near areas that will likely be impacted by the Proposed EIS. For this reason, we are writing to voice our concerns about the Department of Energy's ("DOE") preferred alternatives for tank closure and waste management at Hanford. To summarize, we respectfully request that DOE: clean up all 53 million gallons of nuclear waste in the leaky single-shell tanks to 99.9% retrieval, and remove the tanks themselves; entirely drop the proposal to ship radioactive waste from across the nation to Hanford; clean up the millions of gallons of nuclear waste that has already leaked and is reaching to Columbia; implement the clean-closure option when closing the tanks; and under absolutely no circumstances whatsoever, should DOE transport hazardous radioactive waste along I-90 directly above the sole source Spokane-Valley/Rathdrum-Prairie Aquifer.

1. **DOE should clean up all 53 million gallons of nuclear waste in the leaky single shell tanks to 99.9% retrieval.**

DOE owes it to the citizens of Washington and Idaho to implement the most extensive cleanup option technologically available. While 99.9% retrieval might be the maximum practical removal of the waste from tanks, it is possible to remove the entire tank. The final .1% of waste may include higher concentrations of the long-lived heavy metal radionuclides that are currently present in the tanks. The less extensive alternatives are unacceptable as they would both allow for additional groundwater contamination and potential contamination of the Columbia River- the lifeblood of the Pacific Northwest. Past leaks from just a portion of

455-1

455-1 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. This closure includes the tank system, along with the vadose zone as impacted by the tank farms (i.e., past leaks). However, as discussed in the Summary, Section S.1.3.2, and Chapter 1, Section 1.4.2, of this *TC & WM EIS*, DOE will not make decisions on groundwater remediation based on the proposed actions evaluated in this EIS, including the remediation of groundwater contamination resulting from non-tank-farm areas in the 200 Areas, because that is being addressed under the CERCLA (42 U.S.C. 9601 et seq.) process.

The *TC & WM EIS* closure alternatives considered for the tank farms include no action, landfill closure, selective clean closure, and clean closure, which would involve actions to remove the source of contamination. It does not include proposed actions to address potential groundwater impacts resulting from the tank farms (i.e., past leaks) as this will be addressed along with the 200 Area non-tank-farm area CERCLA process, which includes consideration of all applicable, relevant, and/or appropriate requirements under Federal and state laws and regulations.

This *TC & WM EIS* does consider the Washington State requirements under the MTCA. The "benchmark standards" used in this EIS represent dose or concentration levels that correspond to known or established human-health effects. For groundwater, the benchmark is the MCL if one is available. For example, the benchmark for iodine-129 is 1 picocurie per liter; for technetium-99, 900 picocuries per liter. These benchmark standards for groundwater impacts analysis were agreed upon by both DOE and Ecology as the basis for comparing the alternatives and representing potential groundwater impacts. In addition, use of the standards is consistent with the MTCA standards Method A used to establish cleanup levels under the separate CERCLA and RCRA processes established by the TPA. Method A draws from current Federal and state standards, including the MCLs as listed in Table 720-1 of the MTCA. In this *TC & WM EIS*, the use of MCLs as benchmarks for purposes of determining potential groundwater contamination is thus consistent with the manner in which MCLs are considered in the CERCLA process and provides information to help inform future cleanup decisions.

Commentor No. 455 (cont'd): Michael J. Chappell, Gonzaga Environmental Law Clinic

Hanford's tanks are major contributors of potential additional long-term ground and surface water impacts. Under DOE's current plan, none of the leaked material would be retrieved and, thus, would eventually find its way into the groundwater and the Columbia River. In the interest of saving money, DOE is willing to gamble with the health and wellbeing of current and future residents of this State.

The Draft EIS recognizes that the preferred alternative will result in groundwater contamination that exceeds EPA's Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") Cleanup and Drinking Water Standards within 10,000 years. CERCLA requires that cleanups meet more protective state requirements. 42 U.S.C. § 9621(d)(2). However, the Draft EIS fails to even consider, let alone mention, Washington's more stringent cancer risk-based cleanup under the Model Toxics Control Act ("MTCA"). RCW 70.105D. Not only is this projected exceedance highly objectionable from environmental health and intergenerational equity perspectives, but it threatens to undermine the longevity of at least three very critical sectors of our state's economy: real-estate development along the Columbia River corridor: commercial fishing; and outdoor recreation. Further, the EIS fails to adequately take the increased healthcare costs that will be borne by private individuals as well as the public healthcare system in treating radiation induced cancers into account.

455-1 cont'd

In order to reduce these impacts as much as possible, we strongly urge DOE to implement the 99.9% retrieval alternative. Additionally, we urge DOE to commit to removing the entire tank after 99.9% retrieval for tanks where leakage or the actual composition of the residue creates risks that can be reduced through removal.

2. Drop the proposal to ship radioactive waste from across the nation to Hanford

DOE's preferred alternative to ship radioactive waste from across the nation to Hanford once the Waste Treatment Plant ("WTP") is operational defies logic and poses absolutely unacceptable short and long-term public health and environmental risks. DOE's preferred alternative for landfill closure of cribs and trenches adjacent to the tank farms would result in increased amounts of contamination reaching the groundwater and the river. As the Department of Ecology has recognized, "disposal of the proposed offsite waste would significantly increase groundwater impacts to beyond acceptable levels." *See* "Focus on Effects of Offsite Waste on Hanford," Washington Department of Ecology, 2010. The proposed influx of off-site waste from across the nation would likely add an additional 15 curies of iodine, which under current plans, would not be immobilized in glass and would be highly prone to leach into the groundwater and the Columbia River.

455-2

About 90% of the radioactive iodine that would be released from the landfill would come from imported waste, and about 74% of the radioactive technetium releases would come from imported waste. *See* "Focus on Technetium 99 Removal," Washington Department of Ecology, 2010. These releases are projected to peak 1,000 or 2,000 years in the future at 18 picocuries per liter; 18 times the drinking water standard. The impacts projected from offsite waste are based on hypothetical wastes and there is no rational basis for a claim that the assumptions regarding technetium 99 and Iodine levels estimated for the offsite wastes are conservative. The Appendices to the Draft EIS detail that the offsite waste composition used are mere guesses.

455-2 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

The impacts of the offsite waste in terms of radiological risk are presented in the Summary, Section S.5.5.3, and Chapter 2, Section 2.10, Key Environmental Findings. These sections discuss the radiological risk differences between including and not including offsite waste disposal at IDF-East.

Commentor No. 455 (cont'd): Michael J. Chappell, Gonzaga Environmental Law Clinic

Couple this with the fact that existing contamination is already expected to result in excursions nearly 300 times higher than existing drinking water standards over the next 10,000 years, as well as the fact that DOE is eight years behind schedule and $8 billion over budget in meeting its legal obligations to clean up existing waste, the flaws in DOE's preferred alternative become painfully clear.

455-2 cont'd

It is entirely inequitable to force Washington residents to bear a disproportionate burden of housing much of the nation's most hazardous substances given the fact that the citizens of Washington State have clearly and unequivocally voiced their opposition to becoming the nation's radioactive dumping ground. DOE's plan calls upon Washington residents to shoulder the entire burden of transporting and storing the nation's nuclear waste while, through the passage of Initiative 2004, the people of Washington overwhelmingly expressed their refusal to allow additional shipments of radioactive waste to Hanford until existing waste is cleaned up. Delaying the addition of more hazardous wastes until the WTP becomes operational in 2022 does absolutely nothing to protect the Columbia River and the health of our children for generations to come.

455-3

In addition to these long-term adverse environmental health impacts, DOE's preferred alternative is highly problematic in the near-term, because transporting waste on the region's public roads unjustifiably exposes Washington, Oregon, and Idaho residents to hazardous levels of radiation. The Appendices to the Draft EIS disclose that there may be highly radioactive Remote Handled waste shipped to Hanford. Because there is no federally approved shipping cask for these wastes to be trucked in, and because there will be thousands of truckloads shipped through Washington communities, there is absolutely no way to ensure that the health of residents along I-5, I-84, or I-90 will be adequately safeguarded. This is highly objectionable from an environmental justice perspective because poor and/or minority communities are disproportionately more likely to be located near interstate highways than their affluent, white counterparts. *See generally,* FHWA Transportation and Environmental Justice Case Studies, 2000.

455-4

One issue of particular concern is that DOE has yet to notify the public of its plans for designating those routes that will be taken by trucks transporting hazardous nuclear waste to Hanford. Without letting the public know whether or not their community will potentially be impacted by an influx of radioactive traffic heading to Hanford, any discussions surrounding the viability and desirability of DOE's preferred alternatives are illusory.

In the absence of any specific routes identified by DOE, we cannot help but assume that truckloads of nuclear waste will be passing directly through Coeur d'Alene and Spokane via I-90. At DOE's Spokane hearing regarding the Draft EIS, DOE staff Mary Beth Burandt acknowledged that truckers are free to choose their own route, and prefer interstate highways for shipments to Hanford from Eastern States, or from Hanford to the Idaho National Laboratory ("INL"). At the Spokane hearing, Spokane City Council Member Bob Apple, a former Teamster, suggested that the preferred route, especially in the wintertime, would be I-90 rather than the "representative route" shown in the Draft EIS. Residents of Spokane, Coeur d'Alene and the surrounding areas are particularly concerned with the unjustifiable hazards of transporting such a highly volatile substance along I-90.

455-5

455-3 See response to comment 455-2 for a discussion on the transport and disposal of offsite waste.

455-4 As shown in the Summary of this *TC & WM EIS*, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that the estimated total public radiation exposures from transporting radioactive waste to Hanford for disposal would result in any additional LCFs.

Note that transportation activities analyzed in this *TC & WM EIS* would not use Interstate 5, as shipments would originate from the east and southeast of Hanford. DOE has a national strategy for disposing of radioactive waste that requires transportation between DOE sites. This strategy was analyzed in the *WM PEIS* (DOE 1997). As part of this strategy, radioactive waste could be transported to Hanford for disposal and transported from Hanford for treatment and disposal at other DOE sites.

Transport packages are available for all proposed remote-handled waste streams analyzed for transport to Hanford for disposal. The transportation of radioactive materials and waste, both coming to and leaving Hanford, must comply with DOT and NRC regulations that promote the protection of human health and the environment. This includes requiring the use of certified packaging that minimizes the radiation dose rate outside the transportation package. The applicable regulations for the certified packages are summarized in Appendix H, Section H.3.1.

The referenced case studies regarding environmental justice do not conclude that poor and/or minority communities are disproportionately more likely to be located near interstate highways than their affluent, white counterparts. These case studies were screened and selected for the Federal Highway Administration's Transportation and Environmental Justice Case Studies booklet issued to "illuminate effective practices on how to better promote environmental justice principles." Furthermore, the agency actions considered under many of these case studies involve developing and constructing highways and addressing the impacts of dividing communities. Questions regarding which materials may or may not be transported along those highways are not considered. It is possible that radioactive waste could pass through minority and/or low-income communities during transportation; however, those shipments will also pass through communities characterized by low minority populations and fairly high incomes. As noted above, the results of the analysis conclude that the risks associated with transporting these materials would be small. Therefore,

Commentor No. 455 (cont'd): Michael J. Chappell, Gonzaga Environmental Law Clinic

Our concerns are particularly salient because I-90 lies directly above the highly efficient (i.e. rapidly moving) Spokane-Valley/Rathdrum-Prairie Aquifer ("SVRP Aquifer"). The SVRP Aquifer was designated as a "sole source" aquifer by the Federal Environmental Protection Agency in 1978 because it provides the only safe and affordable source of drinking water to more than 500,000 Idaho and Washington residents. Due to the high efficiency of this aquifer, if the unthinkable were to happen - and a truck containing radioactive waste were to release its payload over our aquifer - aquifer-wide contamination would be inevitable and over 500,000 people would be without a viable source of drinking water. Additionally, any trucks passing through Spokane via I-90 would come dangerously close to areas containing particularly vulnerable populations: Shriner's Hospital for Children; the Kids Clinic Spokane Pediatrics; Spokane Homeless Resource Center; Cancer Care Northwest; St. Luke's Rehabilitation Institute; and Lewis and Clark High School; to name just a few.

455-5 cont'd

Furthermore, DOE has grossly underestimated the total number of fatal cancers that will result from trucking the nearly 3 million cubic feet of radioactive and mixed radioactive wastes to Hanford. The Draft EIS adopts the figure from DOE's 2003 Solid Waste Disposal Final EIS. DOE's figure is significantly flawed as it is based on models that do not independently calculate the cancer risks for children who will be exposed along those routes. This flaw is significant because children are three to ten times more susceptible to getting cancer from exposure to radiation than adults. *See,* Radiation and Children: The Ignored Victims. Nuclear Information and Resource Service, 2004. *See also* US EPA OSWER analyses, directives, and guidance; and, NAS BEIR VII Report; [March 3, 2003. http://epa.gov/ncea/raf/cancer2003.html "Draft Final Guidelines for Carcinogen Risk Assessment"]. Because of the increased susceptibility of children, it is unbelievable that DOE would transport radioactive materials right through Idaho and Washington neighborhoods containing schools and children's hospitals. Additionally, these models are flawed because of DOE's refusal to apply the most recent dose-risk calculations from the National Academy of Science (BEIR VII), which if applied, would likely increase the risk from given doses several times.

455-6

Before endeavoring to host the nation's nuclear waste DOE should, at a minimum, fully comply with its legal obligations to clean up the existing contamination at Hanford. In order to do this, DOE should limit wastes in Hanford landfills to those amounts and types that won't result in leakage in the future and exceed the cancer risk and drinking water standards – including those from state law. DOE should dig up contaminated soil in unlined disposal ditches, and dispose of them in off-site landfills and/or permanent geologic repositories which are not directly adjacent to major interstate waterways or above critical drinking water supplies, as well as continuing the moratorium on importing additional off-site waste to Hanford.

455-7

455-8

To ensure an adequate source of drinking water for our progeny, to safeguard the long-term economic vitality of our State's commercial fishing and recreation industries, to avoid the unnecessary risks of transporting hazardous nuclear waste on the public's roads, to reduce the unnecessary cancer risks, and because of the increased threat to fish and wildlife along the Columbia River, DOE must focus exclusively on cleaning up existing pollution at Hanford and should reject all attempts to transfer additional waste to Hanford.

455-9

transportation of radioactive waste would not pose disproportionately high and adverse impacts on minority and low-income populations.

455-5 This *TC & WM EIS* contains an analysis of transportation routes of specific origination/destination sites to and from Hanford, as shown in Appendix H, Figure H–4, Waste Management Alternatives – Analyzed Truck and Rail Routes. The actual routes used could vary due to changes in route characteristics and highway construction, but the risk results are expected to remain essentially the same. As described in Section H.4.1, DOE used TRAGIS [Transportation Routing Analysis Geographic Information System], a routing computer program, to generate the routes analyzed in this EIS. TRAGIS identifies highway routes that are in accordance with DOT regulations, which require the use of preferred routes (interstate highway, beltway or bypass, or state- or tribal-designated alternative), and precludes roads that are prohibited from transporting radioactive and hazardous materials.

The transportation of radioactive materials and waste, both coming to and leaving Hanford, must comply with DOT and NRC regulations that promote the protection of human health and the environment. This includes requiring the use of certified packaging that minimizes the radiation dose rate outside the transportation package. The applicable regulations for the certified packages are summarized in Section H.3.1.

Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

455-6 On February 2, 2006, DOE published an NOI (71 FR 5655) related to the revised scope of this EIS. Specifically related to offsite waste, a number of key points were addressed in the notice, including DOE's proposal to simplify the alternatives, update the volumes to be disposed of, and update the waste information. DOE also stated its intention to update the transportation analysis of offsite waste shipments to Hanford for disposal based on new information. More specifically, the *Draft* and *Final TC & WM EIS* analyses are based on (1) updated inventories of wastes to be shipped from specific points of origin; (2) an updated, standalone, *TC & WM EIS* analysis of transportation that draws independent conclusions that are not based on the *HSW EIS* (DOE 2004a); (3) current

3. Implement the "Clean Closure" option, clean up the millions of gallons of nuclear waste that have already leaked, and remediate soil and groundwater contamination before it reaches the Columbia River.

DOE's preferred alternative for cleaning up the millions of gallons of existing nuclear waste that are currently migrating toward the Columbia River is no cleanup at all; it's a cover up. DOE's plan to leave the bulk of the contamination from tank leaks, as well as the tanks themselves, and bury it under dirt caps ("landfill closure") reflects the recently defunct view that tank leaks do not pose a significant risk. Again, in the interests of saving money, DOE is willing to jeopardize the health and wellbeing of Washington's citizenry well into the foreseeable future.

WAC 173-303-675 requires, prior to landfill closure, all reasonable efforts must be undertaken to effect removal or decontamination of contaminated components, subsoils, structures, and equipment. Additionally, DOE must disclose and discuss meeting the State's cancer risk based cleanup standards under RCW 70.105D, as well as mitigation measures to meet the standards of compliance with the Washington State Environmental Policy Act ("SEPA") at RCW 43.21 C. DOE's proposed plan is devoid of any plans to mitigate soil and groundwater contamination at Hanford. If DOE's plan is left unchanged, plumes of hazardous contamination will continue to move toward the Columbia River and will result in a long-lived radioactive legacy. In order to avoid leaving such a legacy for future generations, DOE should remove the tanks (via the "clean closure" alternative) and investigate, excavate and mitigate the soil and groundwater contamination caused by tank leaks to the maximum extent technologically achievable.

455-10

4. Decommissioning

While DOE claims that the impacts of releases are not significant for either of the decommissioning alternatives, as hereinbefore indicated, the risks associated with trucking radioactive waste back and forth to the Idaho Nuclear Laboratory are significant and unacceptable because there is no approved shipping cask for the highly radioactive components to be trucked in. For the reasons stated above, we strongly urge DOE to not put any more radioactive waste on the road unnecessarily. DOE should treat the exiting waste at Hanford on-site.

455-11

We recognize that DOE has extended the comment period until May 3rd, 2010. However, we felt compelled to submit comments now because of our vehement opposition to shipping additional radioactive waste from around the nation through Washington communities. In recognition of the fact that the Draft EIS may be modified before the close of the extended comment period, we may submit an addendum to these comments before May 3rd.

Sincerely,

guidance and data bounding impacts on children; and (4) a No Action Alternative that does not include offsite waste shipments to Hanford (i.e., a No Action Alternative that assumes the status quo, including the offsite waste moratorium).

In the *Draft* and this *Final TC & WM EISs*, Appendix D, Section D.3.6, describes the methodology for selecting the sites and the waste inventory and associated uncertainties. Using updated information, Appendix H of the *Draft* and this *Final TC & WM EISs* contains an analysis of the potential impacts that would be associated with transporting radioactive waste to and from Hanford that is independent from the analysis performed for the *HSW EIS*. The transportation analysis in this *TC & WM EIS* is a standalone analysis with its own results for the radiation risks, as described in Appendix H. The *Draft* and this *Final TC & WM EISs* also contain an analysis of the transportation routes from specific origination sites to specific destinations that would most likely be used, as shown in Appendix H, Figures H–2 through H–4.

There is no existing guidance that recommends dose coefficients for children's exposure to external radiation. DOE acknowledges that children have an elevated sensitivity to radiation exposure. The most recent guidance for use of exposure-to-dose coefficients related to external exposure (ionizing radiation) is used in the analysis. This guidance can be found in Federal Guidance Report No. 12, *External Exposure to Radionuclides in Air, Water, and Soil* (Eckerman and Ryman 1993). This guidance provides estimates for an adult, but not for children. For internal exposure to radiation through inhalation and ingestion, EPA currently recommends that assessors calculate chronic exposures by summing time-weighted exposures that occur at each stage of life (EPA 2009). Using this approach, exposure-to-dose coefficients for internal exposure could be determined; however, guidance that provides this information has yet to be developed.

As stated in the National Research Council's Report in Brief on BEIR VII, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* (National Research Council 2006), BEIR VII estimates excess deaths for the sex and age distribution of the U.S population in terms of the number of excess deaths per million people per absorbed dose, which supports the previously reported dose-to-risk conversion factor estimate for developing LCFs (DOE 2003a). The National Research Council report also shows that the maximum number of excess deaths would be 610 LCFs per million people per person-rem of dose assuming a sex and age distribution (including infants, children, teens, and adults) similar to that of the entire U.S. population. The

Commentor No. 455 (cont'd): Michael J. Chappell, Gonzaga Environmental Law Clinic

Michael J. Chappell
Gonzaga Environmental Law Clinic

Rick Eichstaedt, Spokane Riverkeeper
Center for Justice

Mike Petersen, Executive Director
The Lands Council

Terry Harris, Executive Director
Kootenai Environmental Alliance (for)

BEIR VII dose-to-risk conversion factor of 610 LCFs per million people per person-rem is essentially equivalent to the estimate of 600 LCFs per million people per person-rem used in the transportation analysis in this *TC & WM EIS*. The health risk effect in the *Draft* and *Final TC & WM EIS* transportation analysis is therefore consistent with BEIR VII in regard to determining the number of LCFs and the dose conversion factor used for the transportation analyses reflects impacts on infants, children, teens, and adults.

455-7 It is DOE policy to implement sound stewardship practices that are protective of the air, water, land, and other natural and cultural resources impacted by DOE operations and cost-effectively meet or exceed compliance with applicable environmental, public health, and resource protection requirements. DOE is committed to comply with cleanup obligations and regulatory requirements.

455-8 The removal of waste in unlined disposal ditches at Hanford is not within the scope of this *TC & WM EIS* and, therefore, is not analyzed in this EIS. As described in Chapter 1, Section 1.4.2, Decisions Not to Be Made, of the *Draft TC & WM EIS*, these wastes are part of the CERCLA past-practice units and their closure will be addressed at a later date consistent with the TPA process, which includes consideration of NEPA values.

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

455-9 This EIS addresses the environmental impacts of retrieval, treatment, and disposal of tank waste and final closure of the SST system. It also evaluates the impacts of FFTF decommissioning, including management of waste generated by the decommissioning process. Finally, this *TC & WM EIS* evaluates the potential environmental impacts of ongoing solid-waste management operations at Hanford, as well as the proposed disposal of Hanford LLW and MLLW and a limited volume of offsite LLW and MLLW.

455-10 As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities

Commentor No. 455 (cont'd): Michael J. Chappell, Gonzaga Environmental Law Clinic

downriver from Hanford. One of the purposes of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms by landfill closure, selective clean closure, or clean closure. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks, including remediation of the contamination in the vadose zone.

455-11 As stated in the response to comment 455-4, DOE acknowledges that no DOT-approved transport casks capable of holding the FFTF RH-SCs are currently available, as indicated in Chapter 2, Section 2.5.1.2, FFTF Decommissioning Alternatives, and no transport of these components would occur until such a cask is available. The impacts associated with transporting these RH-SCs and other radioactive waste associated with FFTF decommissioning are summarized in the Summary, Section S.5.3, and Chapter 2, Section 2.8.2, of this EIS. For analysis purposes in this *TC & WM EIS*, DOE uses a dose rate of 10 millirem per hour at 2 meters (6.6 feet) from the casks. This dose rate is the maximum value allowed for any certified cask containing radioactive materials (10 CFR 71.47 and 49 CFR 173.411). Sections S.5.3 and 2.8.2 show that the risks of transporting these materials would be very low and would be unlikely to result in an LCF under all of the alternatives, regardless of whether the RH-SCs are treated at Hanford or at INL. In practice, for the expected concentration of nuclides with high ionizing radiation (i.e., cesium-137), the external cask dose rate would most likely be less than 10 millirem per hour at 2 meters, resulting in still lower risks.

Commentor No. 456: Rick and Janet Hogue

From: Janet Hogue [janethogue@gmail.com]
Sent: Friday, April 16, 2010 10:37 PM
To: tc&wmeis@saic.com
Subject: No to Hanford as National Dumping Site

To Whom It May Concern:

Twenty years ago, when my husband and I became aware of the environmental disaster called Hanford, we were appalled. We testified regularly at EPA hearings regarding clean-up efforts. We contemplated moving from the Pacific Northwest as efforts dragged on and on and storage tanks continued leaking radioactive waste or heated beyond control, threatening explosion. It became so upsetting to both of us that we had to withdraw from activist participation in efforts to regulate the clean-up and became donors to Heart of America Northwest, trusting the organization to do the hard leg-work that we could not maintain and continue to live here. We had to step-back and push the threat of Hanford from our daily lives.

However, neither of us would be surprised to wake up one morning to learn that a catastrophic explosion there threatened our water supply here in Portland, the air we breathe and our lives. We do not swim in the Columbia River or eat salmon caught from its waters or from the sea at its mouth. We do not drink wine from grapes grown downwind nor do we eat food grown in its shadows.

Hanford is the most dangerous environmental-disaster-waiting-to-happen in the western United States. I cannot conceive of making it a national dumping ground for more nuclear waste when the waste that is there is so unstable and threatens not only the Pacific Northwest but a large portion of our country. We need to completely stabilize the leaking high level nuclear waste storage tanks and contain the plumes of nuclear waste threatening the Columbia River. The contamination is already beyond control. We cannot add more to the mess that is already there. *456-1*

Sincerely,

Rick and Janet Hogue
16600 NW Joscelyn Street
Beaverton, OR 97006

456-1 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

Commentor No. 457: Jeanne Raymond

From: Jeanne Raymond [raymondj@peak.org]
Sent: Monday, April 19, 2010 6:41 PM
To: tc&wmeis@saic.com
Subject: Hanford DOE Comments

April 19, 2010

To: Mary Beth Burandt
DOE TC&WM EIS Comments
Office of River Protection
PO Box 1178
Richland, WA 99685

I am in agreement with the State of Oregon, The City of Portland, The Alliance for Democracy, and Oregon Physicians for Social Responsibility in their opposition to using Hanford as a national radioactive waste dump site and to transporting nuclear waste on our highways through our communities.

As one who was an original participant of those who "joined hands across the river" with citizens of Washington State, to ask for the clean up of the Hanford Reservation, because of the danger to all of those living down wind and down stream, I again state that we must have a cleanup of all of the nuclear waste material, and the soil, and must prevent any more leakage into the Columbia river. We must not allow anymore radioactive hazardous waste to the site. ***457-1***

I strongly disagree with allowing:

"The EIS's preferred alternatives which would result in continued and growing levels of radioactive waste leaking into the Columbia River. Receipt of off-site waste is projected to have significant adverse long-term impacts on the groundwater as well."

This additional waste (almost 3 million cubic feet which equals about 17,000 truckloads) shipped for storage at Hanford would be transported on our highways. Much of the waste is generated in California and reasonable expectation would see that transported up the I-5 corridor though major population areas. Per the US DOE's own study, over 800 cancer related deaths will result from the transport. Their study evaluates only adult males, but women and children are more susceptible (children 3 to 10 times more); therefore the real figure will be much higher. ***457-2***

We must not allow hazardous nuclear wastes to travel through the I 5 corridor or any other Oregon/Washington transportation corridors, endangering our citizens and our environment.

457-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

457-2 On average, up to 2 trucks per day for 20 years would be involved in transporting about 14,200 truck shipments of LLW and MLLW to Hanford under the Waste Management alternatives, as presented in both the *Draft* and this *Final TC & WM EIS*, Chapter 4, Section 4.3.12, Public and Occupational Health and Safety—Transportation, and Table 4–151, Waste Management Alternatives – Estimated Number of Shipments. None of these shipments would originate from California. Transportation of radioactive waste shipments from DOE sites located in California was not analyzed in this *TC & WM EIS*; therefore, these shipments would not occur without additional NEPA analyses. As shown in Appendix H, Figure H–4, solid radioactive waste transports would originate from DOE sites to the east and southeast of Hanford; for this reason, Interstate 5 would not be used for transports analyzed in this EIS.

The value of 816 LCFs is from the results provided in the *GNEP PEIS* (DOE 2008b). This value represents the maximum impacts associated with 50 years of transportation activities supporting the operations of all existing U.S. commercial light-water reactors if they all were replaced with high-temperature, gas-cooled reactors. The *GNEP PEIS* was canceled by DOE on June 29, 2009 (74 FR 31017). As shown in the Summary of this EIS, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that the estimated total public radiation exposures from transporting radioactive waste to Hanford for disposal would result in any additional LCFs.

There is no existing guidance that recommends dose coefficients for children's exposure to external radiation. DOE acknowledges that children have an elevated sensitivity to radiation exposure. The most recent guidance for use of exposure-to-dose coefficients related to external exposure (ionizing radiation)

Commentor No. 457 (cont'd): Jeanne Raymond

People of Oregon and Washington have already suffered ill health from this hazardous waste site. The cleanup was not initiated so that more hazardous waste would be shipped to Hanford, but so that the site would be cleaned up, and NO MORE WASTE would contaminate that soil, the ground water, or the Columbia River.

457-1 cont'd

Oregonians cherish our environment; we cannot tolerate more radioactive wastes traveling through our state, endangering the health of our people and our environment.

Please follow the promise made to our citizens, to clean it up and shut it down.

Sincerely,

Jeanne Raymond
Corvallis, OR 97330

is used in the analysis. This guidance can be found in Federal Guidance Report No. 12, *External Exposure to Radionuclides in Air, Water, and Soil* (Eckerman and Ryman 1993). This guidance provides estimates for an adult, but not for children. For internal exposure to radiation through inhalation and ingestion, EPA currently recommends that assessors calculate chronic exposures by summing time-weighted exposures that occur at each stage of life (EPA 2009). Using this approach, exposure-to-dose coefficients for internal exposure could be determined; however, guidance that provides this information has yet to be developed.

As stated in the National Research Council's Report in Brief on BEIR VII, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* (National Research Council 2006), BEIR VII estimates excess deaths for the sex and age distribution of the U.S. population in terms of the number of excess deaths per million people per absorbed dose, which supports the previously reported dose-to-risk conversion factor estimate for developing LCFs (DOE 2003a). The National Research Council report also shows that the maximum number of excess deaths would be 610 LCFs per million people per person-rem of dose, compared with about 42 out of 100 individuals who are expected to develop solid cancer or leukemia from other causes, assuming a sex and age distribution similar to that of the entire U.S. population. The BEIR VII dose-to-risk conversion factor is essentially equivalent to the estimate of 600 LCFs per million people per person-rem used in the transportation analysis in this *TC & WM EIS*. The health risk effect in the *Draft* and *Final TC & WM EIS* transportation analysis is therefore consistent with BEIR VII in regard to determining the number of LCFs.

Commentor No. 458: Robin Bloomgarden

From: Robin Bloomgarden [r.bloomgarden@gmail.com]
Sent: Monday, April 19, 2010 10:08 PM
To: tc&wmeis@saic.com
Subject: Hanford EIS

Mary Beth Burandt
DOE Draft TC&WM EIS Comments
Office of River Protection
PO Box 1178
Richland, WA 99685
April 17, 2010

Ms. Mary Beth Burandt,

Despite the very slow progress, and the billions of dollars already spent on cleanup, Hanford won't be clean for thousands of years, if ever, at this rate. I strongly protest the USDOE's continued stalling techniques in this regard!

You also have never considered my preferred alternative option, that of NOT bringing any more waste to Hanford. This, after saying in EIS that all options will be examined.

My other preferred alternatives are to Clean all the tanks to 99.9%, not 99%; Removal of the tanks, and cleaning the soil afterwards; and to finish Cleaning up the site BEFORE bringing any more waste onto the Reservation.

458-1

I sincerely hope that YOU, nor any of your immediate family, ever are negatively affected by all this toxic waste, as I hope that none of us is. The only way to prevent this is to finish cleaning up the mess! Then, and only then, can we even begin to think about safely bringing any more nuclear waste to the site.

Sincerely,

Robin Bloomgarden
Portland, OR 97208
xxx-xxx-xxxx

458-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

The impacts of offsite waste in terms of radiological risk are presented in the Summary, Section S.5.5, and Chapter 2, Section 2.10, Key Environmental Findings. These sections discuss the radiological risk differences between including and not including offsite waste disposal at IDF-East. As described in the Summary and Chapter 2, the radiological risks increase by an approximate factor of seven. The *TC & WM EIS* analysis shows that receipt of offsite waste streams that contain specific amounts of certain isotopes, specifically, iodine-129 and technetium-99, could cause an adverse impact on the environment. Therefore, one means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford.

The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

Commentor No. 459: Barbara Glancy

From: barbg07@peoplepc.com
Sent: Tuesday, April 20, 2010 12:52 AM
To: tc&wmeis@saic.com
Subject: Re: Hanford Nuclear to be national dumpsite - Action needed

Dear M.B. Burandt,

My Portland daughter got breast cancer probably as a result of living near the Columbia R. downstream from Hanford. It's high time that the site be cleaned up & cleaned up properly.

I agree with the Alliance for Democracy & Portland's Mayor Adams. I'd like the leaking tanks be cleaned including the sludge on the bottom. The tanks should then be removed & ground water cleaned before it seeps into the Columbia. No more nuclear waste should be shipped to Hanford until this is done. *459-1*

In fact, other sites in various parts of the country for nuclear waste should be selected. Regional sites would reduce much of the shipping of this dangerous material cross country.

Oregon & Washington have been tainted by this former nuclear plant & the inadequate storage of this dreadful material there. We have been subjected to it for too long already.

Barbara Glancy

459-1 DOE recognizes that groundwater from past leaks is a concern at Hanford and its potential impact on communities downriver from Hanford. One of the purposes of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms. This analysis is also intended to aid DOE in making decisions regarding cleanup of past leaks. The TPA, a legal agreement between DOE, Ecology, and EPA, identifies cleanup actions and schedules, called milestones. The TPA agencies recently completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

Commentor No. 460: Lise and Michael Brown

From: lise brown [sblise@yahoo.com]
Sent: Tuesday, April 20, 2010 1:13 PM
To: tc&wmeis@saic.com
Subject: Hanford Nuclear Dumpsite? No!

Dear Ms. Burandt:

The USDOE is currently seeking comment on the EIS which evaluates the environmental impacts of various alternatives for cleanup of Hanford's most toxic wastes, as well as using Hanford as a national radioactive waste dump. Of the alternatives evaluated, USDOE's preferred alternative is to use Hanford as a national radioactive waste dump for nuclear weapons programs, although this may not happen until after 2022.

The EIS's preferred alternatives would result in continued and growing levels of radioactive waste leaking into the Columbia River. Receipt of off-site waste is projected to have significant adverse long-term impacts on the groundwater as well.

This additional waste (almost 3 million cubic feet which equals about 17,000 truckloads) shipped for storage at Hanford would be transported on our highways. Much of the waste is generated in California and reasonable expectation would see that transported up the I-5 corridor though major population areas. Per the US DOE's own study, over 800 cancer related deaths will result from the transport. Their study evaluates only adult males, but women and children are more susceptible (children 3 to 10 times more); therefore the real figure will be much higher. ***460-1***

Other US DOE stated preferred alternatives include

1. removing only 99% of the tank waste which is currently in the on-site storage tanks, some of which are currently leaking. That leakage is spreading now into the Columbia River. While 99% sounds like a significant amount, in fact the 1% to be left is much more highly contaminated than the portion to be removed. ***460-2***

OUR PREFERRED ALTERNATIVE IS TO CLEAN THE TANKS TO 99.9%.

2. not cleaning the leaked contamination which is in the ground now. That contamination has been spreading through the underground water and is now leaking into the Columbia River. The US DOE's EIS acknowledges that, If left in the ground, it will continue leaking for centuries and flowing into the Columbia River. Yet their preferred alternative would leave the tanks in the ground. ***460-3***

460-1 On average, up to 2 trucks per day for 20 years would be involved in transporting about 14,200 truck shipments of LLW and MLLW to Hanford under the Waste Management alternatives, as presented in this *Final TC & WM EIS*, Chapter 4, Section 4.3.12, Public and Occupational Health and Safety—Transportation, and Table 4–151, Waste Management Alternatives – Estimated Number of Shipments. None of these shipments would originate from California. Transportation of radioactive waste shipments from DOE sites located in California was not analyzed in this *TC & WM EIS*; therefore, these shipments would not occur without additional NEPA analyses. As shown in Appendix H, Figure H–4, solid radioactive waste transports would originate from DOE sites to the east and southeast of Hanford; for this reason, Interstate 5 would not be used for transports analyzed in this EIS.

The value of 816 LCFs is from the results provided in the *GNEP PEIS* (DOE 2008b). This value represents the maximum impacts associated with 50 years of transportation activities supporting the operations of all existing U.S. commercial light-water reactors if they all were replaced with high-temperature, gas-cooled reactors. The *GNEP PEIS* was canceled by DOE on June 29, 2009 (74 FR 31017). As shown in the Summary of this EIS, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that the estimated total public radiation exposures from transporting radioactive waste to Hanford for disposal would result in any additional LCFs.

There is no existing guidance that recommends dose coefficients for children's exposure to external radiation. DOE acknowledges that children have an elevated sensitivity to radiation exposure. The most recent guidance for use of exposure-to-dose coefficients related to external exposure (ionizing radiation) is used in the analysis. This guidance can be found in Federal Guidance Report No. 12, *External Exposure to Radionuclides in Air, Water, and Soil* (Eckerman and Ryman 1993). This guidance provides estimates for an adult, but not for children. For internal exposure to radiation through inhalation and ingestion, EPA currently recommends that assessors calculate chronic exposures by summing time-weighted exposures that occur at each stage of life (EPA 2009). Using this approach, exposure-to-dose coefficients for internal exposure could be determined; however, guidance that provides this information has yet to be developed.

As stated in the National Research Council's Report in Brief on BEIR VII, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* (National Research Council 2006), BEIR VII estimates excess deaths

Commentor No. 460 (cont'd): Lise and Michael Brown

OUR PREFERRED ALTERNATIVE IS TO REMOVE THE TANKS AND CLEAN THE SOIL. *460-3 cont'd*

3. using Hanford as a national nuclear waste dump site. As noted above, they assume this throughout the 6,000 page EIS. The law which requires EIS states that all of the alternatives have to be evaluated; yet the alternative of not bringing more nuclear waste to Hanford was not considered. *460-4*

OUR PREFERRED ALTERNATIVE IS THAT HANFORD BE CLEANING UP FIRST BEFORE MORE NUCLEAR WASTE IS TRANSFERRED THERE

To make the situation at Hanford worse, President Obama has announced that, in his efforts to control nuclear proliferation, the United States will receive the world's nuclear waste. Hanford could be a likely destination for that international waste. *460-5*

*The Northwest should **not** be the dumping ground for the nuclear waste of California and the world. Please act to protect my family in Portland, Oregon and all families in the Northwest.* *460-4 cont'd*

Sincerely,

Lise and Michael Brown

for the sex and age distribution of the U.S. population in terms of the number of excess deaths per million people per absorbed dose, which supports the previously reported dose-to-risk conversion factor estimate for developing LCFs (DOE 2003a). The National Research Council report also shows that the maximum number of excess deaths would be 610 LCFs per million people per person-rem of dose, compared with about 42 out of 100 individuals who are expected to develop solid cancer or leukemia from other causes, assuming a sex and age distribution similar to that of the entire U.S. population. The BEIR VII dose-to-risk conversion factor is essentially equivalent to the estimate of 600 LCFs per million people per person-rem used in the transportation analysis in this *TC & WM EIS*. The health risk effect in the *Draft* and *Final TC & WM EIS* transportation analysis is therefore consistent with BEIR VII in regard to determining the number of LCFs.

460-2 With regard to the disproportionate amount of radioactivity in the residues at the bottom of the tanks, DOE currently does not have a technical basis for making more-specific assumptions about the expected compositions of the waste "heels" that would remain in the tanks after retrieval. Retrieval has been completed on only a small number of SSTs and not much is known about the behavior of, or ability to remove, small volumes of residual waste. However, the tank closure process, which includes detailed examinations of the tanks and residual waste, requires preparation of a performance assessment and a closure plan. These documents will provide the information and analysis necessary for DOE and the regulators to make specific decisions on what levels of residual tank waste are acceptable in terms of short- and long-term risks.

460-3 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. This closure includes the tank system, along with the vadose zone as impacted by the tank farms (i.e., past leaks). However, as discussed in the Summary, Section S.1.3.2, and Chapter 1, Section 1.4.2, of this *TC & WM EIS*, DOE will not make decisions on groundwater remediation, including the remediation of groundwater contamination resulting from non-tank-farm areas in the 200 Areas, because that is being addressed under the CERCLA (42 U.S.C. 9601 et seq.) process. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations.

The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

460-4 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

The impacts of offsite waste in terms of radiological risk are presented in the Summary, Section S.5.5, and Chapter 2, Section 2.10, Key Environmental Findings. These sections describe the radiological risk differences between including and not including offsite waste disposal at IDF-East. As described in the Summary and Chapter 2, the radiological risks increase by an approximate factor of seven. The *TC & WM EIS* analysis shows that receipt of offsite waste streams that contain specific amounts of certain isotopes, specifically, iodine-129 and technetium-99, could cause an adverse impact on the environment. Therefore, one means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford.

460-5 Regarding the United States receiving nuclear materials from overseas, this subject is beyond the scope of this *TC & WM EIS*. The purpose of this EIS is to analyze potential impacts of DOE's proposed actions to retrieve and treat the Hanford tank waste; close the Hanford SST system; store and/or dispose of the waste generated from these tank waste activities; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate environmental cleanup activities at Hanford and other DOE sites.

Commentor No. 461: Sharon Fasnacht

From: Fasnacht [fasnacht@comcast.net]
Sent: Wednesday, April 21, 2010 12:36 PM
To: tc&wmeis@saic.com
Subject: HANFORD

I AM OPPOSED TO DESIGNATING HANFORD A NATIONAL NUCLEAR WASTE DEPOSIT (DUMP).

It requires shipping the waste which creates a hazard for everyone enroute.

It is being shipped to a site which has been unable to completely clean up it's own mess, so should not be asked to take on more. *461-1*

It is a known fact that we have nuclear waste leakage into the Columbia River, which flows into the Pacific. Get the picture? DUH!

It avoids requiring those that created the waste, or will continue creating more waste, from confronting the disposal - AND SEEKING A REAL SOLUTION!

THE TECHNOLOGY TO DISPOSE OF THE WASTE IS SIMPLY NOT THERE, INCLUDING VITRIFICATION WHICH HASN'T BEEN AS SUCCESSFUL AS HOPED. *461-2*

OUR MILITARY SHOULD NO LONGER BE CREATING NUCLEAR WASTE THEY CAN'T DISPOSE OF. IT'S STUPID.

PRIVATE ENTERPRISE AND LOCAL GOVERNMENT SHOULD NOT BE GIVEN LICENSE TO BUILD NEW NUCLEAR POWERED PLANTS. (I BELIEVE 19 NEW SITES WERE GIVEN THE GO AHEAD LATE IN THE BUSH/CHENEY ADMINISTRATION). *461-3*

That's my two cents, which I hope is worth, well, two cents.

Sharon Fasnacht
4006 113th Avenue SW
Olympia, WA 98512
(xxx) xxx xxxx

461-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Radioactive waste is transported in DOT-certified containers that meet strenuous technical standards established by NRC.

461-2 DOE is working diligently to bring the WTP online to treat the tank waste at the site as soon as possible. Chapter 1, Section 1.2.3, provides a brief history and background on DOE's efforts to reduce costs and speed up Hanford cleanup efforts. As discussed in the *TC & WM EIS* Summary, Chapter 1, and Chapter 2, this EIS analyzes additional waste treatment capability that includes expanding the vitrification process capability currently being constructed in the WTP or supplementing the WTP's capability with supplemental treatment technologies. Thus, decisions to be made by DOE regarding whether to treat all waste in the WTP, as is or expanded, or to supplement its capacity by adding new treatment capability depend on demonstrating the feasibility of supplemental treatment technologies.

As noted in the Summary, Section S.3.1.4, and Chapter 2, Section 2.2.2.2, the WTP is currently being constructed in the 200-East Area of Hanford. Site work associated with the project began in late 2001 and construction is more than 62 percent complete. Details regarding the WTP are provided in Appendix E, including its design and processes, waste-form performance, waste forms/disposal packages, and assumptions and uncertainties.

461-3 Nuclear energy and military weapons production and the management of their resulting wastes are not within the scope of this *TC & WM EIS*. Regarding the safe disposal of waste generated from nuclear energy production, the current Administration has established a Blue Ribbon Commission on America's Nuclear Future that has issued a report and recommendations for a path forward for managing the country's HLW. DOE's decisions regarding management of Hanford waste will be consistent with Administration policies. For a more comprehensive discussion of this topic, see Section 2.10 of this CRD.

Commentor No. 462: Elinor Gollay

From: Egollay@aol.com
Sent: Wednesday, April 21, 2010 5:06 PM
To: tc&wmeis@saic.com
Subject: Hanford Cleanup

To: Department of Energy

It is imperative that there be a TOTAL clean up of Hanford. This means no exclusions: the existing mess should be completely cleaned up in order to prevent further degradation of the environment not only in the immediate vicinity, but downstream along the Colombia River.

In addition, the very idea of ADDING MORE waste is outrageous, dangerous and clearly rooted in a poor understanding of the current circumstances. Why would the government want to ADD to what is already the most polluted spot in the country? Perhaps if it were in a completely unpopulated area with no threats of earthquakes, no possibility of leaching into drinking water, etc...perhaps then it MIGHT be plausible. But to take a situation that is already dire and make it worse is WRONG. *462-1*

I am a relatively new resident in Portland and I must admit to being appalled that I have moved so close to such a toxic area.

Without assurances to the contrary, it seems to me that wine from the immediate area around Hanford is best avoided since there would appear to be a high likelihood that the grapes were grown in heavily polluted soil and the water used could also easily be polluted.

If you combine the potential adverse impact on people's health, the adverse impact on the environment, and the potential adverse impact on local businesses that will be producing wine and other food in a polluted environment, the potential for harm seems very high to me. *462-2*

Why aren't we going the other direction and truly cleaning it up instead of making it worse?

Thank you,

Elinor Gollay
Portland, OR

462-1 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

462-2 Chapter 3, Section 3.2.10, of this *TC & WM EIS* summarizes data from the annual Hanford Site environmental report (Poston, Duncan, and Dirkes 2011) regarding doses from Hanford operations. These data indicate that, in 2010, the dose to a hypothetical MEI from airborne emissions and use of Columbia River water was 0.18 millirem. The EPA standard for protection of the MEI from the airborne emissions from DOE facilities is 10 millirem per year (40 CFR 61, Subpart H). Potential radiological impacts on the public from proposed activities at Hanford are presented in Chapter 4, Section 4.1.10, for Tank Closure alternatives; Section 4.2.10 for FFTF Decommissioning alternatives; and Section 4.3.10 for Waste Management alternatives. The potential impacts of combinations of alternatives are presented in Chapter 4, Section 4.4.9, which shows that the potential radiological impacts on an MEI residing near Hanford during the operational phase of the proposed actions would be about 10 millirem in the year of maximum impact.

Commentor No. 463: Kathy Radford

From: Kathy Radford [klradford@comcast.net]
Sent: Wednesday, April 21, 2010 5:57 PM
To: tc&wmeis@saic.com
Subject: Hanford draft Tank Closure & Waste Management Environmental Impact Statement

With regard to the subject impact statement:

- I oppose using Hanford as a national radioactive waste dump;
- I vote for the complete cleanup ("clean closure") of the High-Level Nuclear Waste Tanks;
- I want the Department of Energy to cleanup the contamination from High-Level Nuclear Waste tank leaks & deliberate discharges

Kathy Radford
29790 Marine View Dr SW
Federal Way, WA 98023-3436
xxx-xxx-xxxx

463-1

463-1 The Preferred Alternative for waste management in this *TC & WM EIS* also includes limitations on, and exemptions for, offsite waste importation at Hanford, at least until the WTP is operational. The clean closure alternatives considered for the SST system are represented by the Base and Option Cases of Tank Closure Alternatives 6A and 6B. For both Base Cases, the assumption is that the SST system would be cleaned to levels that would allow for unrestricted use, which would involve removal of the tanks, ancillary equipment, and soils beneath the tanks (contaminated as a result of past leaks) down to the water table. The two Option Cases represent this type of clean closure along with removal of soils beneath the tank farms (contaminated as a result of infiltration from the contiguous cribs and trenches [ditches]). The analysis shows that removal of the contaminants from the vadose zone would not capture those contaminants that may have already reached the groundwater table due to past practices (i.e., past leaks and contiguous cribs and trenches [ditches]).

DOE received comments on the potential impacts of future remediation activities that are in various stages of planning (which, given the inherent uncertainty, were not included in the cumulative impacts analysis). In response, DOE performed a sensitivity analysis to evaluate the potential impacts if certain remediation activities were conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. This analysis is provided in Appendix U of this EIS and is discussed further in Chapter 7, Section 7.5.

Commentor No. 464: Pat Dickason

From: Pat Dickason [p.dickason@comcast.net]
Sent: Wednesday, April 21, 2010 9:37 PM
To: tc&wmeis@saic.com
Subject: Hanford Cleanup Plan Comment

I have serious concerns about the proposed Hanford clean-up plan, and would like to see the following changes made:

1. Get the vitrification plant up and running, and in the meantime accept NO waste until it is fully functioning.
2. Move the target date up to 2030 for complete cleanup.
3. Remove 99.9% of tank wastes from the underground tanks.

I grew up in Pasco, and have been impacted by the exposure I received during my youth---it is NOT right to continue to delay getting this clean-up done. I urge your prompt attention to doing a complete, good-faith clean-up. Too many people have been harmed in the past, and we have no right to continue to create future harm both to people and the environment.

Pat

Pat Dickason
xxx.xxx.xxxx
803 Cooper Pt. Loop SW, Unit D
Olympia, WA 98502
p.dickason@comcast.net

464-1

464-1 The Preferred Alternative for waste management in this *TC & WM EIS* included limitations on, and exemptions for, offsite waste importation at Hanford, at least until the WTP is operational.

The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

DOE performed a sensitivity analysis to evaluate the potential impacts if certain remediation activities were conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. The goal of the sensitivity analysis is to help DOE, EPA, and Ecology prioritize cleanup efforts in the future. This analysis is provided in Appendix U of this EIS and is discussed further in Chapter 7, Section 7.5.

Commentor No. 465: Kevin O'Keefe

From: Kevin O'Keefe [k.kevinokeefe@verizon.net]
Sent: Thursday, April 22, 2010 10:28 AM
To: tc&wmeis@saic.com
Subject: Hanford - the insanity keeps coming!?

Folks –

The news that Hanford will become a repository for *more* waste saddens me deeply. As a New Jerseyan, living in the shadow of the country's oldest nuclear facility, I know that dollars, business and politics are more important to bureaucrats than people – a fact supported by the Hanfords and Oyster Creeks of America.

Stabilize the waste and shut down Hanford - an aged, broken & poisoned facility – enough is enough. It's already the most toxic site in America – does that mean *anything*? If Yucca Mtn. is not an option, at least vitrify the waste and render the 177 tanks inert. You can't possibly think that leaving 53 million gallons of waste in the ground is okay? If you don't help, who will? *465-1*

Kevin O'Keefe

465-1 As discussed in the *TC & WM EIS* Summary, Chapter 1, and Chapter 2, this EIS analyzes additional waste treatment capability that includes expanding the vitrification process capability currently being constructed in the WTP or supplementing the WTP's capability with supplemental treatment technologies. Thus, decisions to be made by DOE regarding whether to treat all waste in the WTP, as is or expanded, or to supplement its capacity by adding new treatment capability depend on demonstrating the feasibility of supplemental treatment technologies.

Commentor No. 466: Jim Kight, Mayor, City of Troutdale, Oregon

From: Debbie Stickney [DSTICKNEY@ci.troutdale.or.us]
Sent: Friday, April 23, 2010 6:36 PM
To: tc&wmeis@saic.com
Subject: Comments on DOE Draft TC&SM EIC
Attachments: Nuclear Waste to Hanford - Opposition.pdf

Mary Beth Burandt,

Attached is a letter from Mayor Jim Kight expressing his opposition to the US DOE's proposal to send nuclear waste to the Hanford Nuclear Reservation near Richland, Washington.

Thank you,

Debbie Stickney, City Recorder
City of Troutdale
104 SE Kibling Avenue
Troutdale, OR 97060
xxx-xxx-xxxx

Response side of this page intentionally left blank.

Commentor No. 466 (cont'd): Jim Kight, Mayor, City of Troutdale, Oregon

CITY OF TROUTDALE

"Gateway to the Columbia River Gorge"

April 23, 2010

USDOE
Attn: Mary Beth Burandt

RE: DOE Draft TC&SM EIC Comments

I want to express my strong opposition to the U.S. Department of Energy's proposal to send tens of thousands of truckloads of new nuclear waste to the Hanford Nuclear Reservation near Richland, Washington, and the designation of Hanford as the National Waste dump for radioactive and "mixed" radioactive hazardous wastes.

As I understand it the nuclear waste would be trucked from California or over Idaho into Oregon using major routes including I-84 which passes through Troutdale. Assuming no accidents, the USDOE has estimated 816 cancer deaths to residents along the route, and to people in traffic near the trucks, from a similar proposal last year. That estimate is based on radiation doses for an adult male. The actual number of cancer deaths could be much higher. Truck accidents or acts of terror along the highway could lead to hundreds of square miles requiring long-term evacuation and thousands of deaths.

Hanford is the most contaminated site of any kind in the western hemisphere. It is also clear that Hanford's radioactive materials flow into the Columbia River at an ever-increasing rate. Hanford's river location makes it a poor choice as a national waste site.

I urge you to seriously reconsider your proposal of transporting nuclear waste through Troutdale and one of the Oregon's most highly protected scenic areas, The Columbia River Gorge.

Sincerely,

Jim Kight
Mayor of Troutdale

466-1

104 SE Kibling Avenue • Troutdale, Oregon 97060-2099 • (503) 665-5175
Fax (503) 667-6403 • TDD/TEX Telephone Only (503) 666-7470

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www.troutdale.info

466-1 On average, up to 2 trucks per day for 20 years would be involved in transporting about 14,200 truck shipments of LLW and MLLW to Hanford under the Waste Management alternatives, as presented in this *Final TC & WM EIS*, Chapter 4, Section 4.3.12, Public and Occupational Health and Safety—Transportation, and Table 4–151, Waste Management Alternatives – Estimated Number of Shipments. None of these shipments would originate from California. Transportation of radioactive waste shipments from DOE sites located in California was not analyzed in this *TC & WM EIS*; therefore, these shipments would not occur without additional NEPA analyses. As shown in Appendix H, Figure H–4, solid radioactive waste transports would originate from DOE sites to the east and southeast of Hanford; for this reason, Interstate 5 would not be used for transports analyzed in this EIS.

The value of 816 LCFs is from the results provided in the *GNEP PEIS* (DOE 2008b). This value represents the maximum impacts associated with 50 years of transportation activities supporting the operations of all existing U.S. commercial light-water reactors if they all were replaced with high-temperature, gas-cooled reactors. The *GNEP PEIS* was canceled by DOE on June 29, 2009 (74 FR 31017). As shown in the Summary of this EIS, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that the estimated total public radiation exposures from transporting radioactive waste to Hanford for disposal would result in any additional LCFs.

There is no existing guidance that recommends dose coefficients for children's exposure to external radiation. DOE acknowledges that children have an elevated sensitivity to radiation exposure. The most recent guidance for use of exposure-to-dose coefficients related to external exposure (ionizing radiation) is used in the analysis. This guidance can be found in Federal Guidance Report No. 12, *External Exposure to Radionuclides in Air, Water, and Soil* (Eckerman and Ryman 1993). This guidance provides estimates for an adult, but not for children. For internal exposure to radiation through inhalation and ingestion, EPA currently recommends that assessors calculate chronic exposures by summing time-weighted exposures that occur at each stage of life (EPA 2009). Using this approach, exposure-to-dose coefficients for internal exposure could be determined; however, guidance that provides this information has yet to be developed.

As stated in the National Research Council's Report in Brief on BEIR VII, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* (National Research Council 2006), BEIR VII estimates excess deaths

for the sex and age distribution of the U.S. population in terms of the number of excess deaths per million people per absorbed dose, which supports the previously reported dose-to-risk conversion factor estimate for developing LCFs (DOE 2003a). The National Research Council report also shows that the maximum number of excess deaths would be 610 LCFs per million people per person-rem of dose, compared with about 42 out of 100 individuals who are expected to develop solid cancer or leukemia from other causes, assuming a sex and age distribution similar to that of the entire U.S. population. The BEIR VII dose-to-risk conversion factor is essentially equivalent to the estimate of 600 LCFs per million people per person-rem used in the transportation analysis in this *TC & WM EIS*. The health risk effect in the *Draft* and *Final TC & WM EIS* transportation analysis is therefore consistent with BEIR VII in regard to determining the number of LCFs.

The *Draft TC & WM EIS* analyzes the transportation of RH-LLW from INL to Hanford for disposal. Based on the public's input and concerns about offsite waste disposal at Hanford, DOE has included in this *Final TC & WM EIS* an example of a potential mitigation measure that could be taken by DOE. Specifically, an offsite waste stream containing a significant inventory of iodine-129 (i.e., RH-LLW resins from INL) was eliminated from the analysis. This mitigation measure has been incorporated into the Waste Management alternatives. In addition, a sensitivity analysis is included that shows the impacts of limiting offsite waste streams containing iodine-129 and technetium-99. The results of this sensitivity analysis illustrate the difference this would make in potential groundwater impacts and are included in Appendix M. Other mitigation measures, such as recycling secondary-waste streams into the primary-waste-stream feeds within the WTP to increase iodine-129 capture in ILAW and bulk vitrification, are discussed in Chapter 7, Section 7.5, of this EIS.

DOE considers the threat of terrorist attack to be credible and makes all efforts to reduce any vulnerability to this threat. DOE considers, evaluates, and plans for potential terrorist attacks that could occur during transportation and storage of radioactive materials. The details of DOE's plans for terrorist countermeasures and the security of its facilities and transports are classified. DOE addresses acts of sabotage or terrorism related to the transport of radioactive materials and waste in this *TC & WM EIS*, Appendix H, Section H.6.6. DOE considers the analyses of sabotage events described in the *Yucca Mountain EIS* (DOE 2002) and its SEIS (DOE 2008a) to be enveloping analyses for this *TC & WM EIS*. The consequences of such acts were calculated to result in a dose to the MEI

Commentor No. 466 (cont'd): Jim Kight, Mayor, City of Troutdale, Oregon

of 40 to 110 rem (at 140 meters [460 feet]) for events involving a truck- or rail-sized cask, respectively. These events would lead to an increase in risk of fatal latent cancer to an MEI of about 2 to 7 percent, or from 2 in 100 to 7 in 100 (DOE 2002).

Commentor No. 467: Bill Bosch

From: Gina King [boschers@q.com]
Sent: Sunday, April 25, 2010 12:01 AM
To: tc&wmeis@saic.com
Subject: Hanford Tank closure and waste management EIS - comments

As a lifelong resident of Washington State, I provide the following comments on the "Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington (DOE/EIS-0391)" on behalf of myself, my wife Gina M. King, and my 12-year-old daughter, Ellie. As a parent and a professional who has worked on Columbia River salmon restoration issues for the past 20 years on behalf of the Yakama Nation, I implore the United States to choose an alternative that best protects the futures of our children, grandchildren, and the "seventh generation". The United States should also be concerned with protecting the billions of dollars it has invested, along with those of us in the region, in Columbia River salmon and habitat restoration. The waters of the Columbia River MUST be protected from ANY further leakage of contaminated nuclear waste materials stored at Hanford. Any alternative that results in dumping more radioactive wastes at Hanford, and endangers public health and the environment is NOT acceptable. *467-1*

I have only had time to briefly review a summary of the EIS and the forward by the Washington State Dept. of Ecology. Proper disposal of contaminated wastes and cleanup of the Hanford site are critical as the Columbia River is the lifeblood to so many who live in the Pacific Northwest. If the United States can not demonstrate the ability to clean up the Hanford site so that ground and surface waters are protected in perpetuity, how can it possibly consider any future for nuclear energy anywhere in the U.S.?

Specifically, I agree with the WA Dept. of Ecology on the following points in the forward:

- I support only alternatives that involve the retrieval of 99 percent or more of the waste from each of the 149 single-shell tanks (SSTs). *467-2*
- The Nuclear Waste Policy Act requires permanent isolation of these (HLW and SNF) most difficult waste streams. Leaving these wastes stored at Hanford indefinitely is not a legal option, nor an acceptable option to the State of Washington. *467-3*

467-1 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

467-2 The removal of 99 percent or more of the tank waste is also DOE's preference, as discussed in Chapter 2, Section 2.12, of this *TC & WM EIS*. This level of waste removal would be achieved under all Tank Closure alternatives, with the exception of Alternative 1 (No Action) and Alternative 5. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

467-3 The draft EIS assumed that the IHLW canisters would not be shipped immediately after generation. Storage capacity for the IHLW canisters was analyzed under the short-term impacts analysis for onsite IHLW interim storage. Regarding the commentor's concern about the disposition of HLW, the current Administration has established a Blue Ribbon Commission on America's Nuclear Future that has issued a report and recommendations for a path forward for managing the country's HLW. DOE's decisions regarding management of Hanford waste will be consistent with Administration policies. For a more comprehensive discussion of this topic, see Section 2.10 of this CRD.

Commentor No. 467 (cont'd): Bill Bosch

- Ecology is concerned about the glass standards and canister requirements for the IHLW. These standards were developed based on what was acceptable to Yucca Mountain. Now that Yucca Mountain is no longer the assumed disposal location, Ecology is concerned about what standards for glass and canisters will be utilized by the WTP. Ecology insists that DOE implement the most conservative approach in these two areas to guarantee that the glass and canister configurations adopted at the WTP will be acceptable at the future deep geologic repository. *467-4*
- Ecology does not agree with alternatives that do not require pretreatment of the tank waste. Such alternatives do not meet the intent of the Nuclear Waste Policy Act to remove as many of the fission products and radionuclides as possible to concentrate them in the HLW stream. For this reason, Ecology requests that DOE rule out any alternative that does not pretreat tank waste. *467-5*
- Ecology has legal and technical concerns with any tank waste being classified as mixed TRU waste at this time. DOE must provide peer-reviewed data and a strong, defensible, technically and legally detailed justification for the designation of any tank waste as mixed TRU waste, rather than as HLW. DOE must also complete the WIPP certification process and assure Ecology that there is a viable disposal pathway (i.e., permit approval from the State of New Mexico) before Ecology will modify the Hanford Sitewide Permit to allow tank waste to be treated as mixed TRU waste. *467-6*

Bill Bosch
116 N. 45th Avenue
Yakima, WA 98908

cc: Senator Patty Murray
Senator Maria Cantwell
Congressman Richard 'Doc' Hastings
Governor Christine Gregoire
Secretary of Energy Steven Chu

467-4 See response to comment 467-3 for a discussion of Yucca Mountain and the Blue Ribbon Commission. DOE will continue to monitor the commission's advice and recommendations and take the necessary actions to ensure that the WTP produces a waste form that is safe and meets the selected disposal site's disposal standards. Also, the impacts of storing all the IHLW canisters are analyzed under each Tank Closure alternative in this *Final TC & WM EIS*, pending a decision on their ultimate disposition.

467-5 As stated in Appendix E, Section E.1.2.3.5.2, of this final EIS, "Each of the *TC & WM EIS* alternatives that includes use of supplemental treatment technologies in the 200-East Area of Hanford would include use of the pretreatment capability provided by the WTP" (i.e., this supplemental treatment would be additional to pretreatment of the waste streams in the WTP). "In contrast, waste feeds for supplemental treatment technologies used in the 200-West Area would not undergo WTP pretreatment, but would instead be subject to solid-liquid separations activities. These activities would primarily entail the application of a solid liquid separations process that would be conducted in a new 200-West Area Solid-Liquid Separations Facility using waste feed from 35 SSTs that have tentatively been identified to contain cesium-137 concentrations of less than 0.05 curies per liter (0.19 curies per gallon) (see Table E–8). Waste contained in many of the 35 tanks was received from processing facilities that removed radionuclides, such as cesium, strontium, and transuranics. The extent of separations activities would depend on the waste feed being processed and the immobilization operation being used."

467-6 As stated in the Alternatives in Chapter 2, Section 2.12, of this *Final TC & WM EIS,* DOE prefers to consider the option to retrieve, treat, and package waste that may be properly and legally designated as mixed TRU waste from specific tanks for disposal at WIPP, as analyzed in Tank Closure Alternatives 3, 4, and 5. DOE would not, however, generate a waste stream without a clear path to disposal. Initiating retrieval of tank waste identified as mixed TRU waste would be contingent on DOE's obtaining the applicable disposal and other necessary permits, and ensuring that the WIPP Waste Acceptance Criteria and all other applicable regulatory requirements have been met. Retrieval of tank waste identified as mixed TRU waste would commence only after DOE had issued a *Federal Register* notice of its preferred alternative and a ROD.

Commentor No. 468: Caitlin Guthrie

From: Caitlin Guthrie [caitlinroseguthrie@gmail.com]

Sent: Sunday, April 25, 2010 2:32 AM
To: tc&wmeis@saic.com
Subject: Hanford draft Tank Closure & Waste Management Environmental Impact Statement

Hello,

As a child, I lived in Richland, WA for 2 years. I am currently a 24 year old AmeriCorps volunteer, and I will be attended UW next year for graduate studies. At the time when I lived in the tri-cities, I had no idea what Hanford was, and I had no idea of my potential exposure to radioactive material. It is not right to expose the people of our country (especially children who do not choose where they live!) to toxic chemical waste of this severity. It is for this reason that I strongly disagree with the preferred alternatives outlined in the EIS. Instead, there must be a complete cleanup (clean closure) of the High Level Nuclear Waste Tanks. We must do ALL that we can to clean Hanford up. For this same reason we must clean up the contamination from High-Level Nuclear Waste tank leaks and deliberate discharges. Finally, I strongly oppose using Hanford as a national radioactive waste dump! *468-1*

-Caitlin Guthrie

468-1 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system.

Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

Commentor No. 469: Lisa Hanson

From: Hanson, Lisa [lhanson@seattleu.edu]
Sent: Monday, April 26, 2010 2:49 PM
To: TC&WMEIS@saic.com
Subject: Hanford site

I am opposed to the use of Hanford as a national radioactive waste dump. The complete cleanup of Hanford is extremely important for the health of the people of the Northwest and the environment. Please follow through with complete clean up. Let's take care of our state, rather than further exploiting it. *469-1*

Lisa Hanson

469-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

Commentor No. 470: Mike Moy

From: Mike Moy [theboyscout48@gmail.com]
Sent: Monday, April 26, 2010 5:47 PM
To: tc&wmeis@saic.com
Subject: Hanford comment period

It is not right to expose the people of our country to toxic chemical waste of this severity. It is for this reason that I strongly disagree with the preferred alternatives outlined in the EIS. Instead, there must be a complete cleanup (clean closure) of the High Level Nuclear Waste Tanks. We must do ALL that we can to clean Hanford up. For this same reason we must clean up the contamination from High-Level Nuclear Waste tank leaks and deliberate discharges. Finally, I strongly oppose using Hanford as a national radioactive waste dump. *470-1*

470-1 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system.

Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

Commentor No. 471: Joe Mitchell

From: Joe Mitchell [jjmit@comcast.net]
Sent: Monday, April 26, 2010 8:37 PM
To: tc&wmeis@saic.com
Subject: Comments

Dear Mary Beth Burandt,

Please no more waste to Hanford on our roads until the vitrification plant is fully functioning.

PLEASE CLEAN THE CONTAINMENT TANKS TO 99.9% OR BETTER! AND,,,

We need to move the completion date up to 2030—no need to take longer!

Thanks for all that you do.

In heart,

Joe Mitchell Portland, Oregon

471-1

471-1 The Preferred Alternative for waste management in this *TC & WM EIS* included limitations on, and exemptions for, offsite waste importation at Hanford, at least until the WTP is operational.

The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system.

Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

Commentor No. 472: Warren Jones

6219 43rd Avenue NE
Seattle, WA 98115-7511
April 27, 2010

TC & WM EIS
P.O. Box 1178
Richland WA 99352

Comment on Tank Closure & Waste Management EIS:

The DOE's preferred alternative of removing 99% of tank wastes is reckless and irresponsible, considering that the residues at the bottom of the tanks contain a disproportionate amount of the radioactivity. The only acceptable solution is to remove 99.9% of the tank waste, or removal to the limits of technical capabilities. Even this higher level of cleanup still leaves troubling cancer risks. *472-1*

This is our legacy to future generations. Please don't cut corners with the clean up.

Sincerely,

Warren Jones

Warren Jones

472-1 The decision to leave 0.1 percent, 1 percent, or more of the waste in the SSTs is one of the decisions supported by this *TC & WM EIS* (see Section S.1.3.1 of the Summary and Chapter 1, Section 1.4.1). In regard to the disproportionate amount of radioactivity in the residues at the bottom of the tanks, the draft EIS estimated the contents of the tank residuals because tank waste retrieval activities are ongoing. The EIS analysis shows that the level of waste retrieved is important in long-term impacts. Once the tank waste in a waste management area is retrieved, then the actual residuals would be evaluated during the closure process for that waste management area. Activities would include detailed examinations of the tanks and residual waste and preparation of a performance assessment and a closure plan. These documents will provide the information and analysis necessary for DOE and the regulators to make specific decisions on what levels of residual tank waste are acceptable in terms of short- and long-term risks.

Commentor No. 473: Eldon Ball

From: Eldon Ball [eldonball@juno.com]
Sent: Wednesday, April 28, 2010 9:25 PM
To: tc&wmeis@saic.com
Subject: Remove Hanford Radioactive Waste!

Don't bring in any radioactive waste to Hanford! What is there now is leeching toward the Columbia River! A million people downstream would be affected! Find a permanent storage facility in the Great Basin, maybe Nevada. If there are any leaks, it won't get to the ocean. Discourage further radioactive waste, it's a problem for 10,000 years! Thanks. *473-1*

Sincerely,

Eldon Ball, 3200 NE 140th St., #11, Seattle, WA 98125

473-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 474: Marjorie Worthington

From: Marjorie Worthington [maworth@skynetbb.com]
Sent: Thursday, April 29, 2010 1:49 PM
To: tc&wmeis@saic.com
Subject: Clean Up the Mess NOW!

To: Mary Beth Burandt
DOE Draft TC&WM EIS Comments
Office of River Protection
Richland, WA

From: Marjorie Worthington
Enumclaw, WA

I have worked with Heart of America Northwest for many years, to get USDOE to clean up its mess [one of the basic rules of behavior set forth in Robert Fulghum's *All I Really Need To Know I Learned in Kindergarten*] before creating MORE of a mess....and time and time again, public hearing after public hearing, delay after delay, **I am at a loss to understand this agency's refusal to take responsibility for cleanup of readioactive waste on the Hanford Site!**

474-1

In addition to this outrageous position, we are now fighting the proposal to ADD MORE contamination, trucking it across our state, seriously endangering public health and the environment en route to the site, using Hanford as a National Radioactive Waste Dump, and abanding existing contamination, that is leaking toward the Columbia River watershed.

We MUST STOP this irresponsible plan in its tracks, and REQUIRE CLEANUP OF ALL THE EXISTING WASTE AT HANFORD!

Listen to the voices of the people who live in the areas thar will be devastated, , if USDOE forges ahead with its "preferred alternative".

474-1 In general, the scope of this *TC & WM EIS* does not include groundwater remediation activity as part of the proposed actions evaluated. DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 475: Victoria Millard

From: Victoria Millard [quicktovic@yahoo.com]
Sent: Thursday, April 29, 2010 4:39 PM
To: tc&wmeis@saic.com
Subject: Hanford Waste Dumping

I strongly disagree with the Department of Energy's proposal to dump more radioactive waste at Hanford. Adequate studies have not been done regarding cancer occurrences in children who live next to such sites. In addition, only deaths of children have been documented, not those who have cancer but are hanging on. There is so much waste that has never been cleaned up, how can you even think of dumping more at this site? The vitrification plant will not get rid of all the waste, because it will be in a lesser, but still toxic, liquid form. The present state of miles of leaking barrels of toxic waste leaching into ground water is abominable. To ignore this, and talk about bringing in more is just folly and disregard for human health and life. Sincerely, Victoria Millard, Seattle, Wa.

475-1
475-2
475-3
475-2 cont'd

475-1 DOE acknowledges that the scientific data indicate that health effects from radiation exposure are more pronounced in children than adults. As discussed in Appendix K, Section K.1.1.6, of this *TC & WM EIS*, a number of authoritative studies provide guidance on risk factors relating health effects to dose. Section K.1.1.6 discusses the scientific evidence relating radiation dose to the incidence of cancers, fatal and nonfatal. The discussion indicates that the fatal cancer risk factor of 0.0006 reflects an age distribution that includes children and is generally regarded as conservative. Appendix Q, Section Q.2.4.2, explains that nuclide-specific risk coefficients, developed using techniques that account for gender and age, were used for the long-term human health impacts analysis.

475-2 In general, the scope of this *TC & WM EIS* does not include groundwater remediation activity as part of the proposed actions evaluated. DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

475-3 Vitrification of radioactive waste into glass is an attractive option because it atomistically bonds the species in a solid glassy matrix instead of its current liquid form. Because radioactive constituents are bonded within the glass structure, the waste forms produced are very durable and environmentally stable over long time durations; however, they remain toxic. EPA has declared vitrification to be the best-demonstrated available technology for HLW disposal.

Commentor No. 476: Barbara Tombleson

From: Barbara Tombleson [bjt@coho.net]
Sent: Friday, April 30, 2010 2:41 AM
To: tc&wmeis@saic.com
Subject: Opposition to Hanford as a radioactive waste dump

Re: The US Dept. of Energy's Environmental Impact Statement, The Tank closure and Waste Management Plan at Hanford, Washington.

To : US Secretary of Energy Chu:

All leaking storage tanks holding high-level nuclear waste and all deliberate and accidental discharges need to be completely cleaned up with clean closure, (not just a feeble attempt to cap and leave behind polluted, contaminated soil and groundwater pollution) including the 40 miles of unlined soil trenches containing radioactive and chemical wastes, and all the single walled tanks. *476-1*

The plan to import low level and mid level radioactive wastes from other sites to Hanford after 2022 is totally and completely unacceptable and irresponsible. The entire Hanford site including all the tank farms need a thorough hazardous waste cleanup. *476-2*

Thank you for your consideration and serious thought in this important matter.

Sincerely, Barbara Tombleson
7526 SW Capitol Hill Rd.
Portland, OR 97219

476-1 The clean closure alternatives considered for the SST system are represented by the Base and Option Cases of Tank Closure Alternatives 6A and 6B. For both Base Cases, the assumption is that the SST system would be cleaned to levels that would allow for unrestricted use, which would involve removal of the tanks, ancillary equipment, and soils beneath the tanks (contaminated as a result of past leaks) down to the water table. The two Option Cases represent this type of clean closure along with removal of soils beneath the tank farms (contaminated as a result of infiltration from the contiguous cribs and trenches [ditches]). The analysis shows that removal of the contaminants from the vadose zone would not capture those contaminants that may have already reached the groundwater table due to past practices (i.e., past leaks and contiguous cribs and trenches [ditches]).

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

476-2 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

One of the purposes of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms by landfill closure, selective clean closure, or clean closure. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks, including remediation of the contamination in the vadose zone.

Commentor No. 477: Audrey Adams

From: audrey55 [audrey55@comcast.net]
Sent: Friday, April 30, 2010 4:08 PM
To: tc&wmeis@saic.com
Subject: No more radioactive waste dumping at Hanford!

The citizens of Washington refuse to be the nation's dumpsite for radioactive waste! Hanford needs to be cleaned up as promised. The health of our citizens and children are at stake. *477-1*

Audrey Adams
Renton, WA

477-1 In general, the scope of this *TC & WM EIS* does not include groundwater remediation activity as part of the proposed actions evaluated. DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

Commentor No. 478: Joyce Namba

From: milonamba@msn.com
Sent: Saturday, May 01, 2010 12:42 PM
To: tc&wmeis@saic.com
Subject: Re: Hanford

Mary Beth Burandt, Document Manager

U.S. Department of Energy, Office of River Protection

P.O. Box 1178, Richland,WA 99352

Dear Ms. Burandt,

I am in absolute agreement with Columbia Riverkeepers environmental organization that the Hanford Nuclear site must have all 55 million gallons of buried nuclear waste cleared to 99.9% retrieval. *478-1*

Any proposals to ship additional radioactive waste from across the United States to Hanford must be halted once the waste treatment plant is operational. Placing the Columbia River at higher risks is not acceptable. *478-2*

The "clean up first" must be the priority. I viewed the CBS "60 Minutes" program highlighting Hanford with Leslie Stahl's research. It was apparent that Hanford clean-up was decades behind. The millions of gallons of nuclear waste that has already leaked and is reaching the Columbia River is not acceptable. *478-3*

Columbia Riverkeepers states that the Department of Ecology must take measures to treat the soil and groundwater beneath the leaky storage tanks. DOE should excavate and fully clan miles of ditches and trenches that contain waste. If unchecked, plumes of this contamination are moving towards the Columbia River. *478-4*

It is a responsibility to protect our environment as citizens. It is a responsibility to see the big picture 100, 200... centuries down the road and not look toward just an immediate patch-up.

Young men and women involved with the United States Military have vowed to protect our country; the land that we have been fortunate to reside upon. And here, there is a direction to further pollute. It is an affront to those risking their lives and who have given their lives to make life more livable in the United States. The rivers, streams, oceans are tied across our planet. They are as one. What we do or not do here in the United States will affect citizens throughout our world. The big picture.

478-1 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

478-2 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

478-3 As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities downriver from Hanford. One of the purposes of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms by landfill closure, selective clean closure, or clean closure. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks, including remediation of the contamination in the vadose zone.

478-4 Comment noted.

Commentor No. 478 (cont'd): Joyce Namba

No man is an island, entire of itself
every man is a piece of the continent, a part of the main
if a clod be washed away by the sea,
Europe is the less, as well as if a promontory were,
as well as if a manor of thy friends or of thine own were
any man's death diminishes me, because I am involved in mankind
and therefore never send to know for whom the bell tolls
it tolls for thee.

-- John Donne

Thank you for your time.
Most sincerely,

Joyce Namba
Portland OR

Response side of this page intentionally left blank.

Commentor No. 479: Karen Axell

From: DAC/All-Source [source@pacifier.com]
Sent: Saturday, May 01, 2010 1:04 PM
To: tc&wmeis@saic.com
Subject: Hanford clean-up

Mary Beth Burandt
Document Manager
U.S. Department of Energy
Office of River Protection

As a Washington resident, clean water advocate and US citizen, I strongly oppose using Hanford as a national radioactive waste dump. *479-1*

I urge you to immediately begin a complete cleanup or "clean closure" of the High-Level Nuclear Waste Tanks and all contamination from tank leaks & deliberate discharges. This would include: *479-2*

- The clean up of all 55-million-gallons of radioactive and hazardous tank waste with over 99% retrieval
- The clean up of the millions of gallons of nuclear waste that has already leaked and is reaching the Columbia *479-3*

Lastly, I am firmly against any proposal to ship radioactive wastes from across the nation to Hanford. *479-1 cont'd*

Sincerely,

Karen Axell
PO Box 5183
Vancouver, WA 98668
source@pacifier.com

479-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

479-2 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

479-3 As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities downriver from Hanford. One of the purposes of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms by landfill closure, selective clean closure, or clean closure. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks, including remediation of the contamination in the vadose zone.

Commentor No. 480: Sally Lider

From: Sally Lider [sally.lider@verizon.net]
Sent: Saturday, May 01, 2010 3:26 PM
To: tc&wmeis@saic.com
Subject: Hanford draft Tank Closure & Waste Management Environmental Impact Statement

As a citizen of the State of Washington and a sane person, I am strongly opposed to using Hanford as a national radioactive waste dump. In fact I urge you to clean up this mess once and for all! I plan on having grandchildren someday growing up in this state. I cannot imagine how our government can ignore all the contamination that is there already and actually consider bringing in more radioactive waste to store there forever!

480-1

I for one do not think that that we should only be concerned with our energy needs of the future and plod blindly along glossing over the dangers of oil spills, climate change and ocean acidification from increasing carbon emissions. But generating more nuclear wastes and burying them for future generations to deal with is not the answer either. Please stop this insanity now! Clean up Hanford and DO NOT turn Washington State into a radioactive wasteland!

Sincerely,

Sally Lider

480-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

One of the purposes of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms by landfill closure, selective clean closure, or clean closure. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks, including remediation of the contamination in the vadose zone.

Commentor No. 481: Noreen Parks

From: Noreen Parks [nmparks@q.com]
Sent: Saturday, May 01, 2010 3:40 PM
To: tc&wmeis@saic.com
Subject: Comments on the Hanford TCWMEIS

Comments on the draft Tank Closure & Waste Management EIS for Hanford nuclear reservation:

The situation at Hanford represents a grave endangerment to human health and one of the Pacific Northwests greatest economic and ecological assets, the Columbia River. Already over a million gallons of high-level nuclear waste has leaked from corroding tanks, and billions of gallons of waste have been discharged into reservation soils. The contamination is spreading rapidly to the groundwater and will continue to move toward the Columbia, where levels of contaminants from Hanford are rising. It is of the utmost urgency that DOE carry out comprehensive clean-up operations as quickly as possible, using the most powerful technologies available. *481-1*

The draft Tank Closure & Waste Management EIS reveals that all proposed management alternatives will significantly increase radioactive contamination of groundwater over the coming millennia. **DOE must commit to the highest possible level of tank waste removal, aiming for 99.9% of the tank wastes, or as much as feasible, to the limits of technical capabilities. Only this level would address the residues at the bottom of the tanks, which contain a disproportionate amount of the radioactivity.** *481-2*

Given the grave and long-enduring threats to public and ecological health posed by contamination from leaking tanks and radioactive discharges to soil, **DOE must follow legal closure procedures for the tank farms after the wastes have been removed. This includes cleaning up the soil and groundwater contamination and either cementing tanks with dirt caps or removing the tanks and pipe systems and cleaning up the underlying soil contamination.** *481-3*

In view of the magnitude and urgency of the clean-up at Hanford, the delays in completing the vitrification plant are unacceptable; this project requires a much faster timeline. Furthermore, since the EIS indicates the capacity of the long-awaited treatment plant will be limited to treating only half of the high-level waste. No matter how this waste is divided up or prioritized, this means that the DOE actually does not intend to fully clean up the waste. **DOE should plan immediately to begin work on a second vitrification plant. And, as recommended by the Hanford Advisory Board and the State of Washington, DOE should abandon supplemental treatment options that have been shown to be less effective and less protective of the environment.** *481-4*

481-1 As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities downriver from Hanford. One of the purposes of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms by landfill closure, selective clean closure, or clean closure. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks, including remediation of the contamination in the vadose zone.

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

481-2 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

With regard to the disproportionate amount of radioactivity in the residues at the bottom of the tanks, DOE currently does not have a technical basis for making more-specific assumptions about the expected compositions of the waste "heels" that would remain in the tanks after retrieval. Retrieval has been completed on only a small number of SSTs and not much is known about the behavior of, or ability to remove, small volumes of residual waste. However, the tank closure process, which includes detailed examinations of the tanks and residual waste, requires preparation of a performance assessment and a closure plan. These documents will provide the information and analysis necessary for DOE and the

Commentor No. 481 (cont'd): Noreen Parks

Finally, **NO MORE WASTE SHOULD BE SHIPPED TO HANFORD.** The fact that this nation and the current administration are ostensibly committed to reducing nuclear weapons must have bearing on the decisions about what to do at Hanford! Facilities that produce radioactive materials **do** have options for onsite storage, which must be their responsibility! Making Hanford a national repository for radioactive waste would involve the large-scale, highly perilous, long-distance shipment of the planets most dangerous substances. This strategy would potentially expose many areas of the county and their populations to greater cancer risks and other hazards. *481-5*

The operations at Hanford have exposed a portion of Washington State and the Columbia River to immeasurable hazard. Let it go no further!

Thank you for the opportunity to comment. I will be carefully watching the outcome of this process.

Noreen Parks, Science & Environmental Writer
52 Becker St.
Port Townsend, WA 98368
xxx xxx-xxxx

regulators to make specific decisions on what levels of residual tank waste are acceptable in terms of short- and long-term risks.

481-3 DOE must comply with certain legal requirements to undertake specific activities that are part of the proposed actions and alternatives; these requirements are identified throughout this EIS. For example, Chapter 1, Section 1.2.1, discusses Hanford regulatory compliance requirements; Section 1.2.7 discusses the WAC regulations DOE must meet for the proposed closure of the SSTs. Section 1.9, which describes the alternatives evaluated in this EIS, refers to the RCRA, WAC, and DOE order requirements that must be met for DOE to implement Tank Closure alternatives. The very nature of "environmental impacts analysis" requires DOE to analyze and describe in this EIS how proposed processes and technologies would operate; what results they are expected to achieve; what end products or byproducts might result; and how these measure up against the legal requirements that apply. Statutory, regulatory, Executive order, and DOE requirements are discussed in the context of each chapter and are listed in the references at the end of each chapter.

481-4 As discussed in the *TC & WM EIS* Summary, Chapter 1, and Chapter 2, this EIS analyzes additional waste treatment capability that includes expanding the vitrification process capability currently being constructed in the WTP or supplementing the WTP's capability with supplemental treatment technologies. Under Tank Closure Alternative 2A, the entire tank waste inventory would be treated using the currently constructed WTP configuration, i.e., two HLW melters and two LAW melters. However, as noted in the Summary and throughout this EIS, completing this configuration would require approximately 75 years. Thus, decisions to be made by DOE regarding whether to treat all waste in the WTP, as is or expanded, or to supplement its capacity by adding new treatment capability depend on demonstrating the feasibility of supplemental treatment technologies, as well as the durability of the long-term groundwater protection provided by supplemental treatment of waste.

481-5 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Radioactive waste is transported in DOT-certified containers that meet strenuous technical standards established by NRC.

Commentor No. 482: Sandy Stienecker

From: Sandy Stienecker [sandyordon@comcast.net]
Sent: Saturday, May 01, 2010 4:37 PM
To: tc&wmeis@saic.com
Subject: Hanford

To Whom It May Concern,

My father died at 47 years of age from the effects of nuclear radiation created by his work in the aerospace industry in Southern California. Neighborhoods surrounding his workplace have high clusters of cancer throughout and there is evidence that many of the water ways are contaminated. It has taken years for the evidence to be identified and many have gotten sick and died from the affects of radiation. I am opposed to using Hanford as a national radioactive waste dump. Please clean up the contamination from High-Level Nuclear Waste tank leaks and deliberate discharges and engage in a complete clean up ("clean closure") of the High Level Nuclear Waste Tanks. *482-1*

Sandy Stienecker

482-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 483: Aleita Hass-Holcombe

From: Aleita Hass-Holcombe [aleita.hass.holcombe@gmail.com]
Sent: Saturday, May 01, 2010 6:08 PM
To: tc&wmeis@saic.com
Subject: Hanford

To Whom it May Concern (it is certainly a concern to many citizens in the Pacific Northwest Region):

I am in total opposition to using Hanford as a nuclear dump site and to transporting nuclear waste on our highways through our communities. *483-1*

Sincerely,

Aleita Hass-Holcombe
First Congregational United Church of Christ Just Peace Committee,Chair
Corvallis, Oregon

483-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 484: Madeline Smith

From: madeline marie smith [msmith28@uoregon.edu]
Sent: Saturday, May 01, 2010 7:35 PM
To: tc&wmeis@saic.com
Subject: Re: Comments on Draft TC and WM EIS

to: Mary Beth Burandy, Document Manager
Office of River Protection
U.S, Department of Energy
TC &MW EIS, P.O. Box1178
Richland Washington, 99352

May 1, 2010

Comments on Draft TC and WM EIS:

My concern is that there is no EIS regarding climate change in the Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland/Washington (Draft TC &WM EIS), neither in the EIS prepared by Washington State Department of Ecology, pp1-9 nor in the Summary of Environmental Impacts: Key Findings, pp S53-4 nor within the carefully spelled out details of all impacts considered, pp S-54-S121.

This oversight is explained by Helen Caldicott as due to how nuclear scientists think about time. Scott Burnell, spokesman at NRC, is probably typical in thinking that, "...global warming occurs on a such a slow scale that we would be able to deal with any changes at the operational level as opposed to a policy level." (Nuclear Power is Not the Answer. Reported by Caldicott on p 87) ***484-1***

Burnell can reasonably think this way because the science involved in nuclear waste is very different from that involved in climate change. While both have uncertainties, only climate can reach a temperature change of 350 degrees C (or over) anywhere between 2012 and 2050. Burnell is accustomed to thinking into the future hundreds of years.

The waste management plans for Hanford can, and needs to be reconfigured to include climate change. The plans ought to reduce waste costs so that as much money as possible goes to reducing carbon emissions to zero. This can easily be done if the plans for the vitrification plant are put on hold. ***484-2***

This is feasible. "As the bipartisan National Commission on Energy Policy recently explained, dry cask storage 'is a proven, safe, inexpensive waste-sequestering technology that would be good for 100 years or more, providing an

484-1 DOE has reviewed and revised, as necessary, its analyses on the effects of climate change on various resources at Hanford and the possible effects on environmental impacts of the *TC & WM EIS* alternatives. As described in Chapter 6, Section 6.3.4, DOE has reviewed climate studies that forecast general trends in Hanford regional climate change. However, there are no reliable methodologies for projections of specific future climate changes in the Hanford region, and thus such changes have not been quantified in this EIS. To account for this uncertainty, Appendix O, Section O.6.2, describes the effects of enhanced infiltration such as that which may occur during a wetter climate. In the *Draft TC & WM EIS*, Appendix V focused on the potential impacts of a rising water table from a proposed Black Rock Reservoir. Following the retraction of this proposal, the focus of Appendix V was changed in this final EIS to analysis of potential impacts of infiltration increases resulting from climate change under three different scenarios. Appendix V includes sensitivity analyses of potential impacts at Hanford that could result from climate changes that may increase model boundary recharge parameters and the rise of the groundwater table. Additional qualitative discussion of the potential effects of climate change on human health, erosion, water resources, air quality, ecological resources, and environmental justice has been added to Chapter 6 of this final EIS. Additional discussion of the types of regional climate change that could be expected has also been added to Chapter 6, Section 6.5.2, Global Climate Change. The potential impacts of the alternatives on climate change are addressed in Chapter 6, Section 6.5.2, and Appendix G, Section G.5, of this *TC & WM EIS*. Current projections of temperature change reported by the Intergovernmental Panel on Climate Change are much less than those suggested by the commentor (IPCC 2007:Table SPM.3).

484-2 DOE is working diligently to bring the WTP online to treat the tank waste at the site as soon as possible. Chapter 1, Section 1.2.3, provides a brief history and background on DOE's efforts to reduce costs and speed up Hanford cleanup efforts. As discussed in the *TC & WM EIS* Summary, Chapter 1, and Chapter 2, this EIS analyzes additional waste treatment capability that includes expanding the vitrification process capability currently being constructed in the WTP or supplementing the WTP's capability with supplemental treatment technologies. Thus, decisions to be made by DOE regarding whether to treat all waste in the WTP, as is or expanded, or to supplement its capacity by adding new treatment capability depend on demonstrating the feasibility of supplemental treatment technologies.

Commentor No. 484 (cont'd): Madeline Smith

interim, back-up solution against the possibility that Yucca Mountain is further delayed or derailed-- or cannot be adequately expanded before a further geologic repository can be ready.' " (Climate Change and the Law ed.Chris Wold, David Hunter, Melissa Powers,2009; quote is in Fred Bosselman's article, The Ecological Advantages of Nuclear Power, p681)

The Climate Change EIS could well lead to changes in money allocations if and when all the ramifications of climate disasters were studied. Hanford managers might reasonably order the delay of the building of the vitrification plant exactly because a planetary 2 degree C increase in temperature might happen at any time.

Jimmy T Bell's article--Alternatives to High-Level Waste Vitrification: The Need for Common Sense, details the complexities in vitrification which make it very costly. In Table IV Bell compares most to least expensive costs. If all the nuclear waste tanks at Hanford are vitrified the estimated cost is between 43 and 63 billion dollars. If only 60 tanks are vitrified, then the cost is estimated at 18 billion dollars. If 60 tanks are dry-packed, the estimated cost is 3 billion dollars. ***484-2 cont'd***

The vitrification phase is costly because it requires so many steps. Bell writes," These estimated costs for vitrification of only Hanford defense tank wastes should be compared to the recent DOE estimate of $50.3 billion for total environmental management (EM) costs (not restricted to tank waste) for Hanford over the years 1997 to 2070." (Nuclear Technology ,

vol 130 Apr.2000, p96). Since Bell doesn't estimate the total cost of dry casting for all Hanford waste, that figure would need to be estimated. That amount would surely be less than the cost of a vitrification plant.

If we achieve a carbon free future, the Climate Change EIS will have been a good precautionary exercise. On the other hand, if the planet goes over the tipping point, then Hanford would have plans in place for how to respond to extreme weather events like drought and scarce water or the opposite, like flooding and sea level rises. No one can really guess in which direction(s) the disaster might go. ***484-3***

Therefore, it would take careful study of disaster possibilities to determine how best to secure Hanford.

As noted in the Summary, Section S.3.1.4, and Chapter 2, Section 2.2.2.2, the WTP is currently being constructed in the 200-East Area of Hanford. Site work associated with the project began in late 2001 and construction is more than 62 percent complete. Details regarding the WTP are provided in Appendix E, including its design and processes, waste-form performance, waste forms/ disposal packages, and assumptions and uncertainties.

It is not within the scope of this *TC & WM EIS* to put the plans for the vitrification plant on hold. As mentioned in the Summary, Section S.1.2.1, the WTP is the cornerstone of tank waste treatment at Hanford and, as discussed in Appendix E, Section E.1.1.3, a major component of the RPP's current program is treatment of waste in the WTP. The current RPP program is based primarily on implementing Phase I of the Preferred Alternative identified in the *TWRS EIS* (DOE and Ecology 1996). The WTP is critical to completing waste treatment at Hanford. Thus, construction and operation of the WTP is evaluated in this *TC & WM EIS*; delaying its progress is not. While DOE agrees that reducing carbon emissions needs to be a priority, DOE is convinced that the benefits gained from reducing the risks the tank waste represents to the environment outweigh the benefits of halting construction and operation of the WTP. Reducing these risks is also part of DOE's mission.

484-3 Carbon dioxide control and global and regional climate change are not within the scope of this EIS. This *TC & WM EIS* addresses proposed actions to retrieve and treat the Hanford tank waste; close the Hanford SST system; store and/or dispose of the waste generated from these tank waste activities; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate cleanup at Hanford and other DOE sites. This EIS does address impacts of the alternatives on global climate change and the potential impacts of regional climate change on activities at Hanford (see Chapter 6, Section 6.5.2, Global Climate Change).

Commentor No. 484 (cont'd): Madeline Smith

I propose that the first priority ought to be that all available resources to go to preventing the planet going over the tipping point by stopping the carbon and other toxic chemical poisons problems. Then, having achieved climate control, there would be ample time to study good final phase nuclear waste solutions because a good intermediate solution, dry casking, had given Hanford, and possibly other nuclear waste facilities, that ample time. ***484-3 cont'd***

Madeline Smith

594 West 11 Ave.
Eugene, Or. 07401
or: e-mail: msmith@uoregon.edu
or: xxx-xxx-xxxx

P.S. I understand arguing that timing is critical can be viewed as an incentive to speed up all nuclear activity. But neither nuclear nor coal produces really clean energy. They are "dirty" in different ways. Another argument in favor of vitrification delay is that a cheaper and cleaner waste process might be invented exactly because Hanford management used precaution, because they were more concerned for the safety of U.S. citizens, than rushing into unknown/unknowable problematic nuclear processes. ***484-2 cont'd***

Response side of this page intentionally left blank.

Commentor No. 485: Jill Reifschneider

From: Michael, Jill, Noah, Nicholas [global_roamers@yahoo.com]
Sent: Sunday, May 02, 2010 12:07 AM
To: tc&wmeis@saic.com
Subject:

Thank you for listening. I oppose using Hanford as a national radioactive waste dump. Please completely cleanup ("clean closure") the High-Level Nuclear Waste Tanks. The Department of Energy must cleanup the contamination from High-Level Nuclear Waste tank leaks & deliberate discharges. This has been going on for way too long. Please protect us and our environment. Thank you. *485-1*

Jill Reifschneider
14846 73th Place NE
Kenmore, WA 98028

485-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Commentor No. 486: Deanne Belinoff

From: Deanne Belinoff [deanne@xprt.net]
Sent: Sunday, May 02, 2010 11:25 AM
To: tc&wmeis@saic.com
Cc: barbara bell; Tina wilson; poppy@poppydully.com; Penelope Schott; Nancy Turner; Nancy Carew; Melinda Fellini; Maxine Thomas; Marilyn Epstein; Maggie Chula; LaValle Linn; artkate Evans; ellen reed; Diane Waggoner; Diana Forester; CAROLHAZZARD@aol.com; jane smiley; "Mkohnstamm@quest.net"@smtp.gssf.org; artSandy Polishuk
Subject: not a hoax: checked it out.....

I am an artist, writer and activist. Please do not allow radioactive waste to contaminate Portland and the Columbia river. *486-1*

see www.hoanw.org

deanne belinoff
xxx xxx xxxx
www.deannebelinoff.com
deanne@xprt.net

486-1 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

Commentor No. 487: Bart Bolger

From: bolgerbart@gmail.com on behalf of Bart Bolger [ripken3@comcast.net]
Sent: Sunday, May 02, 2010 12:47 PM
To: tc&wmeis@saic.com
Subject: Complete Clean-up; then consider more storage

I completely agree with the letter sent to you by the Alliance for Democracy in Portland:
Clean-up the site to 99.9%. Then consider additional storage and processing.

487-1

We all live downstream.

Thank you,

Bart Bolger
vp & treasurer
Veterans For Peace Ch. 132, Corvallis, OR
www.vfpcorvallis.org

487-1 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

Commentor No. 488: Lisa Crosby

From: Lisa Crosby [mailto:lisa.paulb@olympus.net]
Sent: Sunday, May 02, 2010 3:24 PM
To: TC&WMEIS@saic.com'
Cc: The.Secretary@hq.doe.gov'
Subject: comment on the TCWMEIS

Dear Sir/Madam,

I am writing to express my concern over the Energy Department's "preferred alternative" in the draft TCWMEIS which would use Hanford as a national radioactive waste dump for USDOE nuclear weapons and power programs. I oppose this for the following two reasons: *488-1*

1) **Hanford has not demonstrated an ability to safely contain radioactive waste**. Quite to the contrary, radioactive waste already present at Hanford is currently leaking toward and into the Columbia River. No more waste should be accepted at Hanford until this is completely cleaned up. *488-2*
2) **Hanford is in an environmentally sensitive area because of its proximity to the Columbia River.** Failure to contain waste at this site leads to contamination of a river vital to the health of humans and animals.

Lisa Crosby
Port Townsend, WA

488-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

488-2 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

One of the purposes of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks.

Commentor No. 489: Dorothy Lamb

From: Dorothy Lamb [Dorothy16@comcast.net]
Sent: Sunday, May 02, 2010 10:50 PM
To: tc&wmeis@saic.com
Subject: Hanford

Dear DOE,

I want to ask you to do the right thing about nuclear waste. I am a downwinder from the 'thyroid belt.' I was born in the Milton-Freewater the 1942. I believe I was around five years old when my thyroid problem was discovered. I have been on thyroid medication ever since then. This year for some reason it got a lot worse. I am increasing my thyroid medication once again. A family member had their thyroid removed which is particularly bad since the amount of thyroid your body needs varies so to take the same amount every day is not desirable. I don't want to be a 'downstreamer' as well.

To not clean up what is already leaking into the beautiful Columbia River... To not seal the existing leaking tanks. This is very dangerous. I'm overwhelmed that this would be allowed. The Columbia Gorge will be ruined. Portland Oregon will be very contaminated/unlivable. I certainly wouldn't want to be living here when that happens. I don't know what to say because it seems so obvious. *489-1*

Please: Do a clean closure of the High-Level Nuclear Waste Tanks. Clean up the contamination from High Level Nuclear Waste Tanks. Clean up the contamination from the High-Level Nuclear Waste tank leaks and discharges. Do not let any more get into the Columbia River.

I can't believe that Obama is planning to make Hanford the national nuclear dump and to build even more nuclear plants. That means there will be trucks on major highways. (Are they unmarked trucks??!) which would be an easy target for terrorists. And that even if there are no terrorist attacks or accidents that people will die driving beside them on the freeways. This does not make sense to me!!! Why would anyone allow that?? But that is a different EIS… *489-2*

There must be reasons that are not apparent for this to be even considered. Is there a lot of underhanded money involved? Bribes? What is going on? I thought we had laws and safeguards and organizations like Environmental Protection etc etc to prevent this kind of thing.

489-1 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. The clean closure alternatives considered for the SST system are represented by the Base and Option Cases of Tank Closure Alternatives 6A and 6B; selective clean closure is represented by Tank Closure Alternative 4. For the Base Cases of both Tank Closure Alternatives 6A and 6B, the assumption is that the SST system would be cleaned to levels that would allow for unrestricted use.

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

489-2 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

As shown in the Summary of this *TC & WM EIS*, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that the estimated total public radiation exposures from transporting radioactive waste to Hanford for disposal would result in any additional LCFs. The dose to an MEI under incident-free transportation conditions was estimated for a person caught in traffic and located 1.2 meters (4 feet) from the surface of a remote-handled radioactive waste shipping container for 30 minutes. This dose was calculated to be 10 millirem for a single shipment. The dose would be less if the shipment were contact-handled radioactive waste or if the person were caught in traffic next to the waste shipment for a shorter period of time or were farther away. A dose of 10 millirem is roughly equivalent to that obtained from an x-ray of a broken bone, and the risk of incurring a fatal cancer from such a small dose would be 6×10^{-6}, or 6 chances in 1,000,000, which is very low.

Commentor No. 489 (cont'd): Dorothy Lamb

There are plenty of alternatives to nuclear energy. I would refer you to www. BreakthroughPower.net , www.integrityresearchinstitute.org . But there are many many more web sites and inventors I'm sure you know.

Please please do the right thing. Plan for a healthy future.

Sincerely,
Dorothy Lamb

Response side of this page intentionally left blank.

Commentor No. 490: Adrian Villarreal

From: Adrian Villarreal [dea557779@hotmail.com]
Sent: Sunday, May 02, 2010 10:57 PM
To: tc&wmeis@saic.com
Subject: TC&WMEIS Public Hearing Response Letter

May 2, 2010

TC & WM EIS,
P.O. Box 1178,
Richland WA 99352

To Whom It May Concern:

I am writing to protest against the TC&WMEIS preferred plan to dump nuclear waste at Hanford Washington. No further nuclear waste should be dumped at Hanford and the entire Hanford site needs to be decontaminated. There is no legitimate excuse for the continued pollution of nuclear waste into the Columbia River and exposing living organism in the United States, or the rest of the world to nuclear waste. The department of energy needs to clean up all the waste currently dumped in Hanford and the Department of Energy needs to use all the resources of the United States to complete the task. 99.9% of tank waste should be removed and anything less than this increases the risk of polluting our shortening water supply and potentiates the risk of exposure to American citizens. *490-1* *490-2*

Clean closure should be the method used to clean up Hanford and any other method defeats the mission to neutralize Hanford's current nuclear waste. The excuse stated by the DOE, that clean closure would increase the risk of exposing Hanford workers is hypocritical. Cleaning up Hanford is dangerous, and workers currently working at Hanford are already being subjected. Where was the concern for the Downwinders exposed to Hanford's nuclear waste? The DOE should acknowledge the efforts of these individuals by cleaning up all of the waste, and not use them as an excuse to not finish the job that these brave individuals started. The DOE should be asking itself, "Is it better to expose countless individuals to nuclear waste via the Columbia river versus exposing workers through the clean up process? Why is the Federal Government willing to sent troops to fight a war in other countries but is not willing to commit the resources needed to protect its citizens from nuclear exposure?" *490-3*

Part of the clean closure process involves cleaning up the Fast Flux Test Facility. The proposed plan to ship nuclear waste out of Washington State is idiotic to say the least. It is unacceptable to be shipping nuclear waste across state lines and risking exposure to American citizens. The FFTF needs to be cleaned at Hanford and only a clean closure process will be acceptable. *490-4*

490-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

The clean closure alternatives considered for the SST system are represented by the Base and Option Cases of Tank Closure Alternatives 6A and 6B. For both Base Cases, the assumption is that the SST system would be cleaned to levels that would allow for unrestricted use, which would involve removal of the tanks, ancillary equipment, and soils beneath the tanks (contaminated as a result of past leaks) down to the water table. The two Option Cases represent this type of clean closure along with removal of soils beneath the tank farms (contaminated as a result of infiltration from the contiguous cribs and trenches [ditches]). The analysis shows that removal of the contaminants from the vadose zone would not capture those contaminants that may have already reached the groundwater table due to past practices (i.e., past leaks and contiguous cribs and trenches [ditches]).

DOE received comments on the potential impacts of future remediation activities that are in various stages of planning (which, given the inherent uncertainty, were not included in the cumulative impacts analysis). In response, DOE performed a sensitivity analysis to evaluate the potential impacts if certain remediation activities were conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. This analysis is provided in Appendix U of this EIS and is discussed further in Chapter 7, Section 7.5.

490-2 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

490-3 The impacts of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B,

Commentor No. 490 (cont'd): Adrian Villarreal

In order to clean up Hanford, the DOE needs to complete the construction of the Vitrification plant and needs to immediately start the construction of the second Vitrification plant for the Low Activity Waste. Time is of the essence and we need to carefully clean up all of the nuclear waste our government dumped without thought. Now is the time for thinking and action. We need to build and complete these needed plants to stop the pollution of the Columbia River and have the ability to access our underground water supply, to decontaminate the much needed water supply available. *490-5*

The DOE needs to take responsibility and clean up the mess they have left at Hanford. The dumping of Class C or higher nuclear waste should not be dumped at Hanford and the United States government should be providing more security at Hanford to prevent terrorists from gaining access to the currently dumped nuclear waste. The cleaning up of Hanford needs to be completed and the United States needs to stop using Nuclear waste, and any other energy sources that are not reusable and severely increase the health implication of its citizens. *490-6*

Sincerely,

Adrian Villarreal

which evaluate clean closure of all or part of the SST system. As required by NEPA, this *TC & WM EIS* addresses the impacts on both the short- and long-term human environment. Workers related to the activities being analyzed are part of the human environment, and impacts on workers are presented in Appendix K, Section K.3.10, and Chapter 4, Sections 4.1.10, 4.2.10, and 4.3.10, of this EIS. See response to comment 490-2 regarding factors influencing future DOE decisions.

490-4 Radioactive waste is transported in DOT-certified containers that meet strenuous technical standards established by NRC.

490-5 DOE is working diligently to bring the WTP online to treat the tank waste at the site as soon as possible. Chapter 1, Section 1.2.3, provides a brief history and background on DOE's efforts to reduce costs and speed up Hanford cleanup efforts. As discussed in the *TC & WM EIS* Summary, Chapter 1, and Chapter 2, this EIS analyzes additional waste treatment capability that includes expanding the vitrification process capability currently being constructed in the WTP or supplementing the WTP's capability with supplemental treatment technologies. Thus, decisions to be made by DOE regarding whether to treat all waste in the WTP, as is or expanded, or to supplement its capacity by adding new treatment capability depend on demonstrating the feasibility of supplemental treatment technologies.

As noted in the Summary, Section S.3.1.4, and Chapter 2, Section 2.2.2.2, the WTP is currently being constructed in the 200-East Area of Hanford. Site work associated with the project began in late 2001 and construction is more than 62 percent complete. Details regarding the WTP are provided in Appendix E, including its design and processes, waste-form performance, waste forms/disposal packages, and assumptions and uncertainties.

490-6 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

Operations of the plant and the security provided at Hanford are intended to prevent intentional destructive acts. Nevertheless, this *TC & WM EIS* includes analyses of the potential impacts of accidents and intentional destructive acts on workers and members of the public. The results of these analyses are presented in Chapter 4, Sections 4.1.11, 4.2.11, and 4.3.11. More-detailed descriptions

Commentor No. 490 (cont'd): Adrian Villarreal

of the scenarios and the methods of analysis are presented in Appendix K, Section K.3.11.

Regarding the commentor's concern about the inclusion of GTCC LLW in this *TC & WM EIS*, DOE has included information from the *Draft GTCC EIS* in the *Final TC & WM EIS* cumulative impacts analysis. For a more comprehensive discussion on GTCC LLW, see Sections 2.1 and 2.12 of this CRD. The potential for a GTCC LLW disposal facility at Hanford is addressed in Chapter 6, "Cumulative Impacts," of this *TC & WM EIS*.

Commentor No. 491: Richard and Tina Heggen

From: prvs=1739ECE54F=tubegeek@nventure.com on behalf of Dick Heggen [tubegeek@nventure.com]
Sent: Monday, May 03, 2010 12:28 AM
To: tc&wmeis@saic.com
Subject: Hanford TC&WM EIS comment submittal – Heggen
Attachments: EIS TC&WM comments - Heggen 5-1-10.doc

To whom it may concern,

Please accept our formal comments on the Hanford Tank Closure and Waste Management Environmental Impact Statement (TC&WM EIS) in the attached Word document. An acknowledgement of receipt would be appreciated.

Richard and Tina Heggen
6444 N. Five Views Rd.
Tacoma, WA

Response side of this page intentionally left blank.

Commentor No. 491 (cont'd): Richard and Tina Heggen

May 2, 2010

Comments on the Draft Tank Closure and Waste Management (TC&WM) EIS for the Hanford Site, Richland, WA. DOE/EIS-0391

Richard Heggen
6444 N. Five Views Road
Tacoma, WA 98407

1) The TC&WM EIS (EIS) seriously underestimates the actual uranium inventory for both US Ecology and the Environmental Restoration Disposal Facility (ERDF). For example, Page S-91, Table S-50b in the EIS lists US Ecology with 1,820 curies of uranium and ERDF with 54 curies of uranium. A March 1998 PNNL report (PNNL-11200) prepared for the US Department of Energy (USDOE) lists a far greater amount of uranium inventory for both facilities on page 3.31, Section 3.5.2.7 as follows: ERDF = 54,300 curies, and US Ecology = 10,900 curies. Although the PNNL report indicates the ERDF estimate may be somewhat overstated, it is still orders of magnitude greater than the 54 curies provided in the EIS. The EIS must be revised to include the actual uranium inventory. Risk modeling in the EIS must also be revised to accommodate the increased inventory

491-1

2) Uranium chemical inventory in kilograms is missing for both ERDF and US Ecology (Page S-141, Table S-76b). The EIS must be revised to include the actual uranium inventory. Revise the EIS risk modeling to account for the increased inventory.

3) Significant uranium inventory is missing from Appendix S. Although curie inventory for uranium chemical inventory is listed for many of the burial grounds, uranium chemical inventory is missing for all but two burial grounds. The two burial grounds are 218-W-4C and 218-W-5. While W-4C has 72.8 curies and 83 kilograms (kg) of uranium, W-5 has 654 curies and only 0.055 kg. It appears the chemical inventory for many burial grounds including W-5 is either missing or grossly underestimated. The EIS should be revised to more accurately reflect the actual chemical inventory. Revise the EIS risk modeling to account for the revised inventory.

491-2

4) Comparing the plutonium inventory kilogram estimates from the Hanford History of the 200 Area Burial Ground Facilities (September 1996 – Westinghouse Hanford Co. – WHC-EP-0912) to the plutonium curie estimates provided in the EIS indicates several discrepancies. While the EIS lists no plutonium curie inventory for 218-W-2A, W-3A, and W-4B, the Westinghouse report lists plutonium inventory at 6.38 kg, 29.32 kg, and 66.47 kg respectively for these same burial grounds. By comparison, the WHC report lists 218-W-3 plutonium inventory at 68 kg and the EIS has a corresponding 4,930 curies of plutonium for the same burial ground. These discrepancies indicate that thousands of curies of

491-3

491-1 DOE has reviewed the estimated ERDF inventory and revised the total uranium inventory from 54 curies to 412 curies. This revised estimate is based on the inventory of total uranium disposed of at the ERDF through March 2010, as reported in the Hanford Waste Management Information System. DOE recognizes this estimate may not represent the total inventory of uranium that may be disposed of at the ERDF, but it represents the best inventory estimate available at this time. DOE reviewed the *Retrieval Process Development and Enhancements FY96 Pulsed-Air Mixer Testing and Deployment Study* (Powell and Hymas 1996), and found no inventory data in the document to compare with the inventory estimates analyzed in this EIS. Without the correct document citation, a comparison cannot be conducted.

491-2 As discussed in Appendix S, "Waste Inventories for Cumulative Impact Analyses," DOE conducted a detailed review of available inventory data and believes the inventory estimates analyzed in this EIS represent the best-available data at the time of its publication. None of the reviewed documents included a total uranium inventory estimate for these disposal sites. However, in response to comments received, DOE again reviewed the data and revised the ERDF and US Ecology inventories to include a calculated total uranium inventory. This inventory was included in this *Final TC & WM EIS* and analyzed appropriately.

Regarding the commentor's concern as to the accuracy of data, DOE reexamined the inventories used in this *Final TC & WM EIS* and determined that the best-available data were used in the analysis, with the understanding that uncertainty still remains. For a more comprehensive discussion of this topic, see Section 2.2 of this CRD.

491-3 DOE conducted a detailed review of available inventory data and believes the inventory estimates analyzed in this EIS represent the best-available data at the time of its publication. The primary source of referenceable inventory data for the burial grounds used in this EIS was the *Summary of Radioactive Solid Waste Received in the 200 Areas During Calendar Year 1995* (Anderson and Hagel 1996). As discussed in the introduction to this source document, the inventory data contained within included not only the inventory disposed of in 1995, but also the cumulative inventory through 1995. DOE's review of *The History of the 200 Area Burial Ground Facilities* (Anderson 1996) concluded that it may not be the best source for burial ground inventory data. The following statement is an excerpt from the preface to Anderson (1996): "Much of the information is not associated with referenceable documentation, and comes from the author's experiences and associations with others during the

plutonium are missing from above noted burial grounds. Revise all the burial ground inventory numbers to accurately state the correct amount of plutonium curies and chemical inventory in kilograms. Revise the risk modeling in the EIS to account for the increased inventory.

491-3 cont'd

5) Throughout Appendix S, the relation between radioactive uranium inventory in curies and the chemical uranium inventory in kg varies drastically. The EIS provides no explanation for this wide range of ratios. For example, appendix S table S-43a lists a total of 914 curies uranium (almost all due to three burial grounds) and table S-69b lists a corresponding total of 3,127 kg uranium. This is in contrast to the ratio of uranium curies to kg found in tables S-48a and S-74b where the ratio of 25.45 curies to 106,530 kg is far different and not explained in the EIS. There are many examples of this apparent lack of consistency in similar data throughout the EIS. It appears that significant uranium inventory is missing. Revise the EIS and risk modeling to include the missing inventory.

491-4

6) Appendix S, Table S-26 lists the volume of discharged liquid to ground for 216-B-3 pond at 280 billion liters which translates to 154 billion gallons. However, the 2005 Groundwater Monitoring Plan for the Hanford Site 216-B-3 Pond RCRA Facility (PNNL-15479), Section 1.1.1, page 1.3 lists the total liquid discharge to ground at over one trillion liters = greater than 260 billion gallons. The EIS needs to be revised to include the missing 106 billion gallons from 216-B-3 pond.

491-5

7) There is a large difference in the ratio of uranium curies to kilograms between the total numbers for Appendix S and the total numbers for Appendix D (the specific tank farm area with selected discharge areas). The ratio found in appendix S for uranium kg to curies = 70:1 while the ratio for Appendix D = 633:1. This implies missing data or errors in the data. No explanation was found in the EIS. The EIS needs to be revised to either include an explanation or to include all missing data. Additionally, risk modeling must also be revised.

491-6

8) The EIS lists the uranium chemical inventory as total uranium as soluble salt. Apparently the EIS omitted insoluble uranium compounds from the inventory data. If so, this is a serious oversight due to the toxicity of uranium as a chemical/metal which is in addition to the toxic effects of uranium due to radioactivity. The EIS needs to be revised to include all forms of uranium in the inventory data. All relevant risk modeling and discussion must be revised to reflect the additional uranium inventory and all associated risks for all forms of uranium.

491-7

9) The EIS appears to focus strictly on water/liquid related pathways for all risk scenarios. Missing from this EIS is a future failed cover scenario that allows animal and plant life to access contamination remaining in the ground. There is a long history of plants and animals accessing and spreading toxic materials in the ground at Hanford, including radioactive plants (especially long rooted tumbleweeds), radioactive insects, and radioactive animals. Other soil

491-8

time spent in the burial grounds which covered a quarter of a century." However, to address the example provided by the commentor, the 4,930 curies of plutonium estimated in Anderson and Hagel (1996) converts to 67 kilograms of plutonium when the appropriate specific activity (curies/grams) factors are applied; this is approximately the same inventory estimate provided in *The History of the 200 Area Burial Ground Facilities* (Anderson 1996). Therefore, DOE sees no discrepancy in this case.

491-4 See response to comment 491-2 regarding data usage in this EIS.

491-5 Appendix S, Table S–26, includes an estimate of 282.7 billion liters (74.7 billion gallons) that was discharged to this pond. The source of this estimate was SIM, Revision 1 (Corbin et al. 2005). Page A-88 of this report provides a detailed listing of the documents used to generate this estimate. A review of the *Groundwater Monitoring Plan for the Hanford Site 216-B-3 Pond RCRA Facility* (Barnett et al. 2005) found that its total estimate of discharges to the B-3 Pond is 260 billion gallons, but no data were found to support this estimate. Thus, DOE believes SIM (Corbin et al. 2005) represents the best-available and -defensible data for use in the analysis in this EIS.

491-6 See response to comment 491-2 regarding data usage in this EIS.

491-7 Regarding use of the term "soluble salts" for describing the total uranium inventories, the distinction "(soluble salts)" in the table was an error, and that term has been deleted. The inventories provided in the *Draft TC & WM EIS* did represent total uranium, not just the soluble salt form. DOE acknowledges the perception that some of the uranium chemical inventories in the cumulative impacts analysis inventories provided in Appendix S are underreported. DOE conducted a detailed review of available inventory data and believes the inventory estimates analyzed in the draft EIS represented the best-available data at the time of the draft's publication. None of the reviewed documents included estimates of the total uranium inventory for certain sites, primarily burial grounds. However, DOE again reviewed the data and revised the Appendix S inventories to include a calculated total uranium inventory. This inventory was included in this final EIS and analyzed appropriately.

491-8 Facility closure activities and configurations of engineered barriers, including caps, are described in Appendix D of this *TC & WM EIS*. The analysis assumes failure of the facility cover (barrier). The closure designs and depth to the waste are such that biointrusion into facilities would be a small component of the direct human intrusion and groundwater release scenarios evaluated in

Commentor No. 491 (cont'd): Richard and Tina Heggen

disturbance mechanisms could also cause exposure to toxic radioactive and mixed toxic waste in the future. Exposure of humans and the environment could occur through direct contact, ingestion, and air pathways. Revise the EIS to include these risk scenarios. ***491-8 cont'd***

10) The EIS fails to address options on how USDOE will address and cleanup significant shallow contamination related burial grounds, the miles of old contaminated transfer pipelines, in-ground contaminated sand filters, etc. shallow sources of contamination. The EIS must be revised to include all missing inventories as well as associated future risk scenarios. ***491-9***

11) Missing in the EIS are miles of pipelines including the old SST cross-site pipelines that extend beyond the SST tank farm fencelines to interconnect with cribs, trenches ponds, vaults, and process facilities. Although USDOE included some selected cribs and trenches located beyond the SST fencelines, there is no mention of the large system of buried SST pipelines that remain in the ground. The EIS failed to address the contamination associated with these old abandoned pipelines. In the past, many if not most of these old pipelines were removed from service due to leaks, and plugging problems that rendered the lines inoperable. In a few cases the leaks were discovered when liquid waste formed wet areas above the defective piping. Revise the EIS to include a description of these structures and all estimates of associated leaked and plugged inventory remaining in the pipelines. Additionally, include a complete description of past leaks, associated inventory, and a description of how the leaks were remediated. Revise EIS risk modeling to account for this increased inventory and associated future risk scenarios. ***491-10***

12) In section 6.4.3.1, Tables 6-31lists only lists mercury as having a potential cumulative impact to Ecological receptors via on-site surface soil. Under ecological risk (Table 2-46) other contaminants are addressed including benzene, toluene, xylene, and formaldehyde; however these limited additional compounds are assumed to only reach the environment through a water pathway. Missing from the ecological risk direct soil exposure (direct contact, ingestion, and air inhalation) are many other significant toxic isotopes, compounds, etc. Many toxic constituents are potentially available to the ecology the future due to either failed landfill covers or through natural or man-made disturbances to the site soil. Revise the EIS to include these additional contaminants and risk scenarios. ***491-11***

13) The EIS failed to discuss Land Disposal Restriction (LDR) requirements with respect to all scenarios proposing to leave toxic material on site. LDR regulations require a comparison of best available technologies to meet land disposal treatment standards. Rationale for selection of technologies meeting LDR requirements must be included in the EIS. ***491-12***

14) The EIS failed to provide a specific description and diagrams of all of the structures/equipment included in the "SST" system. The EIS must be revised to ***491-13***

this EIS. Methods applied for evaluation of direct human intrusion are presented in Appendix Q, Section Q.2.3, while results of the analysis are presented in Sections Q.3.1 (Tank Closure alternatives), Q.3.2 (FFTF Decommissioning alternatives), and Q.3.3 (Waste Management alternatives). Direct-intrusion exposure pathways include worker inhalation and direct radiation and the complete set of residential farming pathways. Only a small fraction of the ecological populations at the site would be exposed to waste, given the closure designs and depth to the waste. There is no basis for quantitative comparison of risk to ecological receptors exposed by direct contact to waste in failed landfills under the different alternatives.

491-9 In general, the scope of this *TC & WM EIS* does not include groundwater remediation activities or remediation of the burial grounds and old transfer lines included within the SST and DST systems as part of the proposed actions evaluated. However, the estimated inventories for these contaminated sites are included in Appendix S, "Waste Inventories for Cumulative Impact Analyses," and the long-term impacts included in Appendix U, "Supporting Information for the Long-Term Cumulative Impact Analyses." As described in the Summary, Section S.1.3.2, and Chapter 1, Section 1.4.2, DOE is not making decisions regarding a number of contaminated sites, including the above, as part of the NEPA process.

491-10 Appendix D, Section D.1.2, Tank Ancillary Equipment Waste, provides a discussion of the inventories for the ancillary facilities, including the transfer piping associated with the SST and DST farms within the permit and waste management areas. However, there are pipelines outside the permit and waste management areas. Tables D–9 through D–12 provide the radioactive and nonradioactive inventories for the SST and DST ancillary equipment.

491-11 As described in Chapter 6, Section 6.4.3, the selected COPCs are those with the highest Hazard Quotients under the three alternative combinations: mercury for receptors exposed to soil and air at the onsite maximum-impact location, and mercury and benzene for receptors exposed to sediment and Columbia River surface water. For these analytes, only the estimated cumulative concentrations of mercury in onsite surface soil for Alternative Combinations 2 and 3 pose a potential for adverse impacts on ecological receptors. The ecological risk analysis is a tool for comparing alternatives, and it does this with a limited set of contaminants. It is not meant to be an assessment of every possible contaminant potentially released in the past or future. All alternatives evaluate the same set of contaminants, which serve as indicators of the various types of contaminants

include a complete description of the entire SST system. The transfer lines and associated structures do not end at the tank farm fencelines. The revised description must include a discussion of exactly which structures are addressed in this EIS as well as which items are not addressed.

491-13 cont'd

15) The EIS fails to discuss the realities of SST in-tank sampling at Hanford. All tank core samples stop short of the bottom of the tank to avoid damaging the tank steel shell. All SST tank shells (liners) are well beyond the engineered design life and the condition of the steel shell is unknown. The fact that many tanks have leaked, indicate the general condition of the SST steel shells is marginal at best. Several cores are taken from each tank and indicate that the layering of toxic tank sediments/constituents is uneven and therefore the information from a few cores in each tank is not very representative of the specific toxic nature of an individual tank. The original wastes were added to tanks in a liquid form and heavier materials concentrated in the bottom of each tank. Since no sample data is available from the bottom layers of any tank, drawing any conclusions relating to the heavier toxic materials including much of the radionuclide content is not acceptable. Revise the EIS to address this fact and include revised estimates of the residual heavy radionuclides projected to remain in the SSTs.

491-14

16) There is a lack of sufficient characterization for many units at Hanford. Specifically there is very little characterization relating to burial grounds. This is especially a problem for the older burial grounds that lack records of materials dumped in the burial grounds. Additionally the older burial grounds operated with few restrictions and received a wider range of toxic materials than some of the newer burial grounds. Missing from the EIS is a basis for the estimated contamination listed in the EIS. A cross check of documents found discrepancies for estimated inventories in a number of burial grounds (see comments #3 and #4). Revise the EIS to include the basis for burial ground estimates in the EIS.

491-15

17) The EIS fails to include a discussion of specific field sampling used to verify the results of modeling used in the EIS. Revise the EIS to include adequate modeling verification with field samples sufficient to validate the models used in the EIS.

491-16

18) General: Due to the significant amount of contamination at Hanford (and at the adjacent US Ecology facility), the lack of adequate characterization, and the projected future impacts to human health and the environment, additional waste must not be brought to Hanford at any time in the future.

491-17

19) Prior to 1997, I was the Washington State Department of Ecology SST system closure permit writer (now retired). USDOE contractors submitted a graph showing uranium groundwater contamination starting to increase after 10,000 years into the future; yet, at the time USDOE did not consider the information to be relevant since it exceeded a USDOE policy that excluded discussion of any impacts beyond a 10,000 year maximum timeline. The TC&WM EIS also did not

491-18

that might be released, and which were judged to be sufficient for comparing the alternatives and cumulative impacts thereof.

491-12 Chapter 8 of this *TC & WM EIS* identifies the laws, regulations, and other requirements that potentially apply to the alternatives. Specifically, Section 8.1.4 identifies and summarizes the potential hazardous waste and materials management requirements, including the land-disposal-restriction requirements (40 CFR 268). This section also discusses the treatment standards for HLW. Actual implementation of the selected actions following issuance of DOE's ROD for this EIS would be subject to the more detailed evaluations and processes required under RCRA, the Washington State Hazardous Waste Management Act, and CERCLA, as applicable, including meeting Land Disposal Restriction requirements.

491-13 Several sections in Appendix E describe the SST system, its current operation, and the components analyzed in this EIS. Examples include Section E.1.1, Current River Protection Project, and Section E.1.2, Descriptions of Tank Closure Alternative Facilities and Operations.

491-14 Appendix D, Sections D.1.1, Current Tank Inventory of Radioactive and Chemical Constituents, and D.1.1.4, Uncertainty in Best-Basis Inventories, provide discussions of the tank waste inventories and the uncertainties in the inventory estimates. DOE believes the inventories used in this EIS represent the best and most-accurate data available at this time. A number of the SSTs are currently undergoing waste retrieval actions that are part of the tank closure process. The commentor is referred to Chapter 8, Section 8.1.4, for a description of RCRA closure, including landfill and clean closure for tank systems. In addition, this section provides details regarding the TPA, a legal agreement between DOE, Ecology, and EPA that is the mechanism for addressing and defining cleanup commitments and establishing goals for regulatory compliance and remediation with enforceable milestones. Chapter 2, Section 2.2.2.1.1, provides more discussion on how the retrieval benchmarks (0 percent, 90 percent, 99 percent, and 99.9 percent retrieval) coincide with Milestone M-45-00 and Appendix H of the TPA. The tank closure process will include detailed examinations of the tanks and residual waste, as well as preparation of long-term performance assessments and a closure plan. These documents will provide the information and analysis necessary for DOE and the regulators (i.e., Ecology) to make specific decisions on what levels of residual tank waste are acceptable in terms of short- and long-term risks.

Commentor No. 491 (cont'd): Richard and Tina Heggen

include this projected increase in uranium groundwater contamination beginning around the 10,000 years from now. Was this due to the missing uranium data identified in my previous comments and/or a decision to exclude any future projections beyond 10,000 years? Revise the EIS to include this and other relevant projections of risk due to uranium and any other contaminants that are likely to increase beyond 10,000 years.

491-18 cont'd

20) Appendix D, Section D.1.2, Page D-12 states: "The SST farm volumes were derived by assuming a deposition of waste solids with an average thickness of only about 0.01 to 0.02 centimeters (0.004 to 0,008 inches) on the surfaces of the pits and piping (DOE 2003a). Since USDOE has not performed any meaningful characterization of the inside waste deposition of old SST pipelines this assumption is unacceptable. It does not account for the fact that many old SST pipelines experienced plugging or leaks and were eventually removed from service by capping off the ends of the pipes. Most if not all of these old contaminated pipelines remain in the ground and need to be characterized, removed, treated, and properly contained. The assumption that all pipelines contain a miniscule coating of toxic waste does not match historical records and is inappropriate. Revise the EIS to reflect these facts.

491-19

21) Using the existing waste inventory found in the current EIS, concentrations of some toxic constituents are estimated to exceed allowable risk limits in the future. When the site inventory is revised to include the missing waste inventory (discussed in prior comments), risk will only increase, likely causing even more toxic constituents to exceed risk limits in the future. Considering the increasing risk at Hanford, it is imperative that all waste that can be reached be removed, treated, stabilized, contained and properly disposed. At a minimum, this would include removal of single shell tanks and pipelines along with associated contaminated soil. Additionally all waste and associated contaminated soil in the unlined burial grounds must be removed, treated, stabilized, and contained. This should meet clean closure requirements for these items/units on site.

491-20

491-21

22) Although the EIS provided inventory estimates for many units at Hanford, the EIS was unclear about the end state (disposition) of many of these inventories. For instance there are large concrete storage pits inside T-plant containing significant radioactive and non-radioactive toxic materials. Additionally there are several areas outside of T-plant where toxic materials remain in the ground. There are other sources of both contained and in-ground contamination. The EIS is did not address or categorize the end state/disposition for these units. What are the assumptions for these and similar areas of contamination at Hanford? For those areas where the plan is to simply cover the waste, were these waste inventories factored into the cumulative risk calculations? If not identify the waste inventories involved.

491-22

491-15 See response to comment 491-2 regarding data usage in this EIS. Appendix S, Section S.3.5, Analysis of Sites with Missing Inventory, describes from a macro perspective the availability and uncertainties of the cumulative impacts analysis data, including the data for the burial grounds. DOE agrees there is minimal characterization of the burial grounds waste, but has provided this insight to give the reader a sense of the uncertainties in the cumulative impacts analysis inventory estimates.

491-16 DOE disagrees with the supposition that the *Draft TC & WM EIS* fails to include specific field-sampling data. Appendix L, Section L.4.3.2, reveals that field-sampling data from over 5,000 boring logs were used to support lithologic encoding of the regional-scale flow model; Section L.6.1, that field-sampling data from approximately 1,800 groundwater wells were used to calculate the regional-scale flow model; and Appendix N, Section N.1.2, that field-sampling data from approximately 140 vadose zone boreholes were used to calibrate the vadose zone model as well as regional-scale groundwater plume measurements for the BY Cribs, BC Cribs, 216-T-26 Crib, and the REDOX and PUREX waste sites. Furthermore, in Appendix U, modeled contaminant plumes are compared against field measurements for the COPCs. DOE's view is that the overall level of characterization data for Hanford supports differentiation among the alternatives, which is a key feature of a NEPA analysis.

491-17 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

491-18 DOE disagrees with the commentor's assertion that the *Draft TC & WM EIS* does not include a projected increase in uranium groundwater concentrations. Uranium concentrations in groundwater for all of the alternatives are presented in Chapter 5, and the vast majority of them show groundwater concentrations increasing near the end of the 10,000-year simulation period. This issue is extensively discussed in the text of Chapter 5. A discussion of the causes of the increase and the implications for the comparison of the alternatives is presented in Appendix O, Section O.6, of the *Draft TC & WM EIS*.

491-19 Waste volumes in the old SST pipelines were developed from detailed analyses of three SST farms and then extrapolated to the remaining SST

Commentor No. 491 (cont'd): Richard and Tina Heggen

23) Are there any assumptions that a cover/cap over waste left in the ground will contain the waste forever? If so, revise the EIS to include the waste types and quantities the nuclear and non-nuclear toxic waste inventory involved. ***491-23***

24) The EIS indicates that USDOE plans to transport significant amounts of radioactive and mixed waste to Hanford over many hundreds of miles of transportation routes with the assumption that some members of the public will be at risk to exposure. This is unacceptable for a number of reasons, including the potential public exposure and the fact that it will only add to the already high future risk of release of toxic materials at Hanford, in the area near Hanford and to the Columbia River. Revise the EIS to exclude the concept of bringing additional waste to Hanford. The idea of adding more waste to the most contaminated site in North America is unthinkable. ***491-24***

Sincerely,

Richard and Tina Heggen

6444 N. Five Views Rd.
Tacoma, WA 98407

farms. This analysis is documented in the *Closure Technical Data Package for the Tank Waste Remediation System Environmental Impact Statement* (Kline, Hampt, and Skelly 1995) and represents the best-available data. In addition, DOE believes that many of these old SST pipelines may be removed or remediated in place during closure activities because they are located within several feet of the ground surface.

491-20 DOE conducted a detailed review of available inventory data and believes the waste inventories analyzed in this EIS represent the best-available data at the time of its publication. However, in response to a number of comments from the public, DOE undertook another detailed review of the tank past leaks inventory evaluated in the draft EIS and determined that the inventory for a number of unplanned releases needed to be revised. This inventory is relatively minor, but was updated in the inventory estimates and groundwater analyses in this *Final TC & WM EIS*. In addition, DOE found that many of the documents used to develop the cumulative impacts analysis inventory did not include a total uranium inventory estimate in their estimated uranium radioactive inventory. DOE calculated this total uranium inventory and added it to the cumulative impacts analysis inventory for analysis in this final EIS. Thus, the estimated radiological risks due to the additional inventory from the unplanned releases estimate are reflected in Chapter 5 and the Summary, Section S.5.5. The estimated human health impacts due to the additional calculated total uranium inventory are reflected in Appendix T, "Supporting Information for the Short-Term Cumulative Impact Analyses," and Appendix U, "Supporting Information for the Long-Term Cumulative Impact Analyses."

The scope of this *TC & WM EIS* includes non-groundwater remediation activities for tank closure and FFTF decommissioning. Other Hanford remediation activities required under RCRA, CERCLA, and/or the TPA are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. Cleanup decisions regarding the non-tank-farm contamination sites will be made in consultation with Federal and state agencies. The other Hanford remediation activities are considered in the *TC & WM EIS* cumulative impacts analysis, although this EIS is not able to fully reflect the effectiveness of remediation activities and does not consider groundwater remediation. There are significant uncertainties in estimating the degree of cleanup that can be achieved by the remediation activities. For example: (1) the inventories of contaminants released to the ground at many of the sites are uncertain; (2) for liquid release sites, the portion of the originally disposed contaminants remaining in the vadose

Commentor No. 491 (cont'd): Richard and Tina Heggen

zone and the portion that has migrated into the groundwater are uncertain; (3) the specific cleanup/containment methods for some sites have yet to be selected; and (4) the effectiveness of the cleanup/containment methods is uncertain. Therefore, the cumulative impacts analysis in this *TC & WM EIS* is conservative because it does not account for cleanup/containment of waste and contaminated soil at liquid release sites and cleanup/containment of current or future groundwater contamination.

In recognition of the concerns about the effects of the remediation activities, DOE performed a sensitivity analysis to evaluate the potential impacts if certain remediation activities were conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. The goal of the sensitivity analysis is to help DOE, EPA, and Ecology prioritize cleanup efforts in the future. This analysis is provided in Appendix U of this EIS and is discussed further in Chapter 7, Section 7.5.

491-21 The clean closure options considered for the SST system are represented by the Base and Option Cases of Tank Closure Alternatives 6A and 6B. For both Base Cases, the assumption is that the SST system would be cleaned to levels that would allow for unrestricted use, which would involve removal of the tanks, ancillary equipment, and contaminated soils beneath the tanks (contaminated as a result of past leaks) down to the water table. The two Option Cases represent this type of clean closure along with removal of soils beneath the tank farms (contaminated as a result of infiltration from the contiguous cribs and trenches [ditches]). The analysis shows that the removal of the contaminants from the vadose zone does not capture the contaminants that may have already reached the groundwater table due to past practices (i.e., past leaks and contiguous cribs and trenches [ditches]).

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

491-22 Appendix S, "Waste Inventories for Cumulative Impact Analyses," includes the status or future end states assumed for each of the waste sites or buildings within the cumulative impact analyses in Tables S–9 through S–34. The T Plant complex is included in Table S–19.

491-23 Full descriptions of both the modified RCRA Subtitle C and Hanford barriers are provided in Appendix E, Section E.1.2.5.4.1. It is noted in that section that the modified RCRA Subtitle C barrier is designed to provide long-term containment and hydrologic protection for a performance period of 500 years, while the Hanford barrier is designed for 1,000 years. As discussed in Chapter 2, Section 2.5.1.1, Tank Closure Alternatives, the end-state management of the tank farm systems after placement of a barrier includes postclosure care. Postclosure care is identified as the period following closure of a hazardous waste disposal system (e.g., a landfill) during which monitoring and maintenance activities must be conducted to preserve the integrity of the disposal system and continue preventing or controlling releases from the disposal unit.

For analysis purposes in this *TC & WM EIS*, it was assumed that the postclosure care period following landfill closure of the SST system would be extended to 100 years. The planned postclosure care program proposed for Hanford is described in Appendix E, Section E.1.2.5.4.2, Postclosure Care. As discussed in this section, it is recognized that, although these monitoring activities would not be performed for many years, it is important that general information on the various technologies and alternatives for monitoring be identified in this EIS. This section is provided as a general overview and description of the postclosure care program; specific design details (e.g., fencing) and specific administrative control details (e.g., access restrictions) are to be developed in the future.

491-24 Radioactive waste is transported in DOT-certified containers that meet strenuous technical standards established by NRC. See response to comment 491-17 for a discussion on the transport and disposal of offsite waste.

Commentor No. 492: Peter Stoel

From: Peter Stoel [peterfstoel@gmail.com]
Sent: Monday, May 03, 2010 2:32 AM
To: tc&wmeis@saic.com
Cc: Karen Josephson
Subject: Hanford tank closure and waste mgmt EIS

My comments on the TC&WM EIS:

I was born in Portland and lived there most of my life. I've long been very concerned about the waste contamination problem at Hanford, especially the current and future leakage of carbon tetrachloride and radioactive isotopes into the Columbia River some of which can come right down into Portland. *492-1*

-- I am alarmed at the "preferred alternative" course of action which will leave high-level radioactive waste that has leaked from tanks permanently under the old tanks despite its movement toward the River. These wastes must be cleaned up and sealed from further spread! *492-1*

-- The lack of a thorough inventory of the wastes that was thrown into unlined dirt trenches decades ago. We must find out what is in these trenches, and estimated quantities, so we can responsibly manage these materials, monitor future leakage, and decide what cleanup must be done. *492-2*

-- The FFTF needs to be dismantled and the dangerously radioactive materials disposed of properly in a national depository *492-3*

-- **Do not bring any more radioactive waste to Hanford !** The DOE needs to find a truly geologically stable formation somewhere in North America and build a depository in that formation, not at Hanford with its leaky conditions and proximity to a major river. In the meantime do not bring in any more waste. *492-4*

Peter Stoel
3025 SW Morris Av
Corvallis OR 97333

Peter Stoel
RESULTS Corvallis volunteer

492-1 The Summary, Section S.5.5, and Chapter 2, Section 2.10, of this EIS discuss the key environmental findings associated with the alternatives, including findings related to potential long-term impacts on groundwater from closure of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities downriver from Hanford.

One of the purposes of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms by landfill closure, selective clean closure, or clean closure. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks, including remediation of the contamination in the vadose zone.

492-2 DOE has taken responsibility for waste cleanup at Hanford. DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

492-3 Regarding the total dismantlement of FFTF (essentially FFTF Decommissioning Alternative 3), although nearly all elements of FFTF and the two adjacent support facilities would be removed under this alternative, the lower portion of the RCB concrete shell would remain. This would be backfilled with either soil or grout to minimize void space. The area would be regraded and revegetated, with no need for a barrier. DOE's preference is for FFTF Decommissioning Alternative 2,

under which some below-grade structures would remain; however, these would be grouted in place to immobilize the hazardous constituents. The filled area would then be covered with a modified RCRA Subtitle C barrier to further isolate the entombed structures and prevent infiltration of water. These actions (grouting and barrier placement) would minimize the migration of any contaminants to the environment.

492-4 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

The impacts of the offsite waste in terms of radiological risk are presented in the Summary, Section S.5.5.3, and Chapter 2, Section 2.10, Key Environmental Findings. These sections describe the radiological risk differences between including and not including offsite waste disposal at IDF-East.

The *TC & WM EIS* analysis shows that receipt of offsite waste streams that contain specific amounts of certain isotopes, specifically, iodine-129 and technetium-99, could cause an adverse impact on the environment. Therefore, one means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford. Other mitigation measures, such as recycling secondary-waste streams into the primary-waste-stream feeds within the WTP to increase iodine-129 capture in ILAW and bulk vitrification glass, are discussed in Chapter 7, Section 7.5, of this final EIS.

The current Administration has established a Blue Ribbon Commission on America's Nuclear Future that has issued a report and recommendations for a path forward for managing the country's HLW. DOE's decisions regarding management of Hanford waste will be consistent with Administration policies. For a more comprehensive discussion of this topic, see Section 2.10 of this CRD.

Commentor No. 493: Daniel Swink

From: Daniel Swink [drswink@pacifier.com]
Sent: Monday, May 03, 2010 2:58 AM
To: tc&wmeis@saic.com
Subject: TCWMEIS Comments
Attachments: 2010-5-2 Hanford Draft Tank Closure & Waste Management EIS (TCWMEIS) Comments.doc

Dear Mary Beth Burandt,

Please see the attached word document with comments on the Hanford Draft Tank Closure & Waste Management EIS (TCWMEIS).

Regards,

Daniel Swink

Response side of this page intentionally left blank.

Commentor No. 493 (cont'd): Daniel Swink

May 2, 2010

Mary Beth Burandt
Document Manager
U.S. Department of Energy
Office of River Protection
P.O. Box 1178
Richland, WA 99352
Email: TC&WMEIS@saic.com

RE: Hanford Draft Tank Closure & Waste Management EIS (TCWMEIS) Comments

Attention Mary Beth Burandt and the U.S. Department of Energy:

Given the extensive history of existing and continuing contamination expansion in the Hanford area, I continue to find it unconscionable and completely irresponsible of the government agencies involved, to even consider adding more radioactive waste without containing and cleaning up the existing contamination. *493-1*

Radioactive waste is already spreading through groundwater aquifers to the Columbia River and threatening all the humans, wildlife and plants that depend upon these water sources. The longer the contamination continues to exist and the more waste that is brought in, the greater the irreversible deadly threat that will spread through the various environmental conveyance systems and affect the whole Northwest region and beyond. *493-2*

I demand that the U.S. Department of Energy (DOE) implement the following:

1) Complete clean-up of all 55-million-gallons of radioactive and hazardous tank waste with over 99% retrieval. *493-3*

2) Complete cleanup of any additional tank waste.

3) Complete cleanup of the millions of gallons of nuclear waste that has already leaked into the groundwater and is reaching the Columbia River. *493-4*

4) Complete cleanup of the contaminated soil. *493-5*

5) Drop any proposal to import off-site radioactive or nuclear wastes from other parts of the U.S. or from other locations to Hanford. *493-6*

Thank you for your attention to this matter.

Sincerely,

Daniel Swink
PO Box 61884
Vancouver, WA 98666

493-1 In general, the scope of this *TC & WM EIS* does not include groundwater remediation activity as part of the proposed actions evaluated. DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

493-2 The purpose of this *TC & WM EIS* is to analyze potential impacts of DOE's proposed actions to retrieve and treat the Hanford tank waste; close the Hanford SST system; store and/or dispose of the waste generated from these tank waste activities; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate cleanup at Hanford and other DOE sites. The results of the risk analysis for air and groundwater releases to the Columbia River under the various alternatives include potential impacts on human health (Appendix Q, Section Q.3) and ecological resources (including animals and plants) (Appendix P, Section P.3).

493-3 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the single SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

493-4 As analyzed in this *TC & WM EIS*, 67 of the 149 SSTs at Hanford are known or suspected to have leaked liquid waste to the environment between the 1950s

Commentor No. 493 (cont'd): Daniel Swink

and the present, some of which has reached the groundwater. Estimates of the total leak loss range from less than 2.8 million to as much as 3.97 million liters (750,000 to 1,050,000 gallons). DOE recognizes that groundwater contamination from past leaks is a concern at Hanford and its potential impact on communities downriver from Hanford. One of the purposes of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve waste from the buried tanks, treat and dispose of this waste, and close the SST farms by landfill closure, selective clean closure, or clean closure. This analysis is also intended to aid DOE in making decisions regarding cleanup of the past leaks.

493-5 Comment noted.

493-6 See response to comment 493-1 for a discussion on the transport and disposal of offsite waste.

Commentor No. 494: Paul J. Kollas

From: Paul Kollas [pkkollas@gorge.net]
Sent: Monday, May 03, 2010 12:18 PM
To: tc&wmeis@saic.com
Subject: Hanford and the Draft EIS

I hereby protest against the decision and proposals to import more nuclear and hazardous wastes into the Hanford operation. DOE has a long-standing record of inability to clean up in-place wastes. Adding to the problem with importation of off-site wastes hides the problems of waste disposal. The pressure to "go nuclear power" will increase because of the off-shore oil drilling problem. The as-yet-unsolved problems associated with nuclear power must be faced, and addressed by the public at large. Hiding the wastes at Hanford hides the problem.

Paul J Kollas

494-1

494-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

Nuclear energy production and its resulting waste, as well as renewable energy policies, are not within the scope of this *TC & WM EIS*. Regarding the safe disposal of waste generated from nuclear energy production, the current Administration has established a Blue Ribbon Commission on America's Nuclear Future that has issued a report and recommendations for a path forward for managing the country's HLW. DOE's decisions regarding management of Hanford waste will be consistent with Administration policies. For a more comprehensive discussion of this topic, see Section 2.10 of this CRD.

Commentor No. 495: Nelly Sangrujiveth

From: Nelly Sangrujiveth [nelly@uoregon.edu]

Sent: Monday, May 03, 2010 1:36 PM

To: tc&wmeis@saic.com

Subject: Comments to Hanford draft EIS

Attachments: Comments on Hanford Cleanup draft EIS.docx

To Whom it May Concern,

I've included my comments to the Hanford Cleanup program's draft Environmental Impact Statement in the body of this email below. For your convenience, I've also attached a copy of the comments.

Thank you,

Nelly Sangrujiveth

Response side of this page intentionally left blank.

Commentor No. 495 (cont'd): Nelly Sangrujiveth

Comments to Hanford Cleanup Site EIS — Page - 1

To Whom it May Concern:

I am writing this letter to comment on the Department of Energy's Environmental Impact Statement on the Hanford site. I have been living in the Northwest for 5 years and frequently use the Columbia River for recreational purposes. I understand that the proposed action will greatly affect the lives of current and future generations. My connections to this area and my concern for the environment compel me to write this comment.

After reading the Environmental Impact Statement prepared by the U.S. Department of Energy, I have the following comments:

(1) I urge the Department of Energy to reconsider its proposal to accept off-site waste by considering an alternative to not accept off-site waste altogether; *495-1*

(2) Isupport Washington State's preferred alternative to retrieve 99.9% of waste, as opposed to the Department of Energy preferred alternative to retrieve only 99% of waste; *495-2*

(3) I implore the Department of Energy to reevaluate cumulative impacts this project will have on water resources, which should include ocean water and marine natural resources given the fact that the Columbia River flows into the Pacific Ocean. *495-3*

1. The Hanford Site Should NOT Accept Off-Site Wastes

I am opposed to the Department of Energy's (DOE's) proposal to use the Hanford site as a national radioactive waste dump for off-site wastes; nothing in the Environmental Impact Statement (EIS) justifies using the Hanford site as such. *495-1 cont'd*

a. Health risks posed by off-site wastes are too high and the DOE must analyze the reason for accepting off-site wastes in accordance with NEPA.

Practically speaking, the health risks posed by utilizing the Hanford site as a national radioactive waste dump are too high. Statistics say that utilizing the 200 East landfill as a waste dump will increase radioactive contamination and cancer risk levels over the next thousand years by tenfold; this is 100 times the rate that is acceptable in Washington state's cancer risk standards. Another problem with using Hanford as an off-site waste dump is the health risk of transporting radioactive waste to Hanford. The DOE proposes to truck into Hanford nearly 3 million cubic-feet of radioactive and mixed radioactive wastes. That represents more than 2 trucks a day, every day for over twenty years. In other words, at least 14,600 trucks will be carrying radioactive wastes to the Hanford site on public highways where many privatecitizens risk exposure to radiation. *495-4*

Given the fact utilizing the Hanford site in this manner poses high public health risks, the DOEis obligated to elaborate why it is necessary for the Hanford site to store off-site waste.The National Environmental Policy Act (NEPA) is intended to be a vehicle for informing the public of the fundamental purpose of a project. The Hanford Cleanup project is for the purpose of cleaning up the atomic waste generated by the Department of Defense, and addingoff-site waste to the Hanford site while risking further contamination does not further that purpose. Additionally, under NEPA, 40 C.F.R. § 1502.23, the DOE is required to conduct an analysis to *495-1 cont'd* *495-5*

495-1 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

The purpose of this *TC & WM EIS* is to analyze the potential impacts of DOE's proposed actions to retrieve and treat the Hanford tank waste; close the Hanford SST system; store and/or dispose of the waste generated from these tank waste activities; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate environmental cleanup activities at Hanford and other DOE sites.

495-2 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

495-3 While it is true that past operation of the Hanford production reactors along the Columbia River discharged cooling water containing radionuclides into the river, these practices were phased out over time and were discontinued in 1991 when the last reactor was shut down. As described in Chapter 3, Section 3.2.6.1.1, Surface Water, all radioactive contaminant concentrations measured in the Columbia River in 2009 were lower than applicable DOE derived-concentration guides for ingested water (DOE Order 458.1) and Washington State ambient-surface-water-quality criteria.

495-4 The *Draft TC & WM EIS* analyzes the transportation of RH-LLW from INL to Hanford for disposal. Based on the public's input and concerns about offsite waste disposal at Hanford, DOE has included in this *Final TC & WM EIS* an example of a potential mitigation measure that could be taken by DOE. Specifically, an offsite waste stream containing a significant inventory of

Commentor No. 495 (cont'd): Nelly Sangrujiveth

inform the public and the decisionmaker of the costs and benefits of environmentally different alternatives. Therefore, under NEPA, the DOE is obligated to analyze the cost-benefit of utilizing the Hanford site as an off-site waste dump versus not utilizing the Hanford site in this manner. No such analysis was conducted in the EIS.

495-5 cont'd

b. The EIS failed to give a full and fair disclosure of the health effects accepting off-site waste poses, and this failure violates NEPA.

The EIS categorically excluded children from an analysis of the risks of accepting off-site wastes, which violates NEPA. The EIS's purpose is to foster informed decisionmaking and informed public participation. 40 C.F.R. § 1502.1.To accomplish this, an EIS must take a hard look at a proposal's environmental consequences. See 40 C.F.R. § 1502.2. This entails providing a reasonably thorough discussion of the significant aspects of the probable environmental consequences within the EIS. *Id.*In the Hanford EIS, there was no discussion as to how the health of children will be impacted in utilizing Hanford as an off-site waste dump. Undoubtedly, in transporting waste on public highways, both adults and children will be exposed to radiation that will pose health risks. Children are particularly vulnerable to health risks posed by radiation exposure. According to the American Academy of Pediatrics, children's bodies absorb and metabolize substances differently from adults, which makes them more likely to develop certain cancers from radiation exposure.[1]The Environmental Protection Agency (EPA) has also stated that children are more sensitive to radiation than adults. This is because "children are growing more rapidly [which means] there are more cells dividing and a greater opportunity for radiation to disrupt the process."[2] As a matter of policy, EPA's radiation protection standards take into account the difference in the sensitivity due to age and gender. The DOE must do the same. In leaving out an analysis as to how many children will be exposed and what type of health risks they will suffer, the DOE failed to take a hard look at environmental impact of its proposal and failed to do its duty to provide a fully comprehensive cumulative impacts analysis.

495-6

The EIS also fails to analyze what type of risk will be posed from the consumption of agricultural products that were grown or raised with contaminated water. As the EIS indicated, groundwater will become contaminated from carbon tetrachloride, uranium, radioactive iodine, and other substances. After indicating that these substances in the water are carcinogenic and pose health risks, the EIS provided an analysis of how this will affect drinking-water well users, resident farmers, American Indian Resident Farmers, and American Indian Hunter-Gatherers. Although these population groups are pertinent, it is imperative to also include the population who will consume agricultural products grown with contaminated water as part of a comprehensive EIS. One study states:

495-7

> "Internal irradiation can occur after inhalation of a radioactive gas or ingestion of contaminated food (including produce, grains, and milk from goats or cows that have been grazing on contaminated fields). Radiation effects can be direct, interacting with target tissues; or indirect, producing free radicals or other harmful molecules."

[1] American Academy of Pediatrics, "Radiation Disasters and Children," published in PEDIATRICS Vol. 111 No. 6 June 2003, available at http://aappolicy.aappublications.org/cgi/reprint/pediatrics;111/6/1455.
[2] http://www.epa.gov/rpdweb00/understand/health_effects.html#children

iodine-129 (i.e., RH-LLW resins from INL) was eliminated from the analysis. Implementing this mitigation measure reduced the number of shipments analyzed from about 16,600 in the *Draft TC & WM EIS* to about 14,200 in this *Final TC & WM EIS*, as presented in Chapter 4, Section 4.3.12. This mitigation measure has been incorporated into the Waste Management alternatives. In addition, a sensitivity analysis is included that shows the impacts of limiting offsite waste streams containing iodine-129 and technetium-99. The results of this sensitivity analysis illustrate the difference this would make in potential groundwater impacts and are included in Appendix M. Other mitigation measures, such as recycling secondary-waste streams into the primary-waste-stream feeds within the WTP to increase iodine-129 capture in ILAW and bulk vitrification, are discussed in Chapter 7, Section 7.5, of this EIS.

495-5 DOE disagrees with the commentor. Under "Cost-Benefit Analysis" (40 CFR 1502.23), a Federal agency may prepare a cost-benefit analysis; however, one is not required. Chapter 2, Section 2.11, of this *TC & WM EIS* summarizes and compares the relative consolidated costs of continued operation of existing facilities; construction, operation, and deactivation of new or modified facilities; and associated activities in support of the proposed actions, including administrative controls, institutional controls, and postclosure care.

Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

See response to comment 495-2 regarding future DOE decisions.

495-6 DOE acknowledges that the scientific data indicate that health effects from radiation exposure are more pronounced in children than adults. As discussed in Appendix K, Section K.1.1.6, of this *TC & WM EIS*, a number of authoritative studies provide guidance on risk factors relating health effects to dose. Section K.1.1.6 discusses the scientific evidence relating radiation dose to the incidence of cancers, fatal and nonfatal. The discussion indicates that the fatal cancer risk factor of 0.0006 reflects an age distribution that includes children and is generally regarded as conservative. Appendix Q, Section Q.2.4.2, explains that nuclide-specific risk coefficients, developed using techniques that account for gender and age, were used for the long-term human health impacts analysis.

Commentor No. 495 (cont'd): Nelly Sangrujiveth

In another study that documented radiation exposure in communities that were near the Chernobyl disaster area, "it is estimated that approximately 90 percent of the total lifetime radiation dose to individuals in the population is due to internal exposure to radiation from radiocesium ingested in contaminated foodstuffs."[3] Additionally, the study also found that consumption of locally produced milk and milk products was a significant source of internal radiation exposure.

495-7 cont'd

Studies like these show that it is imperative to analyze radiation exposure through agriculture because consumption of these agricultural products may pose health risks in humans. The EIS should contain an analysis of the cumulative impact of drinking well-water and consuming agricultural products grown with contaminated water or grown near the Hanford site, and not just an analysis of the risk of consuming contaminated ground water.

c. The cumulative impacts of accepting off-site high-level waste must be analyzed within this EIS.

The EIS also failed to fully analyze the cumulative impacts of accepting high-level off-site waste. The EIS briefly noted that the Hanford site is being considered as a candidate location for a new GTCC waste disposal facility; however, the cumulative impacts of including a GTCC disposal facility were not analyzed in conjunction with the current proposals for the Hanford site. Even though the DOE is analyzing impacts of a new GTCC facility within a separate EIS, NEPA requires that the cumulative impacts of both projects be discussed.

495-8

d. NEPA requires that the EIS analyze an alternative of not utilizing the Hanford-site as an off-site waste dump.

The EIS failed to include an alternative of not using Hanford as a national radioactive waste dump in violation of NEPA. Under NEPA, the Department of Energy has the obligation to "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." 40 C.F.R. 1502.14(a). After rigorously exploring all the reasonable alternatives, the Department of Energy "shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 40 C.F.R. § 1502.1. This entails devoting "substantial treatment to each alternative considered in detail," 40 C.F.R. 1502.14(b), and providing a detailed statement that outlines the alternatives. 42 U.S.C. § 4332(2)(C)(iii). Whether an alternative is reasonable depends on whether it is feasible, effective, and consistent with basic policy objectives for the management of an area. *N. Alaska Envtl. Ctr.v. Kempthorne*, 457 F.3d 969, 978 (9th Cir. 2006).

495-9

In this case, the EIS only considers which landfill should be used as a radioactive waste dump for outside sources of waste. This proposal and its alternatives unlawfully fail to consider not using landfills as a waste dump at all. Not using the Hanford Site as a storage area for outside waste is reasonable and promotes the overall objective of this project, which is cleaning

[3] Pavlo Zamostian, et. al., "Influence of various factors on individual radiation exposure from the Chernobyl disaster," Environmental Health: A Global Access Science Source 2002, available at http://www.ehjournal.net/content/1/1/4.

495-7 Chapter 5 of this EIS presents the long-term human health impacts of potential exposures to radionuclides and chemicals. The radiation dose to the population was calculated by multiplying the dose determined for the resident farmer, who uses surface water for drinking water and crop irrigation, by an estimated 5 million people in the downstream population. These results are included in those portions of the text dealing with the long-term human health impacts of each alternative. Details of the analysis are presented in Appendix Q, "Long-Term Human Health Dose and Risk Analysis," which also discusses and presents impacts of exposure to chemicals in the groundwater.

495-8 Regarding the commentor's concern about the inclusion of GTCC LLW in this *TC & WM EIS*, DOE has included information from the *Draft GTCC EIS* in the *Final TC & WM EIS* cumulative impacts analysis. For a more comprehensive discussion on GTCC LLW, see Sections 2.1 and 2.12 of this CRD.

495-9 See response to comment 495-1 for a discussion on the transport and disposal of offsite waste.

Commentor No. 495 (cont'd): Nelly Sangrujiveth

up nuclear waste. The purpose of this cleanup project is to ensure that "appropriate response action" is taken as "necessary to protect the public health, welfare and the environment." The Tri-Party Agreement, Article III.14.A. This objective will be accomplished by prohibiting off-site waste from being store at the Hanford site since without the excess waste, there is less probability of leakage or further contamination of the site and the Columbia River.

495-9 cont'd

2. 99.9% of the Wastes Should be Retrieved

The waste contamination problem at Hanford has been lingering for too long. As the Government Accountability Office noted in its 2004 audit report on the Hanford site, "[s]ome of the radioactive components can be very mobile in the environment and, if not checked, may migrate quickly to contaminate soils and groundwater."[4] With this in mind, the cleanup project should be as effective and efficient as possible. A plan to clean less than 99.9% of the waste is an incomplete cleanup and does not accomplish the public's desire to restore the environment.

495-2 cont'd

3. Impacts of to Marine Resources Shouldbe Examined Further

The EIS neglects to analyze environmental impacts contamination will have on marine resources. Groundwater is hydrologically connected to the Columbia River, which flows into the Pacific Ocean. As the EIS noted, seepage of groundwater into the Columbia River has been documented along the Hanford Reach and occurs both below the river surface and on the exposed riverbank. Contaminants originating at Hanford have been documented in some of these discharges along the Hanford Reach. Because the river water will eventually flow into the Pacific Ocean and because contaminants will be found within salmonids, which are andronomous species, it is likely that contaminants will reach ocean waters and cumulatively impact marine resources. That possibility should be explored in the EIS.

495-3 cont'd

Additionally, contamination of ocean waters should be analyzed in context of the cumulative impacts of man-made climate change and ocean acidification. The United Nations Environment Programme has acknowledged that the ocean serves as a controller of climate change by absorbing greenhouse gases.[5] Sea grasses, mangroves and salt marshes are among several marine and coastal ecosystems that act as natural defenses and water purification systems. If these systems are compromised by land use practices that leach contaminants into the streams, rivers, and oceans, humanity will lose the ocean as a resource to combat climate change. The UNEP Executive Director Achim Steiner has stated:

495-10

[4] GAO-04-611 "Hanford Waste Treatment Project," June 2004.

[5] UNEP, "Ocean Acidification from CO2 Emissions Causes Substantial Irreversible Damage to Ocean Ecosystems," available at, http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=606&ArticleID=6417&l=en&t=long.

495-10 DOE has reviewed and revised, as necessary, its analyses on the effects of climate change on various resources at Hanford and the possible effects on environmental impacts of the *TC & WM EIS* alternatives. As described in Chapter 6, Section 6.3.4, DOE has reviewed climate studies that forecast general trends in Hanford regional climate change. However, there are no reliable methodologies for projections of specific future climate changes in the Hanford region, and thus such changes have not been quantified in this EIS. To account for this uncertainty, Appendix O, Section O.6.2, describes the effects of enhanced infiltration such as that which may occur during a wetter climate. In the *Draft TC & WM EIS*, Appendix V focused on the potential impacts of a rising water table from a proposed Black Rock Reservoir. Following the retraction of this proposal, the focus of Appendix V was changed in this final EIS to analysis of potential impacts of infiltration increases resulting from climate change under three different scenarios. Appendix V includes sensitivity analyses of potential impacts at Hanford that could result from climate changes that may increase model boundary recharge parameters and the rise of the groundwater table. Additional qualitative discussion of the potential effects of climate change on human health, erosion, water resources, air quality, ecological resources, and environmental justice has been added to Chapter 6 of this final EIS. Additional discussion of the types of regional climate change that could be expected has also been added to Chapter 6, Section 6.5.2, Global Climate Change. The potential impacts of the alternatives on climate change are addressed in Chapter 6, Section 6.5.2, and Appendix G, Section G.5, of this *TC & WM EIS*.

Commentor No. 495 (cont'd): Nelly Sangrujiveth

"If the world is to decisively deal with climate change, every source of emissions and every option for reducing these should be scientifically evaluated and brought to the international community's attention."[6]

One of the biggest challenges to maintaining balance within ocean ecosystems is ocean acidification. A study conducted by the Convention on Biological Diversity shows that:

"[i]ncreasing ocean acidification will mean that by 2100 some 70% of cold water corals, a key refuge and feeding ground for commercial fish species, will be exposed to corrosive waters. In addition, given the current emission rates, it is predicted that the surface water of the highly productive Arctic Ocean will become under-saturated with respect to essential carbonate minerals by the year 2032, and the Southern Ocean by 2050 with disruptions to large components of the marine food source, in particular those calcifying species, such as foraminifera, pteropods, coccolithophores, mussels, oysters, shrimps, crabs and lobsters, which rely on calcium to grown and mature."[7]

495-10 cont'd

The EPA also takes the position that marine resources need to be preserved and that water pollution contributing to ocean acidification should be regulated. As defined by EPA, "ocean acidification refers to the decrease in the pH of the Earth's oceans caused by the uptake of carbon dioxide from the atmosphere."[8]Section 304(a)(1) of the Clean Water Act requires EPA to develop and publish and periodically revise criteria for water quality to accurately reflect the latest scientific knowledge. In revising its water quality standards, the EPA is currently taking into account ocean acidification and plans to implement a policy pursuant to Section 304(a)(2) of the Clean Water Act.

The ocean is an important resource and any further contamination that compromises its ecosystems could lead to significant cumulative impacts. The DOE is obligated to note these cumulative impacts in its EIS.

We should keep in mind the fact that his project is officially known as the River Protection Project. The Columbia River flows through the site and this cleanup project is designed in part to keep contamination from reaching the river.

Sincerely,

Nelly Sangrujiveth

[6] Earth Times, "Indonesia, UN launch ocean climate initiative – Summary," http://www.earthtimes.org/articles/show/311193,indonesia-un-launch-ocean-climate-initiative--summary.html#ixzz0htEvOjMp.
[7] http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=606&ArticleID=6417&l=en&t=long
[8] See, Federal Register: April 15, 2009 (Volume 74, Number 71, page 17484-17487).

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Commentor No. 496: John Berry

From: John Berry [berryj1@seattleu.edu]

Sent: Monday, May 03, 2010 2:38 PM

To: tc&wmeis@saic.com

Subject: EIS Comment

Attachments: Hanford COmment.doc

Please find my comment to the TC & WM EIS attached.

John Berry
Seattle University School of Law
Class of 2010
(xxx)xxx-xxxx
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Response side of this page intentionally left blank.

Commentor No. 496 (cont'd): John Berry

John Berry
525 Belmont Ave E, Apt. 3C
Seattle, WA 98102

United States Department of Energy
TC & WM EIS
P.O. Box 1178
Richland, WA 99352

April 11, 2009

To Whom It May Concern:

I am writing to comment on the U.S. Department of Energy's (DOE's) *Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington (TC & WM EIS)*. This document discusses the potential environmental impacts of several aspects of the ongoing cleanup of the Hanford Site: tank closure, Fast Flux Test Facility (FFTF) decommissioning, and waste management. While the EIS presents a plethora of issues worthy of comment, my comments today will focus on the potential impacts of these cleanup activities on federally listed threatened and endangered species, specifically Columbia River Chinook and Steelhead salmon.

Endangered Species Act Duty to Consult

Section 7 of the Endangered Species Act ("ESA") is the heart of the ESA's protections related to federal actions. It imposes a strict substantive and procedural duty on federal agencies to ensure that their activities do not cause jeopardy to listed species or adverse modification to their critical habitat.[1] Not satisfied that federal agencies possessed the requisite expertise to satisfy this substantive requirement on their own, Congress added a strict procedural requirement – that the determination of whether any federal action would be likely to cause jeopardy or adverse modification would be made

[1] 16 U.S.C. § 1536(a)(2)

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Commentor No. 496 (cont'd): John Berry

"in consultation with and with the assistance of [the Services]."[2] This mandatory consultation is the key to Section 7; in fact, Congress titled Section 7 "Interagency Cooperation."

The ESA mandates such consultations to insure that an agency action "is not likely to jeopardize the continued existence of any" listed species or adversely modify their critical habitat.[3] The joint consultation regulations require such consultations whenever an action "may affect" a listed species.[4] Where an action is "likely to adversely effect" a listed species, the agency must, in the case of anadromous fish species, conduct formal consultation with the National Oceanic and Atmospheric Administration (NOAA). The end product of formal consultation is a biological opinion in which NOAA determines whether the action will cause jeopardy to the species or adversely modify designated critical habitat.[5]

In the joint consultation regulations, NOAA and the United States Fish and Wildlife Service (USFWS) have established a preliminary review process that can be used to sidestep formal consultation in limited situations. For all actions that "may affect" a listed species, the action agency must determine whether the action is "likely to adversely affect" or "not likely to adversely affect" the listed species.[6] The threshold for such a determination is very low.[7] An action that is "likely to adversely affect" a listed species or its critical habitat must undergo formal consultation that culminates with the Services' issuance of a biological opinion that complies with the ESA and regulatory

[2] *Id.*
[3] *Id.*
[4] *See* 50 C.F.R. § 402.14.
[5] 16 U.S.C. § 1536(b)
[6] 50 C.F.R. § 402.14(a)-(b)
[7] *See* 51 Fed. Reg. 19,926, 19,949 (June 3, 1986) (stating "Any possible effect, whether beneficial, benign, adverse or of an undetermined character, triggers the formal consultation requirement…").

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requirements.[8]

Under the joint regulations, a "not likely to adversely affect" determination can lead instead to an informal consultation, which consists of all discussions and communications between the agencies and ends with the Services' written concurrence in that determination.[9] If NMFS does not concur, the action is deemed "likely to adversely affect" and the agencies must conduct a formal consultation.[10] Utilization of informal consultation is optional in those instances where it is available.

An agency may avoid "consultation only when it has determined the proposed action is unlikely to adversely affect the protected species or habitat *and* the [regulatory agency] concurs with that determination."[11]

Among the forty-three species of fish present in the Hanford Reach are several endangered species, including the Upper Columbia River spring-run Chinook salmon and steelhead ESUs. Spring-run Steelhead trout (*Onchorhynchus mykiss*) spawning has been observed near gravel bars in the Hanford Reach from the 100-BC operable unit to wooded island. While spring-run Chinook salmon (*Onchorhynchus tshawytscha*) have not been documented spawning in the Hanford Reach, juveniles pass through the area during migration.[12] Additionally, incidental occurrences of other fish species listed as threatened under the ESA, including Middle Columbia River ESU Steelhead, Snake River Basin Steelhead, Snake River Fall Run Chinook, and Snake River Spring/Summer Run Chinook, have been documented in the Hanford Reach.[13]

[8] *Id.* at §§ 402.02, 402.14(a)
[9] *Id.* at § 402.13
[10] *Id.* at §§ 402.02, 402.14(a).
[11] *Tinoqui-Chalola Council of Kitanemuk v. U.S. Dept. of Energy*, 232 F3d 1300 (9th Cir. 2000) (citing 50 C.F.R. § 402.14(b)) (emphasis added).
[12] *Threatened and Endangered Species Management Plan*, Department of Energy, DOE/RL 2000-27.
[13] *Interim Remedial Action ROD for 100-NR1 and 100-NR2 Operable Units* (September 1999).

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Commentor No. 496 (cont'd): John Berry

The TC & WM EIS indicates that DOE has engaged in informal consultation with the USFWS and NOAA regarding the potential impacts of the cleanup actions on endangered species.[14] The documents contained in Appendix C, however, fail to establish that DOE has met its consultation duty under Section 7 of the ESA. In Appendix C, DOE presents letters sent to USFWS and NOAA in 2003 asking for lists of endangered species that could be affected by the proposed actions. The documents indicate that DOE did not receive a response from USFWS or NOAA. These communications simply do not satisfy Section 7 requirements.

An agency may avoid "consultation only when it has determined the proposed action is unlikely to adversely affect the protected species or habitat *and* the [regulatory agency] concurs with that determination." *Tinoqui-Chalola Council of Kitanemuk v. U.S. Dept. of Energy*, 232 F3d 1300 (9th Cir. 2000)(citing 50 C.F.R. § 402.14(b)) (emphasis added). In its communications with NOAA, DOE did not make a determination that the proposed action is unlikely to affect protected salmonid species. Indeed, DOE even stated that "activities covered by the EIS may impact the Columbia River and its fisheries' references due to leaks from the tanks reaching the river via the groundwater pathway."[15] Furthermore, even had such a determination that the actions were unlikely to adversely affect protected species or habitat been made, Appendix C suggests that neither USFWS or NOAA made any statement concurring with such a determination. As such, DOE has not yet consulted with USFWS or NOAA, formally or informally, regarding the impacts of the proposed action in the *TC & WM DEIS* on endangered species.

496-1

[14] See *TC & WM DEIS*, Section 3.2.7.4.
[15] *TC & WM DEIS*, Appendix C at 43.

Berry - 4

496-1 In 2003, DOE initiated informal consultation with USFWS and NMFS, as well as the State of Washington, at a time when the proposed scope of this EIS was limited to the retrieval, treatment, and disposal of tank waste and closure of SSTs. However, since that time, the scope of this EIS has been expanded to include decommissioning of FFTF and waste management. Accordingly, DOE reinstituted informal consultation with USFWS, NMFS, and the state in 2008 (see Appendix C, Section C.2.1). While responses to consultation letters were received from the state, none was received from USFWS or NMFS (see Appendix C, Section C.2.3). Each agency was also provided a copy of the *Draft TC & WM EIS*; however, whereas USFWS commented on the document, NMFS did not. It should be noted that neither the 2003 nor 2008 letter to NMFS implied that the proposed actions "may affect" Columbia River resources, but rather sought information from the agency concerning what species DOE should consider in its analysis. In addition, while the *Threatened and Endangered Species Management Plan, Salmon and Steelhead* (DOE 2000b) defines DOE's commitment to stocks of steelhead and spring Chinook salmon, it was not used to support DOE's position relative to the commentor's statement.

Potential long-term impacts on salmonids of actions taken under the various alternatives presented in this *TC & WM EIS* are addressed in Appendix P, Section P.3. The analysis indicates that chromium is the only COPC that could have a potential toxic effect on salmonids (i.e., the Hazard Quotient was above 1 under all Tank Closure alternatives, including No Action, and some Waste Management alternatives). However, it should be noted that there is virtually no difference between the Tank Closure action alternatives and the No Action Alternative, indicating that a source(s) other than the tank farms is contributing significantly to the results. Further, when Hazard Quotients for chromium under Alternative Combinations 2 and 3 are compared with values that include Alternative Combinations 2 and 3 plus nontank sources (i.e., cumulative impacts), it can be seen that the Hazard Quotient of the latter is approximately 10 times that of the former (see Chapter 6, Section 6.4.3), again indicating that a source(s) other than the tank farms is contributing the majority of chromium at the Columbia River. Analysis has shown that the majority of chromium comes from the 100-K Mile-Long Trench, 216-C-1 Hot Semi Work Crib, 216-S-8 Trench, and certain ponds in the 200-West Area and 300 Area. Considering that the actions proposed in this *TC & WM EIS* would not be the major contributors to a Hazard Quotient that is greater than 1 for chromium at the Columbia River, they cannot lead to a finding of "may affect" relative to threatened or endangered

Commentor No. 496 (cont'd): John Berry

Accordingly, any actions taken under the *TC & WM DEIS* would violate the procedural requirements of Section 7 of the ESA.

DOE should consult with USFWS and NOAA before completing the Final TC & WM EIS. As DOE has recognized, the actions proposed in the draft *TC & WM EIS* "may affect" endangered spring-run Steelhead trout and spring-run Chinook salmon because of leaks from the tanks reaching the Columbia River via groundwater pathways. Additionally, the proposed actions "may affect" these endangered Columbia River species because of the potential impacts of the transportation of radioactive waste to and from the Hanford site.

Each of the proposed actions may affect the water quality of the Columbia River, and, by doing so, affect endangered salmon species. The tank closure decision, whether to cleanup 90%, 99%, or 99.9% of the High-Level Nuclear Waste contained in the shells and tanks at Hanford, could affect endangered salmon because of the varying amounts of contaminants that could leach into the Columbia River via groundwater pathways. Likewise, the FFTF decommissioning decision could impact endangered salmon because of the risks of accident or terrorist activities created by transportation of contaminated FFTF parts to the Idaho National Laboratory. A transportation spill adjacent to the Columbia River could have enormous impacts on endangered salmon. Similarly, the waste management proposals – specifically, the decisions to store off-site waste at Hanford – could impact endangered salmon because of transportation risks created by moving off-site low-level radioactive wastes to Hanford for disposal. The transportation routes to the Hanford site are in close proximity to the river, and the potential effects of

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496-1 cont'd

species, or critical habitat, associated with the river. Thus, further consultation with NMFS is not indicated.

It should be noted that the analyses of impacts on threatened and endangered species presented in this *TC & WM EIS* address construction and normal operations. Any analyses of potential impacts of accidents would be highly speculative, considering the very low probability of an accident (see Chapter 4, Section 4.1). Regardless of the source(s) of the chromium, a Hazard Quotient above 1 does not necessarily indicate a high risk to aquatic biota, including salmonids, at the Columbia River. The assumptions applied to the analyses are conservative. For example, the chromium toxicity reference value for hexavalent chromium used to calculate the salmonid Hazard Quotient was the sensitive species test effect concentration affecting 20 percent of the test population (EC20). Further, hexavalent chromium is more toxic than the trivalent form, which is more likely to occur in oxygenated aquatic environments. Additionally, the modeled concentrations in nearshore surface water and sediment overestimate risk because they assume that all groundwater discharge would occur within the 40-meter (130-foot) nearshore zone, when in reality groundwater would likely discharge over a larger area of the riverbed and, therefore, would be more diluted. Thus, while hexavalent chromium Hazard Quotients were used to compare the alternatives, they should not be used as the sole basis for concluding that ecological resources at the Columbia River would be adversely impacted.

Commentor No. 496 (cont'd): John Berry

transportation accidents or terrorist incidents on endangered should be properly examined.

DOE has, in the past, responded to public comments regarding the duty to consult with NOAA and USFWS by claiming that the 2000 *Threatened and Endangered Species Management Plan, Salmon and Steelhead*[16] created in 2003 fulfills DOE's requirements under Section 7 of the ESA. However, this document does not consider any site or action specific effects of DOE actions. Rather, the document simply speaks in generalities about potential effects on listed species from unspecific actions and efforts made by DOE to limit additional adverse impacts. Significantly, the Plan was not submitted to NMFS for a concurrence finding as required by the ESA implementing regulations.[17] The Plan clearly fails to meet the ESA's requirements for consideration of action-specific effects on listed species and should not be considered a site-wide or action-specific consultation document.

Given the presence of endangered salmon and the potential effects of cleanup actions on the water quality of the Columbia River, I believe that DOE has a duty to consult under Section 7 of the ESA. The proposed actions relating to the tank closures, FFTF decommissioning, and waste management at the Hanford site "may affect" endangered salmon in the Columbia River. As such, I hope that DOE will fulfill its Section 7 duty by consulting with NOAA before taking any of the actions proposed in the *TC & WM EIS*.

496-1 cont'd

[16] *Salmon and Steelhead Management Plan*, Department of Energy, DOE/RL 2000-27
[17] 50 C.F.R. § 402.13

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Commentor No. 496 (cont'd): John Berry

Thank you for providing the opportunity to comment on the *TC & WM EIS* and for extending the comment period. I look forward to receiving your response to this comment.

Sincerely,

John Berry

525 Belmont Ave E
Apt. 3C
Seattle, WA 98102

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Commentor Number 497 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 499.

Commentor No. 498: Jane A. Hedges, Program Manager, Nuclear Waste Program, Washington State Department of Ecology

From: Dahmen, Lois (ECY) [ldah461@ECY.WA.GOV]
Sent: Monday, May 03, 2010 3:00 PM
To: tc&wmeis@saic.com
Cc: Dahl, Suzanne (ECY)
Subject: Comments on Draft TC & WM EIS
Attachments: Letter & Comments on Draft EIS - 04-30-2010.pdf

Here are the Washington State Department of Ecology's comments on the draft EIS, including a cover letter.

Lois K. Dahmen

Program Manager's Assistant
Nuclear Waste Program – Richland
Department of Ecology
xxx-xxx-xxxx

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Commentor No. 498 (cont'd): Jane A. Hedges, Program Manager, Nuclear Waste Program, Washington State Department of Ecology

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
3100 Port of Benton Blvd • Richland, WA 99354 • (■■■) ■■■-■■■■

April 30, 2010

Ms. Mary Beth Burandt, Document Manager
Office of River Protection
U.S. Department of Energy
P.O. Box 1178
Richland, Washington 99352

Re: Washington State Department of Ecology's Review of *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site*, Richland, Washington, DOE/EIS-0391, dated October 2009

The Washington State Department of Ecology (Ecology) reviewed the *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site* (Draft EIS). This Draft EIS is important in defining options for the cleanup of Hanford's tank waste and disposal of waste at Hanford. This letter provides Ecology's general comments about the content of the Draft EIS. The enclosure provides more specific comments.

We are requesting changes in the Final EIS. These changes will provide more specific analyses to support upcoming permitting decisions we must make. Without the analyses, we will lack information important to us in framing permits and making decisions about cleanup.

Cooperating Agency

As a cooperating agency in the development of this Draft EIS, Ecology provided our perspectives in a Foreword that appears in the *Readers Guide* and the *Summary*. Those perspectives were based on our reviews of a pre-decisional draft in November 2008. After reviewing this draft Tank Closure &Waste Management (TC&WM) EIS, we have developed further perspectives and specific comments.

We think the data gathering, modeling, and quality assurance were conducted in an adequate manner and the Draft EIS objectively analyzes and predicts the impacts of the reasonable alternatives and the cumulative inventory. Overall, we note that the quality of the Draft TC&WM EIS analyses improved from those we reviewed in the Hanford Solid Waste EIS. In particular:

- The United States Department of Energy (USDOE) improved the quality assurance and quality control of the data that the EIS contractor used to analyze impacts to the groundwater.

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Commentor No. 498 (cont'd): Jane A. Hedges, Program Manager, Nuclear Waste Program, Washington State Department of Ecology

- USDOE improved the integration of analyses of all waste types that may be disposed in Hanford landfills. This change will address ongoing and proposed waste management activities in the Hanford Solid Waste Environmental Impact Statement.
- USDOE improved the quality of the cumulative impact analyses to include wastes already adversely affecting the environment from past releases and disposal practices.

Mitigation Measures Required

We note that certain combinations of alternatives in the Draft EIS are more protective of human health and the environment than other alternatives appearing in this document. It is significant that none of the Draft EIS alternatives bring impacts to acceptable cancer risk levels or meet the safe drinking water standards. However, the Draft EIS is helpful in pointing out the important fact that more effective cleanup is needed across the Central Plateau.

It is our intent to be able to adopt all or part of the Final EIS to meet our State Environmental Policy Act (SEPA). We would use the adopted portions as our basis to take permit actions necessary to advance Hanford cleanup. However, we could not adopt the EIS "as is" because it lacks an analysis that determines how much USDOE must reduce the total Hanford mobile inventory to be protective of the State's groundwater resources. ***498-1***

We request that you develop an analysis that establishes inventory reduction goals and discusses achievable mitigation measures to reach those goals. We request that you include this analysis in the Final EIS and include your methods to achieve the goals in the Record of Decision. The inventory reduction goals would then be the basis for specific mitigation measures discussed and committed to in the USDOE Mitigation Action Plan.

SEPA authorizes Washington State to require mitigation measures in its permitting actions. We intend to establish enforceable conditions in permits to ensure that the USDOE completes mitigation measures. Ecology requests the following items to support mitigation:

- To better inform all of the Tri-Parties Agreement (TPA) agencies, we propose adding enforceable milestones to the TPA for USDOE to develop and maintain a cumulative impact assessment (risk budget) tool. Before any waste disposal plans or cleanup decisions become final, USDOE would evaluate each action to determine its contribution to cumulative impacts. Ecology will also propose milestones for all land disposal facilities that require performance assessments using a process similar to that used for Waste Management Area C. ***498-2***
- Any Mitigation Action Plan must identify distinct approaches for near-term impacts (50-100 years), mid-term impacts (1000 – 5000 years), and long-term impacts (7000 -10,000 years). USDOE should submit the Mitigation Action Plan to Ecology for review and comments. ***498-3***

498-1 The intent of the EIS process is to analyze the range of reasonable alternatives that provides some comparative quality between alternatives so that sound decisions can be made in the future. As discussed in Chapter 5 of this *TC & WM EIS*, DOE acknowledges that "benchmark standards" could be exceeded in groundwater at the Core Zone Boundary and/or at the Columbia River nearshore at various dates. The term "benchmark standards" as used in this *TC & WM EIS* represents dose or concentration levels that correspond to known or established human health effects. For groundwater, the benchmark is the MCL, provided an MCL is available. Ecology may impose additional mitigation measures through future permitting processes or remedial actions under the scope of the TPA.

In response to comments received on the *Draft TC & WM EIS* concerning potential long-term impacts on groundwater resources, additional sensitivity analyses were performed and are included in this final EIS. The additional analyses evaluate the potential impacts if certain remediation activities were conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. Furthermore, sensitivity analyses that evaluate improvements in IDF performance (e.g., infiltration rates) and in secondary- and supplemental-waste-form performance (e.g., release rates) were performed and are included in this final EIS. Chapter 7, Section 7.5, was added to discuss and summarize these results. The results of these analyses will aid DOE in formulating an appropriate mitigation action plan subsequent to this EIS and its associated ROD and in prioritizing future Hanford remedial actions that would be protective of human health and the environment and would reduce long-term impacts on groundwater. As referenced in the Section 7.5.2.8 discussion, DOE has drafted a roadmap that implements a strategy for the development of better-performing secondary-waste forms.

498-2 DOE is receptive to suggestions to improve the process of evaluating waste disposal and cleanup plans, but reserves the right to evaluate the details of any such suggestions before making a final decision. DOE performed a sensitivity analysis to evaluate the potential impacts if certain remediation activities were conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. The goal of the sensitivity analysis is to help DOE, EPA, and Ecology prioritize cleanup efforts in the future. This analysis is provided in Appendix U of this EIS and is discussed further in Chapter 7, Section 7.5. Ecology may also impose additional performance milestones through future permitting processes or RCRA/CERCLA remedial actions within the scope of the TPA.

Commentor No. 498 (cont'd): Jane A. Hedges, Program Manager, Nuclear Waste Program, Washington State Department of Ecology

Ms. Mary Beth Burandt
April 30, 2010
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Ecology will take the following actions to support mitigation:

- Ecology will put specific conditions in dangerous waste permits to mitigate past releases to the soils and to inhibit releases in the future.
- When we issue a SEPA Determination of Significance and a Notice of Adoption, we will list the sections of the Final EIS we are adopting. The adoption will be contingent upon our review of the USDOE Mitigation Action Plan.

Areas of Concern for Ecology

- Offsite waste disposal, as proposed in the Draft EIS, results in significant groundwater impacts. The Final EIS alternatives that consider disposal of offsite waste at Hanford should be eliminated. ***498-4***
- The preferred alternative for Supplemental Treatment should be a second low activity waste (LAW) vitrification facility. The other alternative waste forms are not protective of groundwater and not as "good as LAW glass." ***498-5***
- Disposal of secondary waste derived from treatment of tank waste must be mitigated to avoid unacceptable adverse impact to the groundwater. ***498-6***
- Future landfill disposal was analyzed in the Draft EIS. For the scenarios selected for analysis, disposal in the 200 East Area appears to be more protective of human health and the environment than disposal in the 200 West Area, because the contaminants concentration disperse more quickly in 200 East.
- Because the residual tank waste contributes significantly to future groundwater impacts, mitigation must include retrieval of tank waste to the maximum extent possible. Tanks should be retrieved to the limits of technology or at least 99 percent removal, whichever results in greater retrieval. ***498-7***
- If Landfill Closure is to be used, it will need to be augmented with significant corrective actions to the vadose zone, including the deep vadose zone, to avoid unacceptable future impacts. ***498-8***
- To avoid recontamination of the groundwater and unacceptable future impacts, some past practice units in the Central Plateau will need more extensive remediation than was assumed in the Draft EIS. ***498-9***

Ecology, the USDOE, and the United States Environmental Protection Agency are discussing a sensitivity scenario in the Final EIS. That scenario will illustrate reduction of inventory through mitigation for inclusion in the Final EIS. Ecology is encouraged by USDOE's willingness to develop this scenario.

498-3 Chapter 7, Section 7.1, discusses potential mitigation measures that could be used to avoid or reduce adverse environmental impacts associated with implementation of the alternatives. In response to comments received on the *Draft TC & WM EIS* concerning these potential impacts on groundwater resources, additional sensitivity analyses were performed and are included in this final EIS. Consequently, the discussion found in Section 7.5 was added to summarize these results and appropriate mitigation measures. The sensitivity analyses and mitigation discussion recognize that an appropriate mitigation action plan would involve different strategies for mitigating short-, mid-, and long-term impacts. Following issuance of this *Final TC & WM EIS* and its associated ROD, DOE is required to prepare a mitigation action plan that addresses mitigation commitments expressed in the ROD.

498-4 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

The impacts of offsite waste in terms of radiological risk are presented in the Summary, Section S.5.5, and Chapter 2, Section 2.10, Key Environmental Findings. These sections discuss the radiological risk differences between including and not including offsite waste disposal at IDF-East. The *TC & WM EIS* analysis shows that receipt of offsite waste streams that contain specific amounts of certain isotopes, specifically, iodine-129 and technetium-99, could cause an adverse impact on the environment. Therefore, one means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford. Other mitigation measures, such as recycling secondary-waste streams into the primary-waste-stream feeds within the WTP to increase iodine-129 capture in ILAW and bulk vitrification glass, are discussed in Chapter 7, Section 7.5, of this final EIS.

498-5 Comment noted.

498-6 See response to comment 498-4 regarding mitigation and associated sensitivity analyses included in this final EIS. As referenced in the Chapter 7, Section 7.5.2.8, discussion, DOE has drafted a roadmap that implements a strategy for the development of better-performing secondary-waste forms.

Commentor No. 498 (cont'd): Jane A. Hedges, Program Manager, Nuclear Waste Program, Washington State Department of Ecology

Ms. Mary Beth Burandt
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Ecology regards this Draft EIS as a useful resource, but we will continue to require additional modeling and evaluation for specific tasks before we make permitting decisions. We would like to discuss our comments and concerns with you. Please call Suzanne Dahl at 509-372-7892 to begin discussions.

Sincerely,

Jane A. Hedges
Program Manager
Nuclear Waste Program

Enclosure

cc w/enclosure:
Dennis Faulk, EPA
Shirley Olinger, USDOE
Bill Taylor, USDOE
Stuart Harris, CTUIR
Gabriel Bohnee, NPT
Russell Jim, YN
Susan Leckband, HAB
Ken Niles, ODOE
Administrative Record: TC&WM EIS
Environmental Portal
USDOE-ORP Correspondence Control

498-7 As discussed in Chapter 2, Section 2.12.1, DOE prefers the range of Tank Closure alternatives that would remove at least 99 percent of the tank waste. Note that at least 99 percent of the tank waste would be removed under all of the Tank Closure alternatives except the No Action Alternative and Alternative 5 (90 percent removal).

498-8 The scope of this *TC & WM EIS* includes decisions on storage, retrieval, treatment, and disposal of tank waste and the closure of the SST system. This closure includes the tank system along with the vadose zone as impacted by the tank farms (i.e., past leaks). The *TC & WM EIS* Tank Closure alternatives considered for the tank farm include no action, landfill closure, selective clean closure, and clean closure, which would involve actions to remove the source of contamination. Landfill closure could include corrective actions to address vadose zone contamination. In particular, Tank Closure Alternative 4 addresses selective clean closure, which would involve both landfill closure and clean closure of specific tank farms (i.e., BX and TX tank farms).

DOE received comments on the potential impacts of future remediation activities that are in various stages of planning (which, given the inherent uncertainty, were not included in the cumulative impacts analysis). In response, DOE performed a sensitivity analysis to evaluate the potential impacts if certain remediation activities were conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor and at other tank farms than those included in Tank Closure Alternative 4. The goal of the sensitivity analysis is to help DOE, EPA, and Ecology prioritize cleanup efforts in the future. This analysis is provided in Appendix U of this EIS and is discussed further in Chapter 7, Section 7.5.

498-9 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

Commentor No. 498 (cont'd): Jane A. Hedges, Program Manager, Nuclear Waste Program, Washington State Department of Ecology

Washington State Department Ecology
Specific Comments on the Draft Tank Closure and Waste Management Environmental Impact Statement

General Comments

1. The Washington State Department of Ecology (Ecology) is a Cooperating Agency with the United States Department of Energy (USDOE) for the Draft Tank Closure and Waste Management Environmental Impact Statement (Draft EIS). We have actively participated in the process for the EIS since its initial development. We provided guidance, reviewed data, and participated in briefings to the public. We also provided detailed comments on the pre-decisional draft of the EIS, participated in the comment resolution process, and agreed with the resolution of our comments.

   Based on our reviews, the independent reviews of our consultant, the review of the Model Technical Review Group used by USDOE's EIS contractor, and the Government Accountability Office's review, Ecology agrees that the data used are adequate, that adequate Quality Assurance (QA) procedures are in place to control changes, and that the EIS contractor implemented the procedures correctly.

2. Ecology believes the inventories that the modelers used are reasonable. They could be higher in some cases, but lower in others; overall, they are probably fairly close.

3. Ecology requests that USDOE's EIS contractor insert into the Summary more of the tables and graphs that depict long-term impacts in Chapter 5. We also request that in the Summary, the contractor summarize the discussion about these constituents that appears in Chapter 5. *498-10*

4. On page S-6, the retrieval goal of the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement or TPA) is misstated. The language should be changed to match the TPA. The TPA's retrieval goal is 99% or as much as is technically possible – whichever results in greater retrieval. Thus, the goal is as much as technically possible beyond the 99%. *498-11*

5. USDOE did not select the final preferred alternative in the Draft EIS. However, USDOE stated that TPA requirements for retrieval will be preferable, that it must provide treatment for secondary wastes before disposal, and that it prefers to construct an additional disposal facility in the East Area on the Central Plateau. In addition, the Draft EIS shows that disposal of off-site waste at the Hanford Site will have significant adverse impacts, and the agency will be extending its moratorium on the receipt of off-site waste shipments. Ecology agrees with the actions that the Draft EIS presented as USDOE preferences (except for USDOE preference on supplemental treatment). With respect to off-site waste, Ecology requests that USDOE include in the Final EIS and adopt in a record of decision (ROD) a preferred alternative to not dispose of any off-site waste at Hanford. *498-12*

April 30, 2010 Page 1

498-10 In response to comments that there was not enough summary information on long-term impacts in the draft EIS, DOE added a more extensive discussion of long-term impacts analysis to the Summary of this *Final TC & WM EIS*.

498-11 The language has been revised as follows: "...closure will follow retrieval of as much tank waste as technically possible, the goal being at least 99 percent."

498-12 Consistent with the CEQ regulations (40 CFR 1502.14(e)), DOE has identified its Preferred Alternatives for tank closure, FFTF decommissioning, and waste management in this final EIS, except for a preferred alternative regarding supplemental treatment for LAW. DOE believes it is beneficial to study further the potential cost, safety, and environmental performance of supplemental treatment technologies. DOE is committed to meeting its obligations under the TPA regarding supplemental treatment for LAW. When DOE is ready to identify a preferred alternative regarding supplemental treatment for LAW, this action will be subject to NEPA review as appropriate.

See response to comment 498-4 for a discussion on the transport and disposal of offsite waste, as well as mitigation and associated sensitivity analyses included in this final EIS.

Commentor No. 498 (cont'd): Jane A. Hedges, Program Manager, Nuclear Waste Program, Washington State Department of Ecology

Washington State Department Ecology
Specific Comments on the Draft Tank Closure and Waste Management Environmental Impact Statement

Groundwater Modeling

1. Based on reviews by Ecology and its consultant (Shannon and Wilson), we think that the modeling is adequate for the purposes of the EIS.
2. Reading the Draft EIS does not lead to clarity on modeling issues. Shannon and Wilson stated in their report that the 2005 carbon tetrachloride and uranium-238 plume modeling has some problems. The document does not clearly explain what factors contributed to problems in modeling. *498-13*
3. The plume maps for carbon tetrachloride appearing in Appendix U, Figures U-29 through U-32, (with written description on page U-10) and elsewhere in the document should be corrected. The 2005 plume map shows a plume that is much more extensive than the plume appears in other maps. The Final EIS must address why model failed to describe this plume accurately. *498-14*
4. USDOE's contractor must clarify why they chose the Base Case Flow Model (with 38% flow towards Gable Gap and 62% flow towards east). That model does not use the assumptions that form the bases of other Hanford flow models (for example, 72% flow though Gable Gap and 38% towards east). *498-15*
5. The text does not state whether the base case model incorporates part of the alternate case model (lowering of the Top of Basalt by 3 meters). To Ecology, there appears to be a significant amount of flow though Gable Gap independent of the model selected. The rationale for the selection of the low flow rate must appear in the Final EIS. *498-16*
6. There are unusual fluctuations of predictive modeling analysis of both risk assessment (for example, figures 2-90, 2-91, 5-330, 5-331) and contaminant transport analysis (for example, figure 5-409, 5-410, etc.). Some of the fluctuations are of several orders of magnitude, which should not be the case. Text modifications are needed to explain these unusual fluctuations of predictive analysis. *498-17*

Waste Disposal

1. The sensitivity studies that USDOE's EIS contractor performed for Ecology as a cooperating agency need more data, results, and analysis in the Final EIS. Ecology requests that the EIS contractor develop graphs of concentrations, peak concentration tables, and text for key contaminants at the 200-East Integrated Disposal Facility (IDF) boundary, the 200 Area core zone, and near the Columbia River shore. The contractor should make these additions for the sensitivity study using a recharge rate of 3 millimeters per year. *498-18*
2. It is clear to Ecology that if USDOE disposes of offsite waste in the preferred location in the 200-East IDF, those wastes will cause significant adverse impacts at the landfill's point of compliance and further down gradient. The impacts are even more pronounced when the Draft EIS models disposal of offsite waste in the 200 West IDF location. The impacts are significant because disposal of the offsite waste will result in concentrations that will exceed drinking water standards. *498-19*

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498-13 In response to this and similar comments, the discussion in Appendix U has been revised in this *Final TC & WM EIS* to expand and clarify the discussion of modeled results versus measured results.

498-14 In response to this and similar comments regarding plume maps, the discussion in Appendix U has been expanded in this *Final TC & WM EIS*.

498-15 As stated in the text of Appendix L, Section L.1.3, the selection of the Base Case flow model was predicated on the *Technical Guidance Document* (DOE 2005). Analysis of the results suggests that it may be more useful (in the context of the comparative analysis) to think about the range of fluxes through Gable Gap that is consistent with the field characterization data. This *Final TC & WM EIS* contains an expanded discussion of this issue.

498-16 The Base Case flow model and the Alternate Case flow model are completely separate analyses with separate calibrations (see Appendix L, Section L.10, of the *Draft TC & WM EIS*). The flux through the unconfined aquifer in Gable Gap is a calculated consequence of the boundary conditions and the calibrated material properties (primarily the hydraulic conductivities), not an input parameter or a selection that was made. Both the Base Case and Alternate Case flow models show a significant flux through Gable Gap, which appears to be a requirement of a well-calibrated model. This result suggests that it may be more useful to discuss the issue in terms of the range of flux through Gable Gap allowed by the characterization data, rather than "northerly versus easterly" or "higher top-of-basalt cutoff elevation versus lower top-of-basalt cutoff elevation." A more detailed discussion of this issue is included in Appendix L, Section L.8, of this *Final TC & WM EIS*.

498-17 A detailed discussion of fluctuations in concentration versus time plots has been added to this *Final TC & WM EIS* in response to this and similar comments.

498-18 An analysis of IDF systems performance has been added to this *Final TC & WM EIS* in response to this and similar comments. The results of this analysis are presented in Chapter 7, Section 7.5, of this final EIS.

498-19 DOE agrees with the view that the impacts of disposal of a variety of waste streams in an IDF present complexities in modeling and interpreting the results. In response to this and similar comments regarding assumptions about waste-form performance, infiltration at the IDF(s), and the importance of a clear understanding of the contributions of all waste forms to the impacts at IDF barriers, this *Final TC & WM EIS* contains an additional analysis that includes

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Ideally, landfills should not impact groundwater. When we compared the concentrations of contaminants in several of the alternatives, a distinct peak represented the release of contaminants from the offsite waste component at the 200-East IDF boundary. Offsite waste results approximately in concentrations of 17 pCi/l for Iodine-129 and 1500 pCi/l for Technitium-99 at the peaks.

- Ecology would like USDOE's EIS contractor to separate the impacts associated with offsite waste from impacts of onsite waste. We request that a discussion of the results appear in chapter 5 and the Summary. Ecology also requests that the contractor show the impacts on the environment that result from disposal of onsite waste only.
- Ecology requests USDOE's EIS contractor analyze and describe specific mitigation measures that would reduce the impacts of any offsite waste disposal. This analysis must be sufficient to ensure that the resulting concentrations of all contaminants will be below health standards when the offsite waste releases are combined with all the other wastes that USDOE has already disposed and plans to dispose at Hanford.
  - Ecology requests that USDOE's contractor add an explanation to the text and summary if the most reliable mitigation for this offsite waste is to prohibit its disposal.
  - Ecology requests that USDOE's EIS contractor analyze USDOE's preferred alternative without offsite waste and incorporate the results of the analyses into the Final EIS.
  - Ecology requests that USDOE add disposal of offsite waste as a sub-alternative to distinguish the impacts that result from offsite waste.
  - Ecology's analysis shows that the impacts from offsite waste disposal to the groundwater begin early and last throughout the 10,000-year modeling period. Early releases of contaminants result in violations of the drinking water standards in the Central Plateau. As time elapses, the contaminants migrate from the Central Plateau to the Columbia River.
  - The offsite waste appears to be a one of the primary reasons why all the alternatives result in unacceptable impacts.

3. Secondary waste causes significant adverse impacts at the 200-East IDF boundary. Ecology does not consider it acceptable for a new landfill containing treated waste to significantly increase groundwater contamination. The Draft EIS shows that several contaminants of potential concern will exceed the levels that ensure safety in groundwater. Most health impacts result from tritium, iodine-129, technetium-99, uranium-238, chromium, nitrate, and total uranium (toxic), which are common to all of the Draft EIS alternatives.

498-19 cont'd

498-20

variations in assumptions regarding infiltration, waste-form performance, and the inventory of offsite LLW and MLLW. This analysis is presented in Chapter 7, Section 7.5, of this *Final TC & WM EIS*.

498-20 In response to comments received on the *Draft TC & WM EIS* concerning potential long-term impacts on groundwater resources, additional sensitivity analyses were performed and are included in this final EIS. The additional analyses evaluate the potential impacts if IDF performance (e.g., infiltration rates) and/or secondary- and supplemental-waste-form performance (e.g., release rates) were improved. Chapter 7, Section 7.5, was added to discuss and summarize these results.

Commentor No. 498 (cont'd): Jane A. Hedges, Program Manager, Nuclear Waste Program, Washington State Department of Ecology

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Given the uncertainty of mass balance within the Waste Treatment Plant (WTP) and the variety of secondary waste forms, Ecology requests that USDOE address specific mitigation measures in the Final EIS that would prevent as much of the impact on the groundwater as possible. These measures could include:

- Segregating the key constituents that exacerbate the risk, and sending them offsite for disposal.
- Creating robust secondary waste forms specific for each waste type.
- Additional recycling at the WTP to maximize retention of these constituents in the vitrified glass.

498-20 cont'd

4. The results are clear that locating IDF in its full size in the 200 East has much less lasting impact on the environment than locating a similar facility in the 200 West Area. Ecology requests that USDOE select the 200 East Area IDF location as the preferred alternative in the Final EIS and ROD.

498-21

5. The Draft EIS describes many alternative scenarios for disposal of different waste forms that result from processing of tank waste. The USDOE contractor will dispose of that waste in one or two IDF facilities. All of the disposal scenarios result in adverse impacts. The models predict that the concentrations of contaminants in the groundwater will be higher than the drinking water standards. When the contaminants become mobile, they will create a relatively small plume with a very high peak concentration. To mitigate these excessive concentrations, USDOE must improve the waste forms so that it takes longer for the contaminants to become mobile. This is particularly important for secondary waste, assuming that all the low activity waste (LAW) is immobilized in glass.

498-22

Supplemental Treatment and Pretreatment

1. Ecology will accept only a supplemental treatment technology that vitrifies the low activity waste at least as well a second LAW vitrification facility. All the other alternatives do not protect the groundwater to within acceptable standards and are not "as good as LAW glass." Ecology asks USDOE to choose construction and operation of a second LAW facility as its preferred alternative in the Final EIS and ROD. With the expansion of the LAW vitrification system (2nd LAW) to include four more LAW melters, USDOE will be able to treat the 60% to 70% of the single-shell tank waste that the current WTP cannot.

   We support a second LAW facility of this capacity because without it the high level waste (HLW) vitrification facilities cannot operate at full capacity. If the WTP does not operate at full capacity, treatment will extend decades beyond the design life of the WTP, and waste will stay in the single-shell tanks longer. LAW technology does not require any further development. Ecology has already issued a dangerous waste permit for the existing design, and the first facility is under construction.

498-23

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498-21 As addressed in Chapter 2, Section 2.12.3, Waste Management Alternative 2 is DOE's Preferred Alternative.

Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*.

498-22 In response to comments received on the *Draft TC & WM EIS* concerning potential long-term impacts on groundwater resources, additional sensitivity analyses were performed and are included in this final EIS. The additional analyses evaluate the potential impacts if IDF performance (e.g., infiltration rates) and/or secondary- and supplemental-waste-form performance (e.g., release rates) were improved. Chapter 7, Section 7.5, was added to discuss and summarize these results.

498-23 Comment noted.

Commentor No. 498 (cont'd): Jane A. Hedges, Program Manager, Nuclear Waste Program, Washington State Department of Ecology

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Ecology requests that USDOE not expend limited resources to develop or prove other treatment technologies when LAW vitrification is sufficient and already developed and designed. We ask USDOE to preserve those resources to address other problems with no current solutions.

498-23 cont'd

2. Sulfate Removal: We propose a revision to Draft Tank Closure and Waste Management Appendix E, Section E.1.2.3.9, Sulfate Removal. The method described in this section involves treatment of the WTP LAW feed solutions, namely the removal of sulfate by treatment with strontium nitrate solution after appropriate pH adjustment of the LAW feed. The sulfate is removed as a strontium sulfate precipitate. The proposed revision involves the use of barium nitrate solution. This proposal is based upon several factors:

   - Barium sulfate is much more inert in the environment (soil, water, et cetera). Barite (barium sulfate) has been used in the oil industry as an oil-base and water-base drilling mud (drilling lubricant) additive for more than 70 years; it is an inert weighting component.
   - Barium sulfate has a solubility product of 1.1×10^{-10}, whereas strontium sulfate has a solubility product of 3.2×10^{-7}, which is a factor of 3,000 in favor of the stability of barium sulfate.
   - The acidic pH conditions do not have to be as rigorous for the formation of barium sulfate precipitate in contrast with the formation of strontium sulfate precipitate. So initially, less nitric acid would be needed for precipitation and subsequently the caustic demand would also be less.
   - Due to the superior inertness of barium sulfate, more disposal options would be available in the IDF.

498-24

3. In Alternative 5 of the Draft EIS, USDOE proposes that sulfate be removed from the LAW stream. After the compound is removed from the treated LAW stream, it would be immobilize in a grout matrix and then dispose of it at Hanford.

   The advantages of such a sulfate removal treatment lie in the extension of the vitrification melter life and the resulting reduction in the frequency of melter replacement. Removing sulfate may also increase sodium levels in the LAW glass, resulting in the need for fewer glass canisters and shorter treatment regimens. The drawbacks include the need for two additional facilities to support sulfate removal: (1) a sulfate removal facility and (2) a sulfate waste grout facility.

   Ecology remains concerned with the durability of any grout matrix over time, as well as with the partitioning of contaminants between the grout and the liquid stream that would return to the WTP LAW facility.

498-25

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498-24 The process analyzed in this EIS is considered "representative" and a change from the use of strontium nitrate to barium nitrate appears to be plausible. As discussed in Appendix E, Section E.1.2.3.9.1, screening tests were conducted in which barium nitrate solution was added to a pretreated LAW solution derived from Hanford tank 241-AN-102 supernatant (which had been acidified by the addition of nitric acid) to evaluate radionuclide partitioning in the strontium sulfate precipitate. The percentages of radionuclides removed from the tank are provided in the bulleted items that follow the relevant text in this section. The results of these screening tests concluded that, although barium nitrate was used in the tests, the radionuclide partitioning is expected to be similar if strontium nitrate were used, with the exception of strontium-90. Because any strontium in solution would be isotopically diluted by the addition of nonradioactive strontium nitrate, this EIS assumes that essentially all of the strontium-90 would precipitate and end up in the grouted waste form. Thus, use of strontium nitrate instead of barium nitrate would be acceptable in the sulfate removal process described in this EIS. If this supplemental treatment technology were chosen for implementation in the ROD, DOE would review the use of different precipitation reagents (e.g., strontium, barium) to determine which best suits Hanford waste management purposes and whether additional NEPA analysis would be necessary.

498-25 Comment noted.

Commentor No. 498 (cont'd): Jane A. Hedges, Program Manager, Nuclear Waste Program, Washington State Department of Ecology

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4. Technetium-99 Removal: In Alternative 2B, USDOE proposes to incorporate more technetium-99 (Tc-99) into the HLW glass. That glass must eventually go to an offsite deep geologic repository. Ecology supports the incorporation of Tc-99 into the glass because the isotope is a particularly troublesome contaminant to treat otherwise: it is highly soluble and mobile in groundwater, and plants and animals uptake it readily. It has a long half-life, so it remains dangerous for millennia. Capturing Tc-99 in a glass waste matrix will inhibit its ability to move readily through the environment.

   USDOE does not currently include Tc-99 removal in its WTP design. The original design, however, did include an ion exchange system to remove the isotope from the LAW stream. Alternatives 2B and 3B evaluate the impacts of including Tc-99 removal. In 2B, USDOE would remove Tc-99 from the existing LAW vitrification and a second LAW vitrification feed streams and route to HLW vitrification. In 3B, USDOE would remove the Tc-99 from the LAW feed streams for the 200-East cast stone facility and send it to HLW for vitrification. No other alternative would remove Tc-99 from the LAW feed.

   Ecology reviewed the information in the Draft EIS and found that Tc-99 in groundwater originates from other solid secondary waste, not the immobilized LAW. If the Tc-99 goes to the LAW stream, a smaller amount will remain free after treatment than after HLW treatment. LAW melters appear to capture Tc-99 more efficiently than HLW melters. Regardless of the treatment process, any Tc-99 that treatment does not capture will end up in the melter offgas system. Wastes from that system undergo treatment and become solid waste. If the WTP operates without the capture of Tc-99, the process will release slightly less Tc-99.

   Overall, the impacts to the groundwater from the presence of Tc-99 are significant if Alternative 3B cast stone is the waste matrix. If USDOE removes Tc-99 in the WTP LAW facility and the supplemental 200 East Area cast stone, the Tc-99 concentrations at release are 5,022 pCi/ L (about five times the drinking water standard of 900 pCi/L).

   This EIS analysis shows that moving the Tc-99 to the HLW stream does not affect the risk to the groundwater. However, Ecology would support sending more of Tc-99 offsite in HLW glass if that would not cause more problems with secondary waste disposal. Significant uncertainties in chemical partitioning during the treatment, other uncertainties about retention in the glass during treatment, and long isotope life and high mobility add to the desire to remove Tc-99 and send it into the HLW glass. If USDOE were to determine that including Tc-99 capture is their preferred alternative, Ecology would support restoring the original ion exchange process that incorporates more Tc-99 into the HLW glass, rather than developing another process. That restoration would not delay WTP construction or worsen the treatment of secondary waste.

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498-26 **498-26** DOE notes the commentor's support for removing technetium-99 from waste in the WTP Pretreatment Facility and immobilizing it as IHLW.

Commentor No. 498 (cont'd): Jane A. Hedges, Program Manager, Nuclear Waste Program, Washington State Department of Ecology

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Mitigations Needed in Final EIS

1. All the tank closure options result in significant adverse impacts to the groundwater at the boundary of the facilities and at the core zone. Ecology requests that USDOE's EIS contractor add a discussion of potential mitigation strategies that could lessen these impacts and help decrease the concentrations of the contaminants to bring them closer to drinking water standards. This discussion should appear in the Final EIS and be integral to USDOE's decisions as they appear in the ROD. *498-27*

2. The cribs and trenches and waste from past tank leaks are significant sources of contamination that have adverse impacts on the deep vadose zone. Capping does not stop contamination. To prevent impacts to the groundwater beyond the core zone, USDOE must develop mitigation measures very soon. The Final EIS and ROD must provide mitigation for the deep vadose zone. *498-28*
   - Peak concentrations from the deep vadose occur in the groundwater in 2050. This results from the very deep contamination that is just above the groundwater table and currently in the groundwater. This is a short-term impact in relative terms that requires a distinctive mitigation approach. To be effective, mitigation measures must be developed to address the deep vadose zone contamination on a site-wide basis and be ready for full-scale deployment in the Central Plateau soon.
   - A large amount of the known soil inventory (that is not as deep) would impact the groundwater far beyond 2050. A distinct midterm mitigation approach should be developed for this zone. And the near surface needs a separate mitigation approach.

3. None of the Draft EIS alternatives bring the impacts below acceptable cancer risk or meet the safe drinking water standards *498-29*
   - SEPA authorizes Ecology to establish enforceable mitigation measures in permitting decisions.
   - All land disposal facilities must account for the risk term created by disposal to the facility (e.g., as provided through performance assessments).
   - The Mitigation Action Plan must identify distinct approaches for near-term impacts, mid-term impacts, and long-term impacts.
   - Ecology must be able to review and provide input into the Mitigation Action Plan.
   - Ecology intends to put conditions in dangerous waste permits to mitigate past releases to the soils and to inhibit releases in the future.

4. Where appropriate and necessary, Ecology intends to make mitigation a condition of adoption of the Final EIS under SEPA. When we issue a SEPA Determination of Significance and a Notice of Adoption, we will list those sections we are adopting. We will inform the public that we are adopting the analyses on cumulative impacts on vadose zone and groundwater contingent on Ecology review and input into the USDOE Mitigation Action Plan. The goal of remedial action should be to protect against further soil and groundwater contamination. *498-30*

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498-27 The NEPA evaluation process is conducted early in agency planning, when details of the proposed project are not yet well enough defined for specific mitigation measures to be developed. Chapter 7, Section 7.1, discusses potential mitigation measures that could be used to avoid or reduce adverse environmental impacts associated with implementation of the alternatives. As discussed in Chapter 5 of this *TC & WM EIS*, DOE acknowledges that "benchmark standards" could be exceeded in groundwater at the Core Zone Boundary and/or at the Columbia River nearshore at various dates. The term "benchmark standards" as used in this *TC & WM EIS* represents dose or concentration levels that correspond to known or established human health effects. For groundwater, the benchmark is the MCL, provided an MCL is available.

In response to comments received on the *Draft TC & WM EIS* concerning potential long-term impacts on groundwater resources, additional sensitivity analyses were performed and are included in this final EIS. The additional analyses evaluate the potential impacts if certain remediation activities were conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. Furthermore, sensitivity analyses that evaluate improvements in IDF performance (e.g., infiltration rates) and in secondary- and supplemental-waste-form performance (e.g., release rates) were performed and are included in this final EIS. Chapter 7, Section 7.5, was added to discuss and summarize these results. The results of these analyses will aid DOE in formulating an appropriate mitigation action plan subsequent to this EIS and its associated ROD and in prioritizing future Hanford remedial actions that would be protective of human health and the environment and would reduce long-term impacts on groundwater.

498-28 This *TC & WM EIS* incorporates vadose zone remediation in several of its alternatives: Tank Closure Alternative 4 analyzes selective clean closure at two tank farms, the Base Case under Tank Closure Alternatives 6A and 6B analyzes deep vadose zone remediation beneath tank farms, and the Option Case under Tank Closure Alternatives 6A and 6B analyzes deep soil remediation under the B and T cribs and trenches (ditches). In response to this and similar comments received on the *Draft TC & WM EIS* concerning these potential impacts on groundwater resources, additional sensitivity analyses were performed and are included in this final EIS. Consequently, the discussion found in Chapter 7, Section 7.5, was added to summarize these results and appropriate mitigation measures. The sensitivity analyses and mitigation discussion recognize that an appropriate mitigation action plan would involve different strategies for

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- The preferred alternative should not result in the permanent loss of use of the aquifer.
- We know that further groundwater contamination is going to result from the existing soil contamination as it continues to travel downward.
- Ongoing monitoring and groundwater cleanup are the best near-term responses to the impacts.
- The EIS contractor used assumptions in the Draft EIS for cumulative analysis. Those assumptions were based on the Central Plateau Strategy. The cumulative results show that remedial action is necessary. Capping without removing and treating the waste in some contaminated sites may be unacceptable. More mitigation is essential to future Central Plateau decisions.

498-30 cont'd

5. The Cumulative Impacts indicates that the Hanford Site needs to make decisions in non tank farm contamination sites to reduce contamination in the soil and protect the groundwater from further contamination.

498-31

Fast Flux Test Facility (FFTF) Decommissioning

1. Ecology supports USDOE's preference for entombing the FFTF. We agree with USDOE's proposal to remove all above-grade structures, including the reactor building. We do not object to the below-grade structures, the reactor vessel, piping, and other components remaining in place. We consider the proposal to fill the below-grades structures with grout to immobilize the remaining radiological and hazardous constituents to be protective of the environment.
2. We also support USDOE's proposal to construct an engineered barrier over the filled area to prevent intrusion to be protective. Burial in the IDF of any radiologically or chemically contaminated waste that the entombment activities will generate will be appropriate if the release of contaminants does not increase the concentrations of contaminants in the soil or groundwater.
3. Ecology supports using the bulk sodium inventories that came from the FFTF in the WTP. We also agree with USDOE's proposal to process the remote handled-special components at the Idaho National Laboratory.

498-32

Tank Waste Farm Closure

1. In regard to tank waste, the biggest reduction in impacts comes from removing as much as possible from the tanks during initial retrieval. The closure actions of mixing any remaining waste with grout and capping the tank farms makes only a limited difference in the long run because both the grout and the caps break down before the risk term of the waste is exhausted. Thus, these closure actions only serve to delay the release and spread it out over time. The bar graphs in Chapter 5 showing releases to the Columbia River clearly reflect this. The Final EIS and ROD should include and select a preferred alternative that supports as much retrieval as possible.

498-33

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mitigating short-, mid-, and long-term impacts. Specifically, the sensitivity analyses evaluate what the past leaks and cribs and trenches (ditches) contribute to impacts on groundwater. Other sensitivity analyses evaluate potential impacts if certain remediation activities are conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. Following issuance of this *Final TC & WM EIS* and its associated ROD, DOE is required to prepare a mitigation action plan that addresses mitigation commitments expressed in the ROD. This plan would be prepared before DOE would implement any action that is the subject of a mitigation commitment. DOE is aware and understands the timing of being able to mitigate deep vadose contamination.

498-29 See response to comment 498-27 regarding potential mitigation measures.

Copies of any mitigation action plan developed by DOE will be made available for inspection in appropriate DOE Reading Rooms and will be made available upon request. Ecology may also impose additional mitigation measures through future permitting processes or remedial actions under the scope of the TPA, which include additional opportunities for public comment.

498-30 See response to comment 498-27 regarding potential mitigation measures.

498-31 Regarding contamination originating from non-tank-farm contamination sites and the need to make decisions on these sites, it should be noted that decisions on such sites are outside the scope of this *TC & WM EIS*. Cleanup decisions regarding the non-tank-farm contamination sites will be made in accordance with RCRA, CERCLA, and/or the TPA, and in consultation with Federal and state agencies. These contamination sites are considered in the *TC & WM EIS* cumulative impacts analysis. DOE received comments on the potential impacts of future remediation activities that are in various stages of planning (which, given the inherent uncertainty, were not included in the cumulative impacts analysis). In response, DOE performed a sensitivity analysis to evaluate the potential impacts if certain remediation activities were conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. The goal of the sensitivity analysis is to help DOE, EPA, and Ecology prioritize cleanup efforts in the future. This analysis is provided in Appendix U of this EIS and is discussed further in Chapter 7, Section 7.5.

498-32 Comment noted.

498-33 As explained in Chapter 2, Section 2.12.1, DOE's Preferred Alternative with respect to waste retrieval is the removal of at least 99 percent of tank waste. This would occur under all Tank Closure alternatives, with the exception of

Commentor No. 498 (cont'd): Jane A. Hedges, Program Manager, Nuclear Waste Program, Washington State Department of Ecology

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2. The Draft EIS shows the intrinsic relationship between the decisions concerning tank system closure and remediation of past tank leaks. The tank farm systems closure actions are influenced by effectiveness of past leak mitigation and vice-versa. The decisions cannot be undertaken separately. The Final EIS and the ROD needs to reflect this fundamental interrelationship. *498-34*

3. All alternatives in the Draft EIS include an estimated leak loss from each retrieved tank based on a volume of 4,000 gallons. For the particular EIS impact analysis presented, the estimate of the leak losses should be presented separately from the "other" category. This will improve our understanding of the impacts of the "other" category evaluated, and provide clarity to the reader and decision-maker. *498-35*

   This highlights a mitigation measure that the EIS contractor should identify in the USDOE Mitigation Implementation Plan or in the Final EIS. The mitigation measure should include retrieval leak detection that is adequate to ensure detection of leaks. Tank Waste Retrieval Work Plans must also have an adequate pre-retrieval risk assessment that provides decision-makers with sufficient information to determine a response to a leak.

4. All alternatives indicate that deep soil contamination will continue to have impacts that exceed regulatory minimums for various durations. These impacts will require response actions for the duration of the Hanford remediation activities. *498-36*

5. USDOE selected Landfill Closure as its preferred alternative for the Tank Farms in the Draft EIS. It does not identify additional mitigation that USDOE must conduct to support landfill closure. The following mitigation measures must appear in the Mitigation Plan and in the Final EIS: *498-37*
   a) The enhanced monitoring requirements in the vadose zone within each Tank Farm, following closure.
   b) The need for groundwater flow evaluations that will support the development of a sufficient monitoring system to detect any discharges that Vadose Zone Monitoring may not detect.
   c) Mitigation measures to address the near surface soil, mid level soil and deep soil contamination.
   d) Mitigation measures to address emerging groundwater plumes.

6. Ecology is not making a decision now, based solely on a Draft EIS, with respect to tank farm closure. Ecology will make future decisions in Tank Farm Closure Plans, which will be subject to public comment. This EIS and the Tank Farm-specific Performance Assessments will be used as information for those Closure Plans. However, from this Draft EIS, Ecology can see that: *498-38*
   a) Clean Closure has significant challenges, including exposure to workers and the nearby public and an increased cost and duration of cleanup.
   b) Removing the tank shells does not seem to yield a great deal of risk reduction.

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Alternative 1 (No Action) and Alternative 5; under Alternatives 4, 6A, and 6B, 99.9 percent of the waste would be retrieved (see Chapter 2, Table 2–2). As discussed in Chapter 2, Section 2.2.2.1.1.5, DOE has developed a tiered strategy for maximizing tank waste retrieval while minimizing the potential for causing leakage. The tank closure process, which includes detailed examinations of the tanks and residual waste, requires the preparation of a performance assessment and a closure plan. These documents would provide the information and analysis necessary for DOE and the regulators to make specific decisions on what levels of residual tank waste are acceptable in terms of short- and long-term risks.

498-34 Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

See response to comment 498-21 regarding factors influencing future DOE decisions.

498-35 To clarify the potential impacts associated with retrieval leaks, the impacts of the three components that make up the "other sources" (ancillary equipment, retrieval leaks, and tank residuals) have been split out for presentation purposes under Tank Closure Alternative 2B in Chapter 5, Section 5.1.1.3, as well as in the associated Appendices M, N, and O. Chapter 7, Section 7.1, of this *TC & WM EIS* discusses mitigation measures that could be used to avoid or reduce potential impacts on all resource areas. Many of the mitigation measures discussed would apply across all alternatives because of the similar nature of some of the activities analyzed in this EIS (e.g., construction of facilities). However, the resource subsections of Section 7.1 do acknowledge specific alternatives where only certain mitigation measures would apply or where additional mitigation consideration may be warranted. Following issuance of this *Final TC & WM EIS* and its associated ROD, DOE is required to prepare a mitigation action plan that addresses mitigation commitments expressed in the ROD. This plan would be prepared before DOE would implement any action that is the subject of a mitigation commitment. Copies of any mitigation action plan developed by DOE will be made available for inspection in appropriate DOE public reading room(s) and will also be available upon request.

498-36 See response to comment 498-34 regarding groundwater contamination and remediation at Hanford.

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c) Removing as much tank residual as possible does provide a decrease in risk, as does remediating the contamination in the vadose zone.

d) It may be that different tank farms are closed differently depending on the tank farm specific conditions.

e) Landfill Closure combined with maximum retrieval and significant soil remediation may turn out to be a viable option.

498-38 cont'd

7. Appendix O, page 3, identifies what "lines of analysis" USDOE's contractor used to evaluate impacts of these alternatives. Chapter 5 includes tables that report maximum impacts for each alternative.

   The Final EIS should provide more detail about the effects of installing each tank farm barrier. This information would help decision-makers evaluate the impact of peak concentrations of contaminants on each element and to identify the benefit of any mitigation USDOE considers. USDOE should also provide future maximum impacts in the peak tables.

   Landfill Closure would include:

   - Leaving some amount of mixed waste in place.
   - Removing some soil and equipment to meet standards in WAC 173-340 and the requirements of WAC 173-303-610 and -640.
   - Responding to releases to the uppermost aquifer.

498-39

8. In the Mitigation Action Plan, USDOE must provide mitigation measures for both radiological and non-radiological contaminants. The Mitigation Action Plan must include development of milestones for submittal and approval of TPA primary documents for monitoring of the vadose zone and groundwater, and mitigation measures that address significant adverse environmental impacts. USDOE will include applicable portions of this plan in the Resource Conservation and Recovery Act closure permit application.

   a) USDOE's contractor must initiate the process for Corrective Action investigations for the areas that are identified as "B," "S," and "T" Barriers immediately (page O-4, Appendix E, pp.148 and 149). The contractor must complete an additional groundwater sensitivity evaluation to consider the effects of cleaning up T/TX/TY contamination with similar assumptions to those in Alternative 4 cleanup action for the B/BX and S/SX tank farm areas. The Mitigation Action Plan must include milestones to initiate early corrective action investigations for the mostly highly contaminated Tank Farms immediately.

   b) The Mitigation Action Plan must include any necessary technology development to remediate or mitigate soil contamination that could result in unacceptable risks to human health and the environment. USDOE must provide milestones for further development of technology that would mitigate the contamination in the deep vadose zone.

498-40

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498-37 See response to comment 498-27 regarding potential mitigation measures.

498-38 See response to comment 498-21 regarding factors influencing future DOE decisions.

498-39 DOE believes this information was provided in the *Draft TC & WM EIS*. Appendix O, Tables O–8 through O–84 of this *TC & WM EIS* provide the maximum COPC concentrations at each of the lines of analysis, including the individual tank farm, FFTF, IDF-East, IDF-West, and RPPDF barriers, as appropriate. Chapter 5 of this *TC & WM EIS* provides concentration versus time for COPCs under each alternative. These figures provide an indication of the trend and identify peaks that could occur during the 10,000-year analysis period (through calendar year 11,940).

498-40 Chapter 7, Sections 7.1 and 7.5, discuss potential mitigation measures that could be used to avoid or reduce adverse environmental impacts associated with implementation of the alternatives. These mitigation measures address both radioactive and chemical COPCs. In response to comments received on the *Draft TC & WM EIS* concerning potential long-term impacts on groundwater resources, additional sensitivity analyses were performed and are included in this final EIS. The additional analyses evaluate potential impacts if certain remediation activities are conducted at some of the more prominent waste sites on the Central Plateau and along the river corridor. Specific sensitivity analyses that evaluate the effects of clean closure for the T/TX-TY tank farms were performed and are included in this final EIS. Chapter 7, Section 7.5, was added to discuss and summarize these results. The results of these analyses will aid DOE in formulating an appropriate mitigation action plan subsequent to this EIS and its associated ROD and in prioritizing future Hanford remedial actions that would be protective of human health and the environment and would reduce long-term impacts on groundwater. Ecology may also impose additional mitigation measures through future permitting processes or remedial actions under the scope of the TPA, which include additional opportunities for public comment. As referenced in the Section 7.5.2.8 discussion, DOE has drafted a roadmap that implements a strategy for the development of better-performing secondary-waste forms.

Commentor No. 499: Gerry Pollet, Executive Director, Heart of America Northwest

From: Gerry Pollet [gerry@hoanw.org]
Sent: Monday, May 03, 2010 3:16 PM
To: tc&wmeis@saic.com
Cc: office@hoanw.org; John Price (ECY); Alberich, Jason (ECY); Erik Olds; Olinger, Shirley J; jhed461@ecywa.gov
Subject: Comments on draft TCWMEIS from Heart of America Nrthwest and HoANW Research Center
Attachments: Heart of America Northwest comments on the draft TCWMEIS 5-3-10.pdf

Attached are the comments of Heart of America Northwest and Heart of America Northwest Research Center on USDOE's draft TC & WMEIS. Please note that these supplement oral testimony and the presentation previously submitted as formal comments.

To Ecology recipients, please note that we believe Ecology must review and respond to appropriate comments for SEPA purposes.

Gerry Pollet, JD;
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Heart of America Northwest
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USDOE Must Withdraw Decisions to Use Hanford as a National Radioactive Waste Dump and Issue a New Draft Tank Closure and Waste Management EIS for Comment

Draft Tank Closure and Waste Management Environmental Impact Statement (TCWMEIS)
Joint Comments of Heart of America Northwest and Heart of America Northwest Research Center
May 3, 2010
Submitted to U.S. Department of Energy (USDOE)
and to Washington Dept. of Ecology (cooperating agency)

These comments supplement our presentations made at hearings and submitted as a Powerpoint presentation to USDOE, which are also part of our formal comments. Our organizations also adopt as comments, and support, the formal advice issued by the Hanford Advisory Board (HAB) on March 4, 2010, which our organizations made a considerable effort to assist in development of. *499-1*

USDOE's plans for Hanford Clean-Up, outlined in the "preferred alternatives" in the Draft TCWMEIS, are more properly described as a "cover-up", not a clean-up. The preferred alternatives – USDOE's planned actions – are to leave large amounts of waste and contamination in tanks and in soil sites under ineffective caps, which will not prevent the spread of contamination to groundwater at levels which will cause cancer in large numbers of people who are reasonably expected to be using the Hanford site and Columbia River for thousands of years. *499-2*

1. **USDOE Should Withdraw its Decisions to Use Hanford as a national radioactive waste dump and commit to a preferred alternative and decision not to add any more wastes to Hanford. The impacts to health and the environment from existing wastes and contamination are shown in the draft TCWMEIS to be so high as to make it unconscionable, as well as illegal, to add more wastes.** *499-3*

USDOE proposes two major "waste management" alternatives for waste generated from on-site cleanup activities. Both alternatives for disposing of radioactive & mixed radioactive/hazardous wastes in landfills at Hanford **include using Hanford as a national waste dump**, starting when USDOE operates the vitrification plant. *There is no alternative presented in which Hanford would not be used* *499-4*

499-1 The HAB comment document is included in this CRD as comment document 218.

499-2 DOE disagrees with the commentor's opinion on the Preferred Alternative.

While DOE's Preferred Alternatives for tank closure, FFTF decommissioning, and waste management in this *TC & WM EIS* may not necessarily represent the most environmentally preferred alternatives, the ROD issued by DOE will identify any additional mitigation and monitoring commitments adopted by DOE and specify other factors considered by DOE in reaching its decision. Please see Section S.5.5 of the Summary and Section 2.10 of Chapter 2 of this *TC & WM EIS* for more information on key environmental findings.

499-3 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

499-4 DOE does not believe it is in violation of NEPA. The Waste Management No Action Alternative excludes offsite waste disposal in an IDF at Hanford; it includes continued disposal in existing burial grounds of certain waste types. Offsite waste is not a part of these waste types, except for certain allowances or waste generated from tank closure and FFTF decommissioning activities. For a more comprehensive discussion on the transport and disposal of offsite waste and the use of Hanford as a regional disposal facility, see Section 2.1 of this CRD.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

as a national radioactive waste dump.[1] This is a significant violation of the National Environmental Policy Act (NEPA), which requires that all reasonable alternatives be considered in the EIS.

499-4 cont'd

THE ALTERNATIVES

- Disposal of onsite & offsite generated wastes in two large landfills at Hanford's Central Plateau Core Zone: 200 East (currently exists) & 200 West (USDOE would construct this). These wastes include the vitrified Low Activity Waste from the tanks.
- Disposal of all onsite & offsite wastes in the 200 East landfill.

USDOE'S PREFERRED ALTERNATIVE

Using Hanford as a national radioactive and mixed waste landfill beginning when the vitrification plant operates and disposing of all the wastes in the currently existing 200 East landfill (Integrated Disposal Facility, or IDF).

2. THE MISSING ALTERNATIVES – USDOE fails to consider these reasonable alternatives, which is a violation of the National Environmental Policy Act (NEPA):

- Not using Hanford as a national radioactive and radioactive/hazardous waste dump;
- Disposing of significant amounts of treated waste from Hanford Clean-Up at other sites that are not next to major rivers or above drinkable groundwater.
    - The draft TCWMEIS shows that the levels of groundwater contamination and health risks from the wastes already at Hanford (including releases from proposed new landfills to dispose of vitrified tank wastes and River Protection Project wastes) will be hundreds of times the Drinking Water Standards for hundreds and thousands of years.
    - Plutonium 239 levels, for example, are projected to be nearly 300 times the Drinking Water Standard at the Columbia River shoreline one thousand years from now.[2] Uranium 238 levels on Hanford's Central Plateau outside the "Core Zone" are projected to rise to approximately 200 times the Drinking Water Standard. Technetium 99, Iodine and chemical contaminant levels will also be far above Drinking Water Standards.
    - The Drinking Water Standard is set at a level at which one adult out of every ten thousand who drink average amounts of water will die of cancer. Children are three to ten times more susceptible to cancer from the same exposure as an adult.
    - The only responsible alternative to reduce the impacts projected from existing wastes is to remove from Hanford large quantities of wastes in the ground an projected to be created from treatment processes (e.g., secondary wastes and ILAW) for proper disposal in landfills that are not above potable aquifers or along major Rivers or in deep geologic repositories.

499-5

[1] The no action alternative is not a meaningful alternative as presented (e.g., it would violate numerous laws and the terms of the Hanford Clean-Up Agreement and Consent Order), and it ignores that USDOE has existing decisions to use Hanford as a national radioactive and mixed waste dump. Therefore, under the no action alternative, Hanford would still be used for disposal of offsite waste.

[2] Table U-2.

499-5 DOE does not believe there are "missing alternatives." The alternatives presented in this *TC & WM EIS* were developed under NEPA (42 U.S.C. 4321 et seq.) to address the essential components of DOE's three sets of proposed actions (tank closure, FFTF decommissioning, and waste management) and to provide an understanding of the differences between the potential environmental impacts of the range of reasonable alternatives. Consistent with CEQ guidance (see "Forty Most Asked Questions Concerning CEQ's NEPA Regulations," question 1a; 46 FR 18026, March 23, 1981), this EIS analyzes the range of reasonable alternatives that covers the full spectrum of potential combinations. The alternatives considered by DOE in this EIS are "reasonable" in the sense that they are practical or feasible from a technical and economic standpoint and they meet the agency's purposes and needs. For a more comprehensive discussion on the transport and disposal of offsite waste and the use of Hanford as a regional disposal facility, see Section 2.1 of the CRD. Also, please see response to comment 499-4 regarding the use of Hanford as a regional disposal facility.

The disposal at other sites of treated waste from Hanford cleanup is not within scope of this EIS. However, the disposal of treated waste from tank closure, onsite operations, offsite DOE facilities, and FFTF decommissioning is included within the scope of this EIS. In accordance with the *WM PEIS* ROD, Hanford ships nuclear waste to WIPP in New Mexico for disposal.

DOE presented information in this *TC & WM EIS* on the potential impacts on the groundwater of treated waste disposal. Table 6–19 in Chapter 6 of this *Final TC & WM EIS* lists the maximum COPC concentrations at the Core Zone Boundary and the Columbia River nearshore in the peak year of the 10,000-year period of analysis under Alternative Combination 2, which includes vitrified tank waste disposed of in an IDF and tank cleanup waste disposed of in the RPPDF. For several of the COPCs, the benchmark standard is exceeded. However, in most cases, this is due to past practices at Hanford. The term "benchmark standards" as used in this *TC & WM EIS* represents dose or concentration levels that correspond to known or established human health effects. For groundwater, the benchmark is the MCL, provided it is available. Some of the Tank Closure alternatives in this *TC & WM EIS* incorporate vadose zone remediation, which indicated improvement in the vadose zone and groundwater modeling results, i.e., Tank Closure Alternative 4 includes deep soil remediation under two tank farms, and Tank Closure Alternatives 6A and 6B include deep soil remediation under the tank farms and cribs and trenches (ditches).

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

- USDOE is obligated under NEPA to consider the reasonable alternative of disposing of wastes offsite at regulated facilities. USDOE has adopted commitments to consider commercial regulated facility disposal of its wastes in cleanup decisions, which it failed to consider in the draft TCWMEIS.

- Exhuming much more of Hanford's buried wastes and contamination for treatment and proper disposal, with all Plutonium and Transuranic wastes removed, treated and disposed in deep underground repositories.
  - USDOE should exhume significant quantities of waste, including the 161,000 cubic meters of TRU buried or disposed in soil prior to 1970, and send those wastes to be disposed offsite.

499-5 cont'd

THE IMPACTS

Even without using a landfill in 200 East or 200 West as a national radioactive and "mixed" radioactive hazardous waste dump, USDOE's analysis shows that either landfill location would cause very high contamination and high cancer risks lasting for thousands of years. USDOE prefers to use only the 200 East location because using the 200 West landfill would cause very high contaminant levels heading towards the Columbia River much faster than the 200 East IDF landfill.

Using the 200 East landfill at Hanford as a national radioactive waste dump for the wastes analyzed (which do *not* include USDOE's proposal to also import and bury highly radioactive "Greater Than Class C" wastes) would increase radioactive contamination and cancer risk levels over the next thousand years by tenfold – to 100x WA State's cancer risk standards for toxic cleanup sites.[3]

499-6

Even without disposing of more offsite waste and LAW vitrified waste, the cancer risks from the wastes in Hanford's soil and unlined ditches – which USDOE proposes to leave – will cause shockingly high cancer risk rates to future groundwater users along the River. Plutonium levels entering the Columbia River are projected by USDOE to reach 300 times the Drinking Water Standard in the next thousand years – without adding any more waste to Hanford.[4]

HOANW'S RECOMMENDATION FOR USDOE's PREFERRED ALTERNATIVE:

- NO MORE WASTE GETS ADDED TO HANFORD. Delaying the addition of more wastes until the vitrification plant operates does nothing to protect the River and the health of children for thousands of years.
- Limit disposal in Hanford landfills to amounts and types of Hanford clean-up wastes which won't cause future leakage at levels which will violate cancer risk and other standards. This would involve using off-site landfills that are not next to major rivers or above drinkable groundwater, and not importing off-site waste to Hanford.

499-7

[3] TCWMEIS Figure S-21. page S-100. Peak risk shown from inclusion of off-site waste disposed in 200 E IDF is 1E-4 (one additional fatal cancer for every ten thousand adults exposed). WM Alt 3 has a peak fatal cancer risk greater than 1E-3 (one in one thousand) at the Core Zone Boundary between the years 3000 and 4000. WM Alt 3 includes disposal of offsite waste in IDF West. Neither of these risk estimates include the additional risks from proposed disposal of River Protection Project Disposal Facility releases, which add between 1E-5 and 1E-4 of additional risk at peak periods. See Figure S-22, page S-101. Nor do these risk estimates include impacts from the disposal of GTCC wastes from other sites, which USDOE is improperly considering in a separate EIS, rather than disclosing and considering in this EIS.

[4] Appendix U of TCWMEIS, Table U-2.

The plutonium isotope concentrations listed in Table 6–19 are about 170 percent above the benchmark standard in calendar year 7725 at the Core Zone Boundary and well below the benchmark standard at the Columbia River nearshore. As noted in this *Final TC & WM EIS*, the primary source of this exceedance of the benchmark standard is from a direct injection into the aquifer that occurred in the past.

There is no existing guidance that recommends dose coefficients for children's exposure to external radiation. DOE acknowledges that children have an elevated sensitivity to radiation exposure. The most recent guidance for use of exposure-to-dose coefficients related to external exposure (ionizing radiation) was used in the *TC & WM EIS* analyses. This guidance can be found in Federal Guidance Report No. 12, *External Exposure to Radionuclides in Air, Water, and Soil* (Eckerman and Ryman 1993). This guidance provides estimates for an adult, but not for children. For internal exposure to radiation through inhalation and ingestion, EPA currently recommends that assessors calculate chronic exposures by summing time-weighted exposures that occur at each stage of life (EPA 2009). Using this approach, exposure-to-dose coefficients for internal exposure could be determined; however, guidance that provides this information has yet to be developed.

As stated in the National Research Council's Report in Brief on BEIR VII, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* (National Research Council 2006), BEIR VII estimates excess deaths for the sex and age distribution of the U.S. population in terms of the number of excess deaths per million people per absorbed dose, which supports the previously reported dose-to-risk conversion factor estimate for developing LCFs (DOE 2003a). The National Research Council report also shows that the maximum number of excess deaths would be 610 LCFs per million people per person-rem of dose assuming a sex and age distribution (including infants, children, teens, and adults) similar to that of the entire U.S. population. The BEIR VII dose-to-risk conversion factor of 610 LCFs per million people per person-rem is essentially equivalent to the estimate of 600 LCFs per million people per person-rem used in the transportation analysis in this *TC & WM EIS*. The health risk effect in the *Draft* and *Final TC & WM EIS* transportation analysis is therefore consistent with BEIR VII in regard to determining the number of LCFs and the dose conversion factor used for the transportation analyses reflects impacts on infants, children, teens, and adults.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

- Dig up Plutonium and other "Transuranic" wastes in unlined soil disposal ditches and tank leaks, treat the wastes and dispose of them in deep geologic repositories. Dig up other wastes from unlined soil ditches and tank leaks, treat them, and dispose of them in a regulated commercial radioactive waste facility which is not above drinkable groundwater or next to a river.

499-7 cont'd

- **USDOE should withdraw the Records of Decision to use Hanford as a national waste dump for radioactive Low-Level Waste (LLW) and Mixed Radioactive – Hazardous Waste (MW), instead of continuing to pursue its misguided and unsupported decisions to use Hanford as a national radioactive waste dump to bury 3 million cubic feet of radioactive wastes.**

499-8

- **USDOE should adopt a Record of Decision (RoD) that it will not add more waste to Hanford, due to the unacceptably high contamination and risk levels projected in the draft TCWMEIS from existing wastes.** As shown in our comments, and those of Tribes and individuals, the TCWMEIS underestimates projections of contamination from existing wastes and risk by failing to include the full inventory of radionuclide and chemical wastes and contamination in the soil and likely to be left on-site.

499-9

USDOE has no credibility claiming that it prioritizes cleanup of Hanford while seeking to dump more waste at Hanford. The only way for USDOE's cleanup program to move towards credibility is to withdraw the prior decisions to use Hanford as a national radioactive waste dump and issue a new decision that it will not add more waste to Hanford. USDOE can no longer feign ignorance that its plans to abandon existing wastes and contamination create unacceptable levels of risk, even without adding any more waste. Thousands of people have submitted comments to USDOE on the draft urging this. USDOE's only credible course of conduct it to issue an immediate response that the preferred alternative will be revised to reflect a decision that more waste will not be added to Hanford.

499-10

499-8 cont'd

- **USDOE should commit to follow the principle of "Clean-Up First." Under this principle, contamination would be demonstrably cleaned up and existing wastes brought into compliance, before USDOE considers adding more waste to a site.** This principle was overwhelmingly supported by Washington's voters in adoption of Initiative 297 in 2004, which USDOE spent four years and millions of dollars to overturn in federal court. Only after cleanup actions are completed will the public, USDOE or regulators know how much residual contamination and risk will remain at Hanford (or how well remedies perform)

499-11

The draft TCWMEIS continues USDOE's misguided efforts to pursue a "preferred alternative" under which a landfill in Hanford's 200 East Area (the IDF, or Integrated Disposal Facility) will be ***used as a national radioactive waste dump for approximately 3 million cubic feet of offsite radioactive Low-Level Waste (LLW) and Mixed Radioactive – Hazardous Waste (MW)*** (82,000 cubic meters is the quantity of off-site waste proposed for addition to Hanford under the preferred alternative, presented as implementing the 2004 Record of Decision. The 82,000 cubic

499-12

The remediation of burial grounds is not within the scope of this EIS. However, Appendix S includes DOE's inventory estimates for the burial grounds, and Appendix U provides supporting information on the long-term cumulative impact analyses that includes the burial ground inventories.

499-6 Regarding the commentor's concern about the inclusion of GTCC LLW in this *TC & WM EIS*, DOE has included information from the *Draft GTCC EIS* in the *Final TC & WM EIS* cumulative impacts analysis. For a more comprehensive discussion on GTCC LLW, see Sections 2.1 and 2.12 of this CRD.

The draft EIS inventory database for non–*TC & WM EIS* sources used the inventories for waste sites 316-1, 316-2, and 316-5, as reported in SIM (Corbin et al. 2005), which relied upon a surrogate waste stream from the PUREX process cooling-water/steam condensate, including 12.8 curies of plutonium-239 and -240. This resulted in model results (listed in Table U–2 in Appendix U) close to 300 times over the benchmark standard at the Columbia River nearshore, as noted in the comment. Since the issuance of the draft EIS, a correction to SIM (Mehta 2011) has been issued (in June 2011), which entails deletion of the plutonium inventory at these three waste sites. As a result, the entire inventory of 12.8 curies of plutonium-239 and -240 for the 300 Area was deleted in the reanalysis. This plutonium inventory correction is evaluated in the SA (DOE 2012) in Section 3.1, Item 6, 300 Area Process Trenches inventory corrections. The SA analysis and conclusions are that the soil concentrations at the Core Zone Boundary and the Columbia River nearshore did not change. This *Final TC & WM EIS* reports a maximum plutonium concentration of 2 picocuries per liter at the Columbia River nearshore, which is below the benchmark standard. However, there are still exceedances of the benchmark standard for plutonium at the Core Zone Boundary. This is due primarily to a reverse well, where plutonium was injected directly into groundwater in the past.

499-7 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

The remediation of burial grounds, including digging up plutonium and other TRU waste, is not within the scope of this EIS. However, Appendix S includes DOE's inventory estimates for the burial grounds, and Appendix U provides

meters is proposed to be comprised of 62,000 cubic meters of LLW and 20,000 cubic meters of MW).[5]

499-12 cont'd

The Prior Decisions to Use Hanford as a National Radioactive Waste Dump Which Need to be Withdrawn:

In 2000 and 2004, USDOE issued Records of Decision to use Hanford to dispose of off-site wastes, following issuance of the Waste Management Programmatic EIS (WMPEIS) and the Hanford Solid Waste Disposal EIS. Neither of those prior impact statements properly considered the impacts of disposing of offsite waste at Hanford. The WMPEIS Record of Decision stated that USDOE would perform a site specific impact analysis of its national level decision to use Hanford as one of two national waste disposal sites, acknowledging that the WMPEIS did not have any site specific impact analysis.

The Final Hanford Solid Waste Disposal EIS was issued after USDOE had to withdraw and reissue the initial draft due to woeful inadequacies. Thousands of people attending hearings and submitted comments on the drafts objecting to USDOE's proposal to use Hanford as a national radioactive waste dump and objecting to the serious shortcomings of the EIS. After issuance of the Solid Waste Disposal EIS, USDOE's internal analyses, revealed in legal discovery, showed that USDOE acknowledged that the EIS was inadequate in regard to human health risk analyses, transportation risk and groundwater risk analyses. USDOE agreed in settlement of WA v. Bodman, to a moratorium on waste import to Hanford until a new impact statement was completed, which USDOE hopes will be the TCWMEIS. Thus, the draft TCWMEIS represents USDOE's fourth effort to prepare a legally adequate impact statement to support the improper decision made by USDOE in 2000 to use Hanford as a national radioactive waste dump. And, like the prior three efforts, the draft TCWMEIS fails.

499-13

The Draft TCWMEIS Summary misrepresents that Washington State has agreed to USDOE's plan to import and dispose of 62,000 cubic meters of offsite waste at Hanford. The Summary, in reporting on public comment on scoping the TCWMEIS states that USDOE's response is "This is the amount indentified in the Settlement Agreement for disposal at Hanford." (page S-15.)

The Settlement Agreement sets this quantity as a limit and included a formal moratorium on offsite waste disposal until USDOE prepared and adopted a Final EIS that cured the inadequacy of the groundwater and cumulative impact analyses in the Hanford Solid Waste Disposal EIS.

499-14

Even though USDOE failed to revise analyses in the draft TCWMEIS for each of the areas in which the Solid Waste Disposal EIS was "indefensible" and inadequate, the draft TCWMEIS, nonetheless, demonstrates that adding offsite waste is indefensible.

499-15

[5] We urge USDOE to present waste quantities in units more easily understood and envisioned by the public, cubic feet, which are commonly used in USDOE's internal documents regarding waste disposal. Use of cubic meters is clearly designed by USDOE to downplay the volume to the public. The conversion to cubic feet is presented in parentheses in the Summary. However, it should be the primary unit of communication throughout the EIS and in materials provided to the public. Cubic feet are appropriate for presenting and analyzing the individual components of offsite waste proposed to be added to Hanford.

supporting information on the long-term cumulative impact analyses that includes the burial ground inventories.

499-8 In the *WM PEIS*, DOE indicated that additional analyses would be prepared to implement DOE's programmatic decisions. The *Draft TC & WM EIS* analyzed the potential environmental impacts associated with a number of proposed actions, including disposal of LLW and MLLW potentially shipped to Hanford from offsite DOE locations. Decisions made by DOE on the proposed actions will be based on a number of factors, including health and safety, environmental, economic, and technical considerations; agency statutory missions; and national policy considerations. The decisions on the selected course of action and supporting rationale will be documented in a ROD issued no sooner than 30 days after the EPA Notice of Availability for this *Final TC & WM EIS* is published in the *Federal Register*. In all cases, DOE will select an approach to cleanup of the site that reflects a commitment to protection of public health and safety.

Depending on the outcome of this *Final TC & WM EIS* and its ROD, DOE will evaluate whether additional NEPA reviews or updates to previous decisions are appropriate, as needed.

See response to comment 499-3 for a discussion on the transport and disposal of offsite waste.

499-9 In response to comments, DOE reviewed the available inventory data and updated, as necessary, the inventory estimates analyzed in this EIS. DOE believes these estimates represent the best-available referenceable data. See the SA for more information on the reanalysis results.

499-10 Both DOE and Congress are committed to the cleanup efforts at Hanford, and DOE continues to seek funding for these efforts. DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

499-11 See response to comment 499-3 for a discussion on the transport and disposal of offsite waste.

499-12 The volume of this offsite waste was established in the "Record of Decision for *the Solid Waste Program, Hanford Site, Richland, WA*: Storage and Treatment

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

The TCWMEIS (EIS) identifies unacceptably high impacts to human health and the environment due to contamination which will reach the groundwater from disposal, on-site, of existing waste and wastes which are projected to be created during Hanford clean-up. These impacts are compounded by high levels of groundwater contaminants, as estimated from USDOE's preferred alternatives for High-Level Nuclear Waste tanks and their wastes (landfill closure). ***499-16***

Approximately three million cubic feet of offsite waste imported to Hanford landfills is projected in the EIS to increase the contamination levels in groundwater by as much as tenfold for key contaminants of concern. It could reach a cancer risk level for groundwater, over the next thousand years, in excess of one hundred times Washington State's cancer risk standard for cleanup and landfills. (Another serious inadequacy of the draft TCWMEIS requiring revision and reissuance is USDOE's failure to present and discuss Washington State's cancer risk and cleanup standards, discussed later in these comments). ***499-17***

USDOE undermines its credibility by seeking to include the import and burial of 82,000 cubic meters of offsite waste (approximately 3 million cubic feet of waste) in the TCWMEIS while saying that it will honor a moratorium on importing waste until the vitrification plant is operational – projected for the year 2022. ***499-18***

3. Inadequate Assessment of the Impacts from the 3 Million Cubic Feet of Waste Which USDOE Proposes to Import and Bury at Hanford:

Appendix D notes that projecting wastes which USDOE would be importing from 2010 through 2035 is unquantifiable as to specific volumes, sources and great uncertainty as to its composition, because the waste is mostly yet to be generated. Compounding this problem is USDOE's poor management practice under which it discontinued forecasting specific waste streams which it will be generating and needing to dispose. Contrary to public assertions by officials at the TCMEIS hearings, the waste proposed to be disposed at Hanford is NOT from cleanup of existing legacy contamination at USDOE sites, but will be newly generated wastes (including from decommissioning of facilities). Even before USDOE said it would not import waste to Hanford until after the vitrification plant is operational, the contractor preparing the draft TCWMEIS warned that the nature of the wastes to be disposed at Hanford under the proposed preferred alternative could only be guessed at. ***499-19***

If USDOE intends to honor the moratorium on import until the vitrification plant is operational (estimated for the year 2022, then the uncertainty as to waste streams is greatly compounded. The draft EIS in Appendix D includes a "cover your a__" memo by SAIC about the uncertainty in waste stream estimates beginning in 2010. This uncertainty undermines the necessary quality of the site specific impact analysis required for NEPA and SEPA purposes for the Hanford TCWMEIS. If the estimates were uncertain for 2010, they are nothing short of politically motivated guesses as to waste streams for after 2022.[6] ***499-20***

[6] It is illegal to store the mixed wastes without treatment and disposal for the decade plus time period between 2010 and 2022. Therefore, the vast majority of Mixed Wastes generally described in Appendix D as being potential wastes for shipment and disposal at Hanford would have been treated and disposed of long before any waste would be sent to Hanford (unless USDOE does not honor its voluntary moratorium). Presumably, cleanup agreements and consent orders will also forbid prolonged storage of LLW at the USDOE sites as well. As noted, since USDOE

of Low-Level Waste and Mixed Low-Level Waste; Disposal of Low-Level Waste and Mixed Low-Level Waste, and Storage, Processing, and Certification of Transuranic Waste for Shipment to the Waste Isolation Pilot Plant" (69 FR 39449). The volumes are limited to 62,000 cubic meters (81,100 cubic yards) of LLW and 20,000 cubic meters (26,200 cubic yards) of MLLW. This volume was determined to be a reasonable starting point and followed the 2006 Settlement Agreement and its associated MOU between DOE and Ecology, and was reflected in the 2006 NOI (71 FR 5655). The Preferred Alternative for waste management in the draft and final EISs also included limitations on, and exemptions for, offsite waste importation at Hanford, at least until the WTP is operational.

All metric numbers used throughout this EIS, not just in the Summary, are converted to the English system for readers not familiar or comfortable with SI units (the abbreviation for the Système international d'unités). A conversion table is also provided in the beginning of the *TC & WM EIS* Summary and each volume of this EIS.

499-13 See response to comment 499-3 for a discussion on the transport and disposal of offsite waste.

499-14 The responses provided in the *Draft TC & WM EIS* Summary, Section S.1.4.1, and Chapter 1, Section 1.6.1, as well as the discussion of the Settlement Agreement in the Summary, Section S.1.2.3, Hanford Solid Waste Program, have been revised in this *Final TC & WM EIS* to clarify that this volume was determined to be a reasonable starting point and followed the 2006 Settlement Agreement and its associated MOU between DOE and Ecology, and was reflected in the 2006 NOI (71 FR 5655).

499-15 DOE respectfully disagrees with the commentor that DOE failed to revise the analysis from the *HSW EIS*. See Appendix D, Section D.3.6, of this *TC & WM EIS* for more information.

See response to comment 499-3 for a discussion on the transport and disposal of offsite waste.

499-16 DOE recognizes the potential negative impacts on Hanford groundwater that offsite waste poses without mitigation. The *TC & WM EIS* analysis shows that receipt of offsite waste streams that contain specific amounts of certain isotopes, specifically, iodine-129 and technetium-99, could cause an adverse impact on the environment. Therefore, potential means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford or to generate a better-

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

In addition, these off-site waste streams have not been properly identified, with the EIS relying on unverifiable estimates. The Appendix acknowledges that there is no reliable information but does note that a significant portion may be extremely radioactive "Remote-Handled" wastes and contain large amounts of Transuranic elements just below the threshold which would require disposal in a deep geologic repository.

The contractor noted in Appendix D of the draft TCWMEIS, that the information used to model impacts from offsite waste – which would also affect the ability to project impacts from transportation – is not reliable:

> "The information needed for the EIS was not readily available, so efforts were undertaken to use existing corporate information, supplemented by information from DOE waste managers. The EM program has corporate performance metrics that capture the actual and projected volume of LLW and MLLW for disposal from "baselined" projects. The information was not sufficiently detailed for modeling purposes, e.g. LLW and MLLW are combined, and data on radionuclide or hazardous chemical constituents is not collected and maintained corporately."
> Page D-126.

> "(T)here are significant uncertainties in waste volume projections because waste is yet to be generated, and little characteristic information is available as previously discussed. This is a change from the situation during the early years of the EM program when most MLLW was in storage awaiting treatment and disposition.

> "In addition to uncertainties in waste volume, the newly collected LLW and MLLW waste data did not include radionuclide or hazardous chemical data needed for EIS modeling. EM has not collected radionuclide and hazardous constituent information since the 1990's, when data was collected to support the Federal Facilities Task Force and the WMPEIS development. Documented information on radionuclides is found in the *Low-Level Waste Capacity Report*, Revision 2, produced in 2000. This document continues to serve as a source for waste characteristics.

> "It is difficult to predict the radionuclide and hazardous chemical composition of waste projected in the future…," Page D-127

Significant amounts of mixed waste with Plutonium and other TRU just below the legal cutoff requiring disposal in a deep geologic repository is likely to be included in the offsite waste sent to Hanford… However, the Draft TCWMEIS acknowledges that no reliable chemical composition data is available. E.g. LANL and West Valley, NY wastes. Pages D-127 and 128.

499-21

sought to ship waste to Hanford following the 2004 RoD and court settlement imposed moratorium, the wastes which USDOE claimed had to be disposed at Hanford have been, instead, largely disposed in the regulated commercial facility run by Energy Solutions in Clive, UT. It is likely that all of the projected lower activity wastes forecasted for potential disposal at Hanford in Appendix D will be disposed at the Utah facility before 2022. This would greatly increase the concentrations of hard to treat chemical wastes and the proportion of highly radioactive wastes with Plutonium and other Transuranic elements, Uranium, Tc 99 and Iodine to be disposed at Hanford. This would greatly increase the impacts at Hanford compared to the already unacceptable impacts forecast in the draft TCWMEIS.

performing waste form. Other mitigation measures are discussed in Chapter 7, Section 7.5, of this final EIS.

499-17 DOE disagrees with the commentor that this EIS is inadequate and must be revised because cancer risk and cleanup standards are not addressed. Chapter 8 identifies and discusses the laws and legal requirements that are potentially applicable to the proposed actions and alternatives, as well as the permits and approvals DOE must obtain from Federal, state, and local agencies.

The potential doses to, and health impacts on, the public and workers from past Hanford operations have been the subject of a number of studies. Summaries of these studies are presented in Chapter 3, Section 3.2.10.3, of this EIS. As indicated in that section, the question of whether the population around Hanford has elevated cancer incidence or cancer mortality is unresolved. One past study showed no elevated levels of cancer around nuclear facilities, including Hanford; another study of 16 counties near Hanford determined that cancer incidence in white males and females was below the national average in most counties. The counties in which the incidences of cancer were higher than the national average were not those downwind of Hanford.

The Hanford Dose Reconstruction Project evaluated doses to, but not health effects on, members of the public from releases from 1944 through 1972. Airborne releases of iodine-131 from 1944 through 1957 were responsible for most of the doses from air emissions. The largest organ doses were estimated to be 24 to 350 rad to the thyroid. The maximum total effective dose equivalent to an adult from air emissions over the period from 1944 through 1972 was estimated to be 1 rem. The risk of a fatal cancer associated with a dose of 1 rem is about 1 in 1,600. The maximum dose through releases to the Columbia River (from eating nonmigratory fish) was estimated to be 1.4 rem.

Through this EIS, DOE evaluates the potential environmental and human health impacts of proposed actions that would contribute to the cleanup of Hanford, namely, alternatives for the storage, retrieval, treatment, and disposal of tank waste generated from defense plutonium production activities; closure of SSTs; and FFTF decommissioning. This EIS also addresses disposal of LLW and MLLW. The analyses include potential human health impacts (through the air pathway) of normal operations, presented in Chapter 4, with details in Appendix K ("Short-Term Human Health Risk Analysis"), as well as long-term impacts (including through the groundwater and river pathway), presented in Chapter 5, with details in Appendix Q ("Long-Term Human Health Dose and Risk Analysis").

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The method used to estimate these wastes is not reliable and reflects inherent biases from utilizing interviews with site managers seeking to ensure that wastes from their sites would be included in a decision to dispose of wastes at Hanford.

499-21 cont'd

The amounts and hazards of the wastes proposed to be shipped to Hanford and buried are significant, even with this inherent bias: over 6,800 cubic meters of the wastes are projected to be extremely radioactive Class C and Remote Handled Wastes (over 200 mrem radiation at the cask surface); 1,800 Curies of Technetium 99 (which is a major concern because of the projected release of Tc 99 from the IDF landfill in excess of standards even without adding offsite waste); 1.5 Curies of Iodine 129 (similar concern about violation of standards fro IDF releases); and 54.5 Curies of Plutonium 239 and 240. Pages D-134 and 135.

499-22

Despite estimating that the offsite wastes will include $5.34x10^{1}$ curies of Uranium isotopes, the chemical estimate has NO Reported Uranium. Throughout the TCWMEIS, we have found that USDOE failed to include Uranium as a chemical of concern with significant toxicity hazards, even when documenting that Uranium was present in large quantities in the radionuclide inventories.

499-23

Since the IDF landfill is already built in 200 East, the only reason for the Waste Management portion of the EIS is to provide support for the decision to import and bury additional waste – which USDOE says it will not do for twelve years.

499-24

USDOE can not use the results of unreliable guesstimates about waste quantities and composition provided by site managers or from questionable assumptions that pas cleanup wastes will be similar to future generated wastes, in assessing the impacts from disposing of those future wastes at Hanford. USDOE should withdraw the decisions to use Hanford as a national waste dump, and commit not to add any wastes to Hanford's problems. Then, if in 2022, if the vitrification plant is operational and if USDOE has significantly reduced the hazards and long term groundwater impacts from Hanford's existing wastes, then USDOE could issue a new reliable EIS utilizing real waste data.

499-25

The EIS's cumulative impact analysis projects that the Hanford site will persist in re-contaminating groundwater and the Columbia River over the next hundred to thousand of years, even after current allocated budgets and identified cleanup is done. There is no acknowledgement within the EIS of the need for additional retrieval from burial grounds, tank leaks, tank bottoms and other sources - where there are significant amounts of waste discharges and buried waste, in order to drive down cumulative impacts.

499-26

The quantity of waste already in the ground at Hanford and proposed to be buried in shallow landfills after being created during vitrification and other processes is simply too high. The waste volumes proposed to be disposed and already in the soil are projected by USDOE to result in extremely high contamination levels exceeding health and groundwater risk standards by magnitudes. These impacts are compounded by USDOE's intention to add more waste to the site.

- **NEPA requires that USDOE disclose and consider reasonable alternatives. USDOE failed to present reasonable alternatives: a) to using Hanford as a national waste dump; or, b) for retrieving, treating and removing wastes from Hanford for disposal**

499-27

499-18 See response to comment 499-3 for a discussion on the transport and disposal of offsite waste.

499-19 Regarding the commentor's concern as to the accuracy of data, DOE reexamined the inventories used in this *Final TC & WM EIS* and determined that the best-available data were used in the analysis, with the understanding that uncertainty still remains. For a more comprehensive discussion of this topic, see Section 2.2 of this CRD.

499-20 It is unclear what the commentor is referring to. DOE is not aware of a "cover" memorandum prepared by Science Applications International Corporation in Appendix D of this EIS. The EIS analyses are appropriate and properly disclose uncertainties as required under NEPA. Section D.3.6 describes the process for determining the inventory and the uncertainty related to disposal of these future waste streams.

499-21 Appendix D, Section D.3.6, includes an excerpt from *Analysis of Offsite-Generated Waste Projections, "Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site"* (DOE 2006a), which was prepared by the EM Office of Disposal Operations. This DOE report documents the methodology and analysis applied to offsite LLW and MLLW that potentially could require disposal at Hanford and states clearly that "It is difficult to predict the radionuclide and hazardous chemical composition of waste projected in the future, particularly from cleanup programs, because the waste does not exist until the cleanup work progresses." DOE believes the offsite waste inventory presented in Section D.3.6 and analyzed in this EIS is appropriate to use.

499-22 The *TC & WM EIS* analysis shows that receipt of offsite waste streams that contain specific amounts of certain isotopes, specifically, iodine-129 and technetium-99, could cause an adverse impact on the environment. It is also noted that the commentor referred incorrectly to the inventories for iodine-129 and plutonium-239 and -240 listed in Appendix D, Table D–81, of the draft EIS. The correct inventory estimates for these radionuclides are 15.3 and 545 curies, respectively. One means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford.

In response to comments about offsite waste disposal at Hanford, DOE has included in this *Final TC & WM EIS* an example of a potential mitigation measure that could be taken. Specifically, an offsite waste stream containing a significant inventory of iodine-129 and technetium-99 was eliminated from the analysis by applying proposed waste acceptance criteria. A sensitivity

in geologic repositories and landfills which are not projected to cause impacts to groundwater in violation of standards.

499-27 cont'd

New monitoring data showing contamination levels higher than projected in the EIS' model, e.g., chromium upwelling into the Columbia River and contamination spreading from tank leaks and discharges, cast doubt that the modeling projecting very high impacts is conservative. As discussed above, the modeling for impacts from offsite waste is NOT conservative, since the forecasts of wastes are unverifiable estimates, with a likelihood that the wastes awaiting disposal beginning in 2022 will be of higher radioactivity levels and have greater concentrations of Plutonium, Uranium, Tc99, Iodine 129 and harder to treat chemicals than those projected in appendix D as available for disposal starting in 2010.

499-28

The EIS should contain a full evaluation of the potential to reduce cumulative impacts by exhuming burial sites, to the degree practical, before capping; and, consider reasonable alternatives which would remove and treat long-lived, extremely radioactive or mixed chemical hazardous wastes for disposal in deep geologic repositories or regulated offsite landfills which are not projected to cause contamination in excess of relevant standards (e.g., remove and dispose in a deep geologic repository TRU buried before 1970 or in soil discharge sites; and, remove and dispose of tank farm equipment, piping, equipment and residues as Greater Than Class C waste in a geologic repository).

499-29

4. NEPA and SEPA both require that USDOE disclose and discuss all relevant laws and standards:

One key law ignored by USDOE in the TCWMEIS is known as the Offsite Waste Rule of the federal Superfund law (CERCLA). CERCLA 121(d), 42 U.S.C.A. § 9621(d); and 40 CFR 300.440.

Under the Offsite Waste Rule, waste from other Superfund sites may not be added to landfills of units which are not in compliance, are releasing contaminants, or which are located on a facility at which other units or sites have uncontrolled releases of contamination into the environment.

USDOE proposes to use Trenches 31 and 34 for offsite waste at Hanford, prior to utilizing the IDF landfill and under the No Action Alternative, ignoring that these trenches have never been permitted. They were opened in the 1990s without a RCRA/HWMA Part B permit – illegally. They still have no permit.

499-30

As the TCWMEIS makes amply clear, there are hundreds of sites at Hanford with uncontrolled releases of contamination spreading into the environment. Some of them will not be subject to a specific remedial action decision or closure decision for decades. These are not "controlled." Thus, under the Offsite Waste Rule, neither the IDF landfill nor the existing MW Trenches 31 and 34 are eligible to receive wastes from other USDOE sites undergoing closure or cleanup under the Superfund law.[7]

[7] USDOE sites do not need to be on the National Priority List (NPL) to be under Superfund's authority for cleanup.

analysis is also included that shows the impacts of limiting offsite waste streams containing iodine-129 and technetium-99. The results of this sensitivity analysis illustrate the difference this would make in potential groundwater impacts and are included in Appendix M. Other mitigation measures are discussed in Chapter 7, Section 7.5, of this EIS.

499-23 Estimates of the total uranium inventory were not provided in the table. DOE revised the Appendix D inventories to include a calculated total uranium inventory. Note that the uranium inventory was included in the analysis of both the draft and this final EIS, but was not entered as a total in the table.

499-24 A permit was issued by the state for construction of IDF-East and disposal of ILAW glass. This *TC & WM EIS* evaluates these activities as required by NEPA and informs DOE's decisionmaking on Hanford LLW and MLLW disposal.

499-25 The EM report cited in Appendix D, Section D.3.6, states clearly that "It is difficult to predict the radionuclide and hazardous chemical composition of waste projected in the future, particularly from cleanup programs, because the waste does not exist until the cleanup work progresses." DOE's analyses conservatively account for the reasonably foreseeable range of potential impacts, and uncertainties are discussed in accordance with NEPA requirements for incomplete and unavailable information (40 CFR 1502.22). DOE believes the offsite waste inventory presented in Section D.3.6 and analyzed in this EIS is the best-available data at the time of its publication.

See response to comment 499-3 for a discussion on the transport and disposal of offsite waste.

In a *Federal Register* notice published on December 18, 2009 (74 FR 67189). DOE also included GTCC waste as part of that moratorium. DOE has not changed its Preferred Alternative in this final EIS concerning this extended moratorium. DOE's inclusion of the moratorium in its ROD following issuance of this final EIS would result in its enforceability.

499-26 As stated in Chapter 1, Section 1.4.2, of this *TC & WM EIS*, groundwater contamination in the non-tank-farm areas of the 200 Areas (including the burial grounds, cribs, and trenches [ditches]) is being addressed under CERCLA remedial action, which will also satisfy substantive RCRA and Washington State Hazardous Waste Management Act corrective action requirements. Contamination in the vadose zone resulting from tank farm past leaks will be addressed as part of the SST closure process. The cumulative impact analyses for

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The IDF landfill permit conditions are never mentioned in the TCWMEIS. Under both NEPA and SEPA, USDOE and Ecology are obligated to assess – in the draft EIS for public review – the adequacy of those conditions as mitigation measures to prevent the forecasted releases from IDF from violating standards in the future. Under NEPA and SEPA, USDOE is also obligated to present the permit conditions for IDF as relevant legal standards, which the TCWMEIS fails to do. Because no EIS was prepared for IDF, and the draft shows probable significant impacts to health and the environment from projected releases, the TCWMEIS must assess both the impacts and adequacy of mitigation measures (conditions in the permit).

499-30 cont'd

State Clean-Up Standards and laws Ignored:

The EIS fails to discuss and consider the relevant State cleanup standards (MTCA) in comparing projected contamination levels to what are referred to in the EIS as "benchmark standards". MTCA standards are more protective of human health for cancer risk than the levels shown in the EIS. Washington's MTCA (RCW Chapter 70.105D) is not even listed in the draft EIS' list of authorities. As we discuss in the section on SEPA adoption in greater detail, this failure requires revision and reissuance of the draft for comment.

499-31

In preparing the draft TCWMEIS and developing its preferred alternatives, USDOE has failed to consult with the National Marine Fisheries Service (NMFS) and USFWS as required by the Endangered Species Act (ESA):

To cure this serious defect, USDOE must consult under Section 7 of the ESA and provide the public with the opportunity to comment on the results of that consultation in a revised draft EIS.

USDOE's proposed actions and the contamination from existing wastes are shown in the draft TCWMEIS and numerous other USDOE documents to affect the critical habitat of listed endangered salmonid species in the Hanford Reach of the Columbia River. For example, chromium and Uranium levels flowing into the River and at shorelines are currently unacceptably high and are projected to grow.

499-32

USDOE's proposed actions are "actions" under the ESA triggering formal consultation requirements with the expert agencies regarding whether the proposed actions will impact critical habitat or harm the endangered species.[8] For example, USDOE must consult as to whether

[8] 15 USC 1536

(a) Federal agency actions and consultations

(2) Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency (hereinafter in this section referred to as an "agency action") is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with affected States, to be critical, unless such agency has been granted an exemption for such action by the Committee pursuant to subsection (h) of this section. In fulfilling the requirements of this paragraph each agency shall use the best scientific and commercial data available.

this *TC & WM EIS* (see Chapter 6 and Appendix U) include the vadose zone in the 200 Areas, as well as other areas of Hanford.

The commentor brings up the issue of integration and cleanup of CERCLA and RCRA units, which could influence each other. Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

499-27 DOE disagrees with the assertion that the alternatives are not reasonable. The alternatives presented in this *TC & WM EIS* were developed under NEPA (42 U.S.C. 4321 et seq.) to address the essential components of DOE's three sets of proposed actions (tank closure, FFTF decommissioning, and waste management) and to provide an understanding of the differences between the potential environmental impacts of the range of reasonable alternatives. Consistent with CEQ guidance, this EIS analyzes the range of reasonable alternatives that covers the full spectrum of potential combinations. The alternatives considered by DOE in this EIS are "reasonable" in the sense that they are practical or feasible from a technical and economic standpoint and meet the agency's purposes and needs. Potential conflicts with laws and regulations do not necessarily cause an alternative to be unreasonable, but additional mitigation commitments may be required if it is selected for implementation. For a more comprehensive discussion on compliance with regulatory requirements, see Section 2.7 of this CRD.

See response to comment 499-3 for a discussion on the transport and disposal of offsite waste.

499-28 A new discussion has been added to Appendix U (described throughout Section U.1.2) in this final EIS that addresses the impacts of chromium in the Central Plateau, as well as flux of chromium to the Columbia River nearshore. In general, chromium fluxes to the river as modeled are within an order of magnitude of current estimates from field data. Modeled impacts at the Central Plateau are somewhat higher than current observations, although still within an order of magnitude.

Regarding the commentor's concern as to the accuracy of data, DOE reexamined the inventories used in this *Final TC & WM EIS* and determined that the best-available data were used in the analysis, with the understanding that uncertainty

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contaminants projected to flow into the River are of concern to salmon and critical habitat, and what levels should require additional actions:

> Section 7(a)(2) of the ESA requires the Secretary of the Interior to ensure that an action of a federal agency is not likely to jeopardize the continued existence of any threatened or endangered species. To this end, section 7(b) sets out a process of consultation whereby the agency with jurisdiction over the protected species issues to the Secretary a "biological opinion" evaluating the nature and extent of jeopardy posed to that species by the agency action. 16 U.S.C. § 1536(b). In order to maintain the status quo, section 7(d) forbids "irreversible or irretrievable commitment of resources" during the consultation period. *Id.* § 1536(d).
>
> Section 7 specifically provides that a federal agency (the "action" agency) *shall* "in consultation with ... the Secretary [of the Interior], insure that any action authorized, funded, or carried out by such agency ... is not likely to jeopardize the continued existence of any endangered species or threatened species...." *Id.* § 1536(a)(2) (emphasis added).
>
> Procedural guidelines for complying with this consultation requirement are codified at 50 C.F.R. Part 402. The FWS implementing regulations under the ESA require agencies to review their action "at the earliest possible time to determine whether any action may affect listed species." *Id.* § 402.14(a). The FWS defines agency "action" broadly to include "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies...." *Id.* § 402.02.

Lane County Audubon Society v. Jamison, 958 F.2d 290 at 294 (9th Cir. 1992).

499-32 cont'd

Washington State's State Environmental Policy Act (SEPA) requires that an agency disclose for comment specific conditions that will mitigate projected impacts in order to bring a facility into compliance; and, requires enforceable mitigation commitments as part of SEPA. The EIS could not, as currently written, support RCRA/HWMA permitting under SEPA.

The impacts of relying on caps without remediation are shown to greatly exceed relevant standards. USDOE does not discuss, within the EIS, state requirements to remove contamination, to the degree practicable, before capping.

Secondary waste disposal, from the Waste Treatment Plant, is projected to cause significant groundwater impacts. Technetium is a driver for elevated impacts.

499-33

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(3) Subject to such guidelines as the Secretary may establish, a Federal agency shall consult with the Secretary on any prospective agency action at the request of, and in cooperation with, the prospective permit or license applicant if the applicant has reason to believe that an endangered species or a threatened species may be present in the area affected by his project and that implementation of such action will likely affect such species.

(4) Each Federal agency shall confer with the Secretary on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under section 1533 of this title or result in the destruction or adverse modification of critical habitat proposed to be designated for such species. This paragraph does not require a limitation on the commitment of resources as described in subsection (d) of this section.

still remains. For a more comprehensive discussion of this topic, see Section 2.2 of this CRD.

499-29 The scope of this *TC & WM EIS* did not include the remediation of the burial grounds as part of the proposed actions evaluated. However, Appendix S includes DOE's inventory estimates for the burial grounds, and Appendix U provides supporting information concerning the long-term cumulative impact analyses that includes the burial ground inventories.

DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

Regarding the status of groundwater contamination and remediation at Hanford, groundwater remediation activities, as required under RCRA, CERCLA, and/or the TPA, are in various stages of assessment, risk-based end-state development, corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 of this CRD.

499-30 CERCLA requirements pertaining to Hanford environmental restoration cleanup activities are implemented under the TPA, as described in the *Draft TC & WM EIS*, Chapter 8, Section 8.1.4.

As a waste generator, DOE complies with the provisions of the CERCLA "Offsite Rule" and has issued guidance concerning application of the rule to DOE waste management facilities. The CERCLA Offsite Rule allows CERCLA waste to be transferred by the generator to an offsite RCRA Subtitle C land disposal facility, including a facility regulated under the "permit-by-rule" provisions (40 CFR 270.60), i.e., interim-status facilities or those that do not yet have final permits, such as Hanford. Such transfers may occur even where a nonreceiving unit located at the facility is releasing hazardous waste constituents or hazardous substances if the release is controlled by an enforceable agreement or a corrective action under RCRA Subtitle C or other applicable Federal or state authority (40 CFR 300.440(b)(2)(ii)(B) and (D)). Releases are "deemed" to be controlled upon issuance of the order, permit, or decree that initiates and requires compliance under an RCRA (or federally delegated state law) Facility Investigation/Corrective Measures Study or upon corrective measures implementation (40 CFR 300.440(f)(3)(iv) and (f)(3)(v)).

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5. Because of the serious deficiencies in the draft TCWMEIS, USDOE should withdraw the draft and revise it for reissuance – dropping any proposal to add offsite waste to Hanford.

499-34

The draft TCWMEIS fails to include known inventories of key wastes and contaminants, rendering the cumulative impact analysis inadequate. Other examples of serious inadequacies include:

499-35

i) Human health impacts are not presented from projected exposures, violating NEPA;

499-36

ii) The draft TCWMEIS fails to include site specific transportation route analyses for USDOE's plan to truck 3 million cubic feet of waste to Hanford, despite court decisions that a legally adequate EIS must include route specific impact analyses;

499-37

iii) The draft TCWMEIS fails to consider and disclose the direct and cumulative impacts from pending formal proposals to add other wastes to Hanford, particularly USDOE's pending proposal to import and bury large quantities of highly radioactive mixed wastes referred to as "Greater Than Class C" (GTCC) and "Greater Than Class C like" wastes;

499-38

iv) Failing to present and consider Washington State's cleanup standards, including its cancer risk standard, in comparison to USDOE's projected contamination levels from its proposed actions and cumulative impacts;

499-39

v) Failing to present and commit to substantive mitigation measures designed to bring proposed actions into compliance with relevant state and federal standards. Failure to present mitigation measures for comment in the draft EIS and failing to include proposed mitigation measures for adoption (e.g., RCRA permit limits) means that the TCWMEIS can not be accepted for use by Washington Ecology under the Washington State Environmental Policy Act (SEPA).

- USDOE has responded orally to this concern by saying it will prepare a separate mitigation summary document after adoption of the Final EIS.

- SEPA requires that Ecology offer the public the opportunity to review and comment on the proposed mitigation measures in the EIS; and, that Ecology propose adoption of specific mitigation measures. The draft TCWMEIS is devoid of all reference to specific mitigation measures to bring proposed actions and contaminant or risk levels into compliance with relevant standards. Indeed, based on our review seeking references to MTCA and Washington's HWMA and RCRA permit, there appears to be not one reference in the entire draft EIS to either Washington's MTCA standards and rules or to any potential provisions in the RCRA/HWMA permit for Hanford to achieve standards (except in the language quoted below in Ecology's Foreword).

499-40

The public is entitled to review and comment on an adequate and complete draft EIS. Therefore, USDOE should commit to cure the significant errors and omissions in the draft TCWMEIS and resubmit the EIS for public comment. This view is shared by the Hanford Advisory Board (HAB) in its formal advice to USDOE and Washington Ecology (Adopted March 4, 2010). The flaws in the current Draft TCWMEIS, despite USDOE having spent $50 million in preparation, are an embarrassment, heightened by the apparent incompetence and/or bias of the contractor which prepared the draft EIS, SAIC.

499-34 cont'd

In Hanford's case, the "release control mechanism" would be the TPA, which integrates the requirements of CERCLA, RCRA, and the Washington State Hazardous Waste Management Act. The release remains controlled as long as the facility is in compliance with the order, permit, or decree and enters into subsequent agreements for implementation. Note that it is EPA, not DOE, that determines the receiving facility's acceptability. EPA has previously determined that the Central Waste Complex and LLBGs currently in use at Hanford are "acceptable" for purposes of the CERCLA Offsite Rule. EPA consulted with the State of Washington in making its determinations that the Central Waste Complex and LLBGs appeared to be in substantial compliance with applicable Federal and state environmental regulations and notification requirements. EPA's determinations noted that releases or threatened releases of hazardous constituents and hazardous substances from other areas of Hanford are being addressed under CERCLA or RCRA corrective action authority. EPA's determinations also require that future shipments be coordinated with EPA and Ecology. EPA's acceptability determination may change based on future compliance issues, judicial challenge, or discovery of a significant release for which emergency action is necessary. DOE has not received a notice from EPA that the acceptability status of the Central Waste Complex or LLBGs has changed since EPA's original determinations.

499-31 The "benchmark standards" used in this *TC & WM EIS* represent dose or concentration levels that correspond to known or established human health effects. For groundwater, the benchmark is the MCL if an MCL is available. For example, the benchmark for iodine-129 is 1 picocurie per liter; for technetium-99, it is 900 picocuries per liter. These benchmark standards for groundwater impacts analysis were agreed upon by both DOE and Ecology as the basis for comparing the alternatives and representing the potential groundwater impacts. In addition, this approach is consistent with the MTCA standards Method A, which is used to establish cleanup levels under the separate CERCLA and RCRA processes established by the TPA. Method A draws from current Federal and state standards, including the MCLs listed in Table 720-1 of the MTCA.

499-32 In 2003, DOE initiated informal consultation with USFWS and NMFS, as well as with the State of Washington, at a time when the proposed scope of this EIS was limited to the retrieval, treatment, and disposal of tank waste and closure of SSTs. However, since that time, the scope of this EIS has been expanded to include decommissioning of FFTF and waste management. Accordingly, DOE reinstituted informal consultation with USFWS, NMFS, and the state

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

Ecology's Foreword to the Draft TCWMEIS (presented in the Readers' Guide and Summary) misrepresents the standards under SEPA in regard to when the public must be able to review and comment on proposed mitigation measures. The Foreword states:

> "After this *TC & WM EIS* is finalized, Ecology will proceed with approving regulatory actions required to complete the Hanford cleanup. These include actions under the Hanford Federal Facility Agreement and Consent Order (HFFACO, or Tri-Party Agreement) and actions that require state permits or modifications to existing permits, such as the Hanford Sitewide Permit. This permit regulates hazardous waste treatment, storage, and disposal activity at Hanford, including actions such as tank closure and supplemental treatment for tank waste.
>
> Ecology must comply with SEPA when undertaking permitting actions. It is Ecology's hope that the *Final TC & WM EIS* will be suitable for adoption in whole or in part to satisfy SEPA."[9]

The TCWMEIS, however, can not be "suitable for adoption in whole or in part to satisfy SEPA" unless the draft for public comment was prepared and the comment period conducted in a manner which satisfies SEPA. As of now, USDOE has failed to prepare a draft for public review which meets fundamental requirements of SEPA. For example, the public has been denied its rights to review and comment on a draft EIS which discloses and considers Washington State's cleanup and cancer risk standards, mitigation measures, reasonable alternatives, and even a summary for public review which presents impacts and mitigation measures. These violations of SEPA are substantive and can not be cured in a Final EIS. They can only be cured by revision and reissuance of the draft EIS for comment.

499-41

Pursuant to WAC 197-11-792, alternatives to be presented for review and for the agency officials to act upon are "mitigation measures", which may include measure outside the proposed action (e.g., regulatory actions beyond USDOE's proposals).

WAC 197-11-440(4) requires that the Summary of the EIS include a statement of " the effectiveness of mitigation measures."

The Summary – like the rest of the EIS – is devoid of discussion of mitigation measures. This is not only the view of our organizations, but also of the Hanford Advisory Board (representing a wide range of geographically diverse communities of interest).

To be adopted by Washington State, the DRAFT EIS must present for public review and comment a section (or incorporate into the sections describing the impacts and loss of use of resources from impacts [e.g., loss of use of groundwater due to projected contamination – which the EIS fails to discuss]) describing specific mitigation measures. WAC 197-11-440(6) requires:

> (6) **Affected environment, significant impacts, and mitigation measures.**
>
> (a) This section of the EIS shall describe the existing environment that will be affected by the proposal, analyze significant impacts of alternatives including the proposed action, and discuss reasonable mitigation measures that would significantly mitigate these impacts….

[9] Foreword Sec. III, page 3.

in 2008 (see Appendix C, Section C.2.1). While responses to consultation letters were received from the state, none were received from USFWS or NMFS (see Appendix C, Section C.2.3). Each agency was also provided a copy of the *Draft TC & WM EIS*; USFWS commented on the document, while NMFS did not. It should be noted that neither the 2003 nor 2008 letter to NMFS implied that the proposed actions "may affect" Columbia River resources, but rather sought information from the agency concerning what species DOE should consider in its analysis. In addition, while the *Threatened and Endangered Species Management Plan, Salmon and Steelhead* (DOE 2000b) defines DOE's commitment to stocks of steelhead and spring Chinook salmon, it was not used to support DOE's position relative to the commentor's statement.

It should be noted that the analyses of impacts on threatened and endangered species presented in this *TC & WM EIS* address construction and normal operations. Any analyses of potential impacts of accidents would be highly speculative, considering the very low probability of an accident (see Chapter 4).

499-33 Under "Adoption — Procedures" (WAC 197-11-630), which is part of the regulations implementing SEPA, a state agency such as Ecology may choose to adopt an existing environmental document (e.g., this *TC & WM EIS*) to satisfy SEPA requirements for a proposed future permit instead of preparing its own separate document. The agency must independently review the contents of the existing environmental document and determine that it meets the agency's environmental review standards and needs for purposes of issuing a future permit. The existing environmental document is not required to meet the agency's procedures for preparing a separate document (such as circulation, commenting, and hearing requirements) to be adopted.

As a cooperating agency (as defined under CEQ regulations) in DOE's preparation of this *TC & WM EIS*, Ecology has independently reviewed the *Draft TC & WM EIS* and will review this *Final TC & WM EIS* for the express purpose of ensuring that this EIS satisfies Ecology's SEPA needs. The State of Washington has agreed that the descriptions of the alternatives identify the information needed to meet SEPA requirements. Ecology expects that the analysis provided in this *Final TC & WM EIS* will provide enough information to adequately inform its permitting requirements. Permits needed to implement the actions identified in the ROD would be processed under Washington State's Hazardous Waste Management Act and other applicable authorities, which generally require a separate opportunity for public comment on any proposed permits developed by Ecology. SEPA authorizes (but does not require) Ecology

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(iii) Clearly indicate those mitigation measures (not described in the previous section as part of the proposal or alternatives), if any, that could be implemented or might be required, as well as those, if any, that agencies or applicants are committed to implement….

(v) Summarize significant adverse impacts that cannot or will not be mitigated.

The Hanford Advisory Board (HAB) formally found that mitigation measures were not considered or presented – representing a widespread consensus about the draft TCWMEIS, and advised USDOE and Ecology (in advice we share and include as part of our comments to be responded to):

> "Most tank closure and the waste management alternatives appear to lack necessary actions to ensure that soil and groundwater are not further contaminated, that risk to human health and the environment does not increase in the future, and that the soil and groundwater are restored." (HAB Advice 229, March 4, 2010, Page 3)
>
> "Each alternative presented in the draft TC & WM EIS should be amended to identify mitigation measures to protect the soil, groundwater, environment and uncounted future generations." Id page 4
>
> "The draft TC & WMEIS should include specific conditions to mitigate impacts from all wastes supposed (sic) for disposal, which include treatment methods and waste acceptance criteria, to prevent contamination of groundwater above standards from any landfill." HAB Advice 229 Page 11
>
> Also, at page 12, the HAB advice found:
> "The estimated risk arising from the quantity of waste already in the ground at Hanford and from the proposed volumes to be buried in shallow landfills… exceeds Model Toxics Control Act (MTCA) standards. Mitigation measures should be identified to reduce this risk to meet regulatory standards. These risks would be further compounded by DOE's intention to add more waste to the site."

The only way to cure this major deficiency of the EIS, if it is to be adopted by Ecology for support of RCRA/HWMA and TPA actions is for dramatic revision of the EIS to incorporate the elements describing:

a) limits on the use of resources;
b) human health impacts from reasonably foreseeable exposures; and,
c) a description of potential regulatory measures and changes to the proposed actions which would mitigate the impacts.

If mitigation will not bring proposed actions into compliance with standards (which is likely that it is impossible to do), then changes to the proposed actions must be included in the EIS description of alternatives. *Such mitigation measures and changes should include regulatory and permit provisions barring any addition of offsite waste; requirements barring capping of all waste disposal, tank farm and unplanned release sites without characterization of releases and "distribution of hazardous substances" in trenches, burial grounds, discharge sites and*

499-41 cont'd

to include enforceable mitigation measures in its future permitting decisions for the IDF(s). Following completion of the mitigation action plan, Washington State RCRA/Hazardous Waste Management Act permit decisions will be made to ensure the necessary mitigation measures are implemented. The permitting process will consider the mitigation measures provided in this *TC & WM EIS* and may include other measures that the State of Washington determines are necessary for protection of human health and the environment. The State of Washington's "Dangerous Waste Regulations" (WAC 173-303) implement the Hazardous Waste Management Act of 1976 and provide the requirements for cleanup- and permit-related decisionmaking. These regulations ensure that, as cleanup begins, public input will be sought and the state MTCA cleanup standards will be considered. Please see Ecology's foreword to this *Final TC & WM EIS* for Ecology's perspective as a cooperating agency.

499-34 DOE has satisfied NEPA requirements by preparing a complete and technically accurate EIS, responding to public comments in this CRD, and making changes to this EIS where appropriate and necessary. In accordance with CEQ regulations (40 CFR 1502.9(c)) and DOE regulations (10 CFR 1021.314(c)), DOE prepared an SA to evaluate information previously presented in the *Draft TC & WM EIS* that has been updated, modified, or expanded to determine whether a supplement to the draft EIS is warranted. DOE concluded, based on analyses in the SA, that the updated, modified, or expanded information developed subsequent to the publication of the *Draft TC & WM EIS* does not constitute significant new circumstances or information relevant to environmental concerns and bearing on the proposed action(s) in the *Draft TC & WM EIS* or their impacts. Further, DOE has not made substantial changes in the proposed action(s) that are relevant to environmental concerns. Therefore, in accordance with CEQ regulations (40 CFR 1502.9(c)) and DOE regulations (10 CFR 1021.314(c)), DOE determined that a supplemental or new *Draft TC & WM EIS* was not required. See Chapter 1, Section 1.8.2, for more information.

499-35 DOE disagrees with the commentor's assertion that the cumulative impact analyses are inadequate. Appendix S of this *TC & WM EIS* explains the process used to develop the inventory data set for the cumulative impact analyses and discusses data uncertainty.

499-36 This *TC & WM EIS* presents the potential human health impacts of projected exposures in Chapters 4 and 5. Potential short-term radiological human health impacts of proposed activities at Hanford are presented in Chapter 4, Section 4.1.10, for Tank Closure alternatives; Section 4.2.10 for FFTF

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contaminated soil sites (SEE WAC 173-340-350(7)(c)(iii): remedial investigation must be sufficient to characterize the "distribution of hazardous substances as well as the threat….").

- Ecology must propose a mitigation measure under which no further waste is added to the site, so long as existing wastes and proposed actions are projected to violate relevant standards; and, because the projected impacts from disposal of offsite waste will violate relevant standards. As noted earlier, Figure S-21 at S-100 demonstrates that offsite wastes increase the degree of violation above MTCA's risk and cleanup standards ten-fold.

- Energy's proposed voluntary, unenforceable moratorium on offsite waste until the vitrification plant is "operational" does NOTHING to mitigate the long term violations of standards or to reduce the long-term contamination and health impacts from adding offsite waste over hundreds and thousands of years. And, in addition to the lack of reducing any long-term impact, because it can be lifted at any time, USDOE's voluntary moratorium is not even a proper mitigation measure. ***499-41 cont'd***

For Ecology to adopt the TCWMEIS, the TCWMEIS must be revised and reissued for public comment with specific shortcomings addressed, including, but not limited to, presentation for comment of specific mitigation measures, a summary which describes the likely impacts on health and the environment from proposals, and a description of resources whose use will be limited due to contamination or other impacts. To be legally adequate, the draft EIS should be reissued for comment with identification of specific mitigation conditions that could bring proposed landfills and other waste management units into compliance with relevant state and federal standards.

For Ecology to adopt the TCWMEIS, it must independently review and respond to comments – it can not merely accept and adopt USDOE's (the polluter's) comments. ***499-42***

These shortcomings are not solely relevant to adoption of the TCWMEIS by Ecology. The TCWMEIS fails to meet CEQ guidelines and NEPA requirements and must be revised and reissued for public comment. ***499-43***

A serious legal inadequacy of the draft TCWMEIS requiring revision and reissuance is USDOE's failure to present and discuss Washington State's cancer risk and cleanup standards NEPA requires discussion of relevant standards. Under the federal Superfund law, CERCLA, Washington State's cleanup standards are "applicable and relevant standards" for the cleanup decisions at Hanford. Under federal hazardous waste laws, including RCRA and the Federal Facilities Compliance Act, Washington's closure standards govern mixed waste units such as the High-Level Nuclear Mixed Waste tanks. Washington's cleanup standards, including Washington's cancer risk standard for residual contamination used to establish cleanup levels, are found in the Model Toxics Control Act (MTCA), RCW Chapter 70.105D, and WAC Chapter 173-340. ***499-44***

The most fundamental cleanup standard under State law is the cleanup carcinogen risk level

Decommissioning alternatives; and Section 4.3.10 for Waste Management alternatives, with details presented in Appendix K, "Short-Term Human Health Risk Analysis." Potential long-term impacts are presented in Chapter 5, and details of the potential long-term human health impacts, in Appendix Q, "Long-Term Human Health Dose and Risk Analysis."

499-37 The *Draft TC & WM EIS* contains an analysis of transportation routes of specific origination/destination sites to and from Hanford, as shown in Appendix H, Figure H–4, Waste Management Alternatives – Analyzed Truck and Rail Routes. The actual routes used could vary due to changes in route characteristics and highway construction, but the risk results are expected to remain essentially the same.

499-38 Regarding the commentor's concern about the inclusion of GTCC LLW in this *TC & WM EIS*, DOE has included information from the *Draft GTCC EIS* in the *Final TC & WM EIS* cumulative impacts analysis. For a more comprehensive discussion on GTCC LLW, see Sections 2.1 and 2.12 of this CRD.

499-39 Please see response to comment 499-31 regarding the commentor's reference to appropriate cleanup standards.

499-40 Additional sensitivity analysis has been added to this *Final TC & WM EIS* for potential secondary-waste mitigation, offsite-waste mitigation, vadose zone soil mitigation, and the IDF. Following issuance of this *Final TC & WM EIS* and its associated ROD, DOE is required to prepare a mitigation action plan that addresses mitigation commitments expressed in the ROD. This plan would be prepared before DOE would implement any action that is the subject of a mitigation commitment. Copies of any mitigation action plan developed by DOE will be made available for inspection in appropriate DOE public reading room(s) and will also be available upon request.

Following completion of the mitigation action plan, Washington State RCRA/Hazardous Waste Management Act permit decisions will be made to ensure the necessary mitigation measures are implemented. The permitting process will consider the mitigation measures provided in this *TC & WM EIS* and may include other measures that the State of Washington determines are necessary for protection of human health and the environment. The State of Washington's "Dangerous Waste Regulations" (WAC 173-303) implement the Hazardous Waste Management Act of 1976 and provide the requirements for cleanup- and permit-related decisionmaking. These regulations ensure that, as cleanup begins, public input will be sought and the state MTCA cleanup standards will be considered.

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Nowhere in the draft EIS is there a single mention of these standards.

This is either a deliberate choice, reflecting political beliefs by Department officials that they do not wish to meet State standards (continuing a decades long fight against application of state cleanup standards by the Department – despite clear Congressional direction), or gross incompetence.

The EIS section describing "Hanford Regulatory Requirements" (Section 1.2.1) fails to mention MTCA or Washington's Hazardous Waste Management Act (HWMA), RCW Chapter 70..105, which governs "closure", construction and operation of tank systems and other units used to store, treat or dispose of hazardous wastes. Closure of tank systems and past practice units under HWMA requires compliance with MTCA's standards. WAC 173-303-64620.

Washington State's cleanup standards in the Model Toxics Control Act [MTCA], RCW Chapter 70.105D and WAC Chapters 173-303 and 340, are important guide posts regarding acceptability of health impacts from projected levels of contamination. Failure to discuss the standards and failure to provide the public with comparisons of proposed actions to the standards can only be cured by revision and reissuance of the Draft TCWMEIS for public comment.

- CERCLA applies at federal facilities "in the same manner and to the extent as such guidelines, rules, regulations, and criteria are applicable to other facilities" 42 USC 9620 (a)(2).
- State Cleanup laws apply to federal facilities that are not on the Superfund National Priorities List (NPL) to the same extent that they apply generally to all other sites in the state. 42 USC 9620 (a)(4).
- If Hanford does not meet state cleanup standards when taken off the NPL, it would be subject to cleanup under the state's more protective Model Toxics Control Act standards.
- Because a more protective state cleanup standard would apply after a federal facility is removed from the CERCLA NPL… cleanup of the federal facility should meet the state's more protective cleanup standards when designing the cleanup. Therefore:
  CERCLA requires that cleanups meet more protective state requirements:
- any applicable, relevant and appropriate standard or requirement under state laws or rules for any pollutant that would remain after cleanup. 42 USC 9621(d)(2).

- CERCLA's requirement from Sec. 120 that applicable or relevant state standards (ARARs)be applied in selecting the remedy requires that standards which EPA may not view as enforceable must still be explicitly considered and applied if they are "relevant".
- Thus, Washington State's standard for total carcinogen risk is a requirement that must be met whether the site is being cleaned up under CERCLA or Washington's Hazardous Waste Management Act (using delegated authority under the federal RCRA hazardous waste law, which allows the state to have more protective standards).
- The applicable and relevant Washington State standard for carcinogens – explicitly including all radionuclides – is one additional cancer for every one hundred thousand persons exposed (expressed in scientific notation as 1E-5). SEE RCW Chapter 70.105D and WAC Chapter 173-340; and, RCW 70.105E.050

499-44 cont'd

499-41 Under "Adoption — Procedures" (WAC 197-11-630), which is part of the regulations implementing SEPA, a state agency such as Ecology may choose to adopt an existing environmental document (e.g., this *TC & WM EIS*) to satisfy SEPA requirements for a proposed future permit instead of preparing its own separate document. The agency must independently review the contents of the existing environmental document and determine that it meets the agency's environmental review standards and needs for purposes of issuing a future permit. The existing environmental document is not required to meet Ecology's procedures for preparing a separate document (such as circulation, commenting, and hearing requirements) before it can be adopted.

As a cooperating agency (as defined under CEQ regulations) in DOE's preparation of this *TC & WM EIS*, Ecology has independently reviewed the *Draft TC & WM EIS* and will review this *Final TC & WM EIS* for the express purpose of ensuring that this EIS satisfies Ecology's SEPA needs. The State of Washington has agreed that the descriptions of the alternatives identify the information needed to meet SEPA requirements. Ecology expects that the analysis provided in this *Final TC & WM EIS* will provide enough information to adequately inform its permitting requirements. Permits needed to implement the actions identified in the ROD would be processed under Washington State's Hazardous Waste Management Act and other applicable authorities, which generally require a separate opportunity for public comment on any proposed permits developed by Ecology. SEPA authorizes (but does not require) Ecology to include enforceable mitigation measures in its future permitting decisions for the IDF(s). Following completion of the mitigation action plan, Washington State RCRA/Hazardous Waste Management Act permit decisions will be made to ensure the necessary mitigation measures are implemented. The permitting process will consider the mitigation measures provided in this *TC & WM EIS* and may include other measures that the State of Washington determines are necessary for protection of human health and the environment. The State of Washington's "Dangerous Waste Regulations" (WAC 173-303) implement the Hazardous Waste Management Act of 1976 and provide the requirements for cleanup- and permit-related decisionmaking. These regulations ensure that, as cleanup begins, public input will be sought and the state MTCA cleanup standards will be considered. Please see Ecology's foreword to this *Final TC & WM EIS* for Ecology's perspective as a cooperating agency.

499-42 As discussed in the Summary, Section S.1, and Chapter 1, Section 1.1, of this *TC & WM EIS* and in Ecology's foreword, which is located in the front section of

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- CERCLA includes radionuclides in definition of hazardous substances and authority for cleanup, including for federal facilities.
- MTCA standards apply at federal facility Superfund cleanups as ARARs
- Fundamental Difference is Cancer Risk:
- CERCLA risk range allows up to one additional fatal cancer for every 10,000 adults exposed (1x10-4; or 1E-4)
- MTCA protects more sensitive individuals to one additional cancer for every 100,000 persons exposed (1x10-5: or 1E-5) from ALL carcinogens at site

MTCA has a more protective standard than CERCLA requiring use of permanent remedies to ***maximum*** extent practicable. RCW 70.105D.030(1)(b):

"In conducting, providing for, or requiring remedial action, the department shall give preference to permanent solutions to the maximum extent practicable and shall provide for or require adequate monitoring to ensure the effectiveness of the remedial action"

- Caps are recognized as not being preferred permanent remedies versus removal and treatment.

- This is yet another failure of the draft TCWMEIS to address and present relevant Washington State standards applicable to cleanup at Hanford; and, a failure to meet SEPA's requirement that mitigation measures must be presented in the draft EIS. Clearly, use of Washington's preference for use of permanent remedies, in contrast to USDOE's preferred alternatives' reliance on the use of caps without retrieval of waste discharges, buried wastes or tank leaks, must be considered in any EIS under SEPA as a mitigation measure.

499-44 cont'd

The public deserves to see how proposed releases from individual units (e.g., the IDF landfill, tank farm units) and cumulative impacts from releases of all sites and units on the Central Plateau compare to Washington State's cleanup standards and determinations of "acceptable" cancer and toxicity or other illness risks. Only if this comparison is provided in a revised draft for public comment will the public have this vital opportunity to consider and comment.

Mitigation measures must include actual characterization of wastes in tanks, in soils and in discharge and burial ground/ landfill units. Instead, USDOE proposes to cap without characterization. This fails to meet legal requirements:

- The HWMA requires characterization ***for investigation*** of contamination at units, including burial grounds, cribs and release sites. See WAC 173-340-350(7)(a).
- WAC 173-340-350(7)(c)(iii) requires that field investigations shall be: "Sufficient investigations to **characterize** the distribution of hazardous substances present at the site, and threat to human health and the environment." (emphasis added).

Without providing an opportunity for the public to comment on a revised draft TCWMEIS that discusses the projected impacts, contamination and risk levels in comparison to State standards, **Washington State's Department of Ecology CAN NOT accept and adopt the TCWMEIS for use in its decisions on tank farm closure and other RCRA/HWMA decisions.**

this EIS, Ecology is participating in this NEPA activity as a cooperating agency; as such, it is responsible for reviewing the content of this *TC & WM EIS* under the authority of SEPA (RCW 43.21C) to ensure it satisfies state requirements and supports its proposed action to issue permits under its Hazardous Waste and Toxics Reduction Program.

499-43 The alternatives presented in this *TC & WM EIS* were developed under NEPA (42 U.S.C. 4321 et seq.) to address the essential components of DOE's three sets of proposed actions (tank closure, FFTF decommissioning, and waste management) and to provide an understanding of the differences among the potential environmental impacts of the range of reasonable alternatives. Consistent with CEQ guidance, this EIS analyzes the range of reasonable alternatives that covers the full spectrum of potential combinations. The alternatives considered by DOE in this EIS are "reasonable" in the sense that they are practical or feasible from a technical and economic standpoint and they meet the agency's purposes and needs.

499-44 DOE disagrees that this EIS is inadequate because it does not address the MTCA, CERCLA, and state cancer risk. This EIS was prepared under NEPA and is not intended to be a CERCLA decision document; CERCLA standards do not apply to the decisions to be based on this *TC & WM EIS*. Chapter 8, Section 8.1, discusses the MTCA, and Chapter 5 and Appendix Q present information on risk. Washington State regulations are identified where appropriate in both the draft and this final EIS.

The commentor's bulleted list of requirements is based on CERCLA. DOE agrees that Hanford is a CERCLA cleanup site; however, the proposed actions are activities permitted under RCRA and subject to evaluation under NEPA.

The "benchmark standards" used in this *TC & WM EIS* represent dose or concentration levels that correspond to known or established human health effects. For groundwater, the benchmark is the MCL if an MCL is available. For example, the benchmark for iodine-129 is 1 picocurie per liter; for technetium-99, it is 900 picocuries per liter. These benchmark standards for groundwater impacts analysis were agreed upon by both DOE and Ecology as the basis for comparing the alternatives and representing the potential groundwater impacts. In addition, this approach is consistent with the MTCA standards Method A, which is used to establish cleanup levels under the separate CERCLA and RCRA processes established by the TPA. Method A draws from current Federal and state standards, including the MCLs listed in Table 720-1 of the MTCA.

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Essentially, USDOE will have wasted $50 million on the TCWMEIS unless it is revised and reissued for comment with a full discussion of Washington State's cleanup standards.

499-44 cont'd

6. Health Risks Not Considered and Failure to Disclose and Commit to Application of Applicable and Relevant Standards:

USDOE failed to disclose and consider Washington State's cancer risk standard governing cleanup; and, failed to assess how proposed actions would violate this level of "acceptable" risk:

- CERCLA's requirement from Sec. 120 that applicable or relevant state standards (ARARs) be applied in selecting the remedy requires that standards which EPA may not view as enforceable must still be explicitly considered and applied if they are "relevant".
- Thus, Washington State's standard for total carcinogen risk is a requirement that must be met whether the site is being cleaned up under CERCLA or Washington's Hazardous Waste Management Act (using delegated authority under the federal RCRA hazardous waste law, which allows the state to have more protective standards).
- The applicable and relevant Washington State standard for carcinogens – explicitly including all radionuclides[10] – is one additional cancer for every one hundred thousand persons exposed (expressed in scientific notation as 1E-5). SEE RCW Chapter 70.105D and WAC Chapter 173-340; and, RCW 70.105E.050
- CERCLA includes radionuclides in definition of hazardous substances and authority for cleanup, including for federal facilities.
- Cancer Risk under CERCLA is less protective than MTCA; However, USDOE only presents impacts in comparison to the CERCLA NCP risk level or USDOE's own far less protective radiation exposure limits:
    - CERCLA risk range allows up to one additional fatal cancer for every 10,000 adults exposed (1x10-4; or 1E-4)
    - MTCA protects more sensitive individuals to one additional cancer for every 100,000 persons exposed (1x10-5: or 1E-5) from ALL carcinogens at site

499-45

USDOE fails to present the potential non-cancer health impacts from exposure to radionuclides and fails to present any potential impacts from chemical exposures. These should be presented in the summary. Sadly, they are not to be found anywhere in the EIS.

USDOE errs in presenting cancer risk in its impact statements in terms of additional adult fatal cancers rather than total cancers caused from exposure: USDOE presents risks in terms of fatal cancers only, and removes from its estimates individuals who die early from exposure but would eventually have died from a cancer.

[10] The official Explanatory Statement for MTCA, adopted by Ecology, is the binding legal interpretation of the State cleanup law. It explicitly interprets MTCA's carcinogen risk cleanup standards as governing cleanups of radionuclide releases to the environment. CERCLA, the federal Superfund law, includes radionuclide releases as releases of hazardous substances subject to the total cancer risk standard for determining cleanup levels at Superfund sites. SEE OSWER.

The State of Washington's "Dangerous Waste Regulations" (WAC 173-303) implement the Hazardous Waste Management Act of 1976. These regulations provide requirements for cleanup- and permit-related decisionmaking.

DOE disagrees that information on IDF and tank farm releases and on the cumulative impacts of all releases was not made available to the public. Information related to analysis results at the source unit boundaries, the Core Zone Boundary, and the Columbia River nearshore was presented in the *Draft TC & WM EIS* for the proposed alternatives. Cumulative impacts at the Core Zone Boundary and Columbia River nearshore were presented. In addition, combinations of the cumulative impacts and a range of proposed alternatives were presented in the alternative combinations discussions.

In response to comments received on the *Draft TC & WM EIS* concerning potential long-term impacts on groundwater resources, additional sensitivity analyses were performed to evaluate the potential impacts if certain remediation activities were conducted in the future at some of the more prominent waste sites on the Central Plateau and along the river corridor. The discussion found in Chapter 7, Section 7.5, Long-Term Mitigation Strategies, was expanded to summarize these results. Prior to implementing any closure actions, DOE will develop a tank farm system closure plan that will be implemented for each of the waste management areas. The plan will be reviewed to ensure regulatory compliance by Ecology and presented for public comment before approval as a permit modification to the Hanford sitewide permit. Additional information on the relationship of actions analyzed in this final EIS and closure activities is provided in Section 7.1.

499-45 Please see response to comment 499-31 regarding the commentor's reference to appropriate cleanup standards.

The commentor indicates that noncancer health impacts due to exposure to radionuclides were not presented in this EIS. As discussed in both the draft and this final EIS, Appendix K, Section K.1.1.6, a number of authoritative studies provide guidance on risk factors relating health effects to dose. Section K.1.1.6 discusses the scientific evidence relating radiation dose to the incidence of cancers, fatal and nonfatal. This discussion indicates that the fatal cancer risk factor of 0.0006 reflects an age distribution that includes children and is generally regarded as conservative. Appendix Q, Section Q.2.4.2, explains that nuclide-specific risk coefficients, developed using techniques that account for gender and age, were used for the long-term human health impacts analysis.

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See for example, draft GNEP PEIS At C.2, page C-8:

"Current DOE guidance (DOE2002h) from estimating public and worker cancer risk from exposure to ionizing radiation recommends using a conversion factor of 6x10-4 fatal cancers per rem, and a factor of 8x10-4 per rem for estimating excess cancer morbidity (incidence). Based on this guidance , the probability of an individual worker or member of the public contracting a fatal cancer is 6x10-7 per rem….

This approach estimates excess cancer fatalities (i.e., those above the naturally occurring annual rate).

The "number of cancer fatalities" corresponding to a single individual's exposure over a (presumed) 70-year lifetime to 0.3 rem per year is the following… = .01 cancer fatalities… estimated effect of background radiation exposure on the exposed individual would produce a 1.3 percent chance that the individual might incur a fatal cancer caused by the exposure."

499-45 cont'd

7. USDOE failed to disclose the pending and closely related formal proposal to truck to Hanford, and bury in Hanford landfills, highly radioactive mixed wastes, referred to as "Greater Than Class C" (GTCC) and "Greater Than Class C – like" wastes.

USDOE has a separate pending formal proposal to use Hanford to bury an undisclosed large quantity of GTCC and GTCC-like wastes. USDOE has announced that it will prepare a separate programmatic EIS on disposal of these wastes, and that Hanford is one of several leading proposed sites for disposal.

Instead of presenting the impacts from the related actions of using Hanford as a national radioactive and radioactive hazardous waste dump for 3 million cubic feet of waste disclosed in the draft TCWMEIS and from a yet to be disclosed quantity of GTCC wastes, USDOE seeks to impermissibly "piecemeal" disclosure and analysis of the impacts in separate impact statements. This deprives both the public and regulators, as well as USDOE officials, of the information needed to determine if regulatory conditions (mitigation measures) should bar all or some of the wastes.

The GTCC and GTCC-like wastes are highly radioactive – so radioactive that they are referred to as "Remote-Handled", barring direct human handling. There is no facility in the USDOE complex available to assay and characterize or treat these wastes, which USDOE has acknowledged as mixed wastes.[11] Amongst the GTCC-like wastes are wastes which USDOE had previously sought to ship to Hanford under its Western Hub proposal for consolidation of

499-46

[11] See RH-TRU and WMPEIS decisions for acknowledgement that these are legally Mixed Wastes. GTCC is presumed to be Mixed Waste because of the likelihood that the processes creating the wastes including hazardous or dangerous wastes, and because it is not possible to characterize them in existing USDOE facilities. Therefore, for legal purposes, these wastes must be considered Mixed Wastes.

499-46 Regarding the commentor's concern about the inclusion of GTCC LLW in this *TC & WM EIS*, DOE has included information from the *Draft GTCC EIS* in the *Final TC & WM EIS* cumulative impacts analysis. For a more comprehensive discussion on GTCC LLW, see Sections 2.1 and 2.12 of this CRD.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

Remote-Handled Transuranic Waste (RH-TRU). Heart of America Northwest along with WA State and other co-plaintiff citizen groups successfully sued and obtained an injunction against USDOE shipping these wastes to Hanford in May, 2003, without an adequate EIS.

USDOE issued a formal Record of Decision in 2000, following adoption of the Waste Management Programmatic EIS that Hanford would be one of two "regional" disposal sites in the nation for USDOE's Mixed and Low-Level wastes. Despite the use of the word "regional", this designation is to use Hanford as a national mixed waste and LLW dump.

The other "regional" site designated for disposal of offsite LLW and MW is the Nevada Test Site. The State of Nevada has formally informed USDOE that the existing MW disposal landfill must be closed by the end of 2010. That leaves Hanford as the sole site for disposal of the GTCC and GTCC-like wastes under USDOE's existing Record of Decision.

NEPA (and SEPA as well) requires that all related proposals and any formal or informal pending proposal which may increase the cumulative impacts of proposed actions must be disclosed in the EIS with cumulative impacts considered and alternatives with mitigation measures presented. USDOE's GTCC proposal is not only related, but USDOE's existing RoDs make it likely that Hanford will be the selected site for disposal. Therefore, in the draft TCWMEIS, USDOE must present the quantities of GTCC waste which it may truck to, and bury at, Hanford along with the impacts, cumulative impacts, alternatives and mitigation measures.

The impacts of disposing of GTCC wastes at Hanford are likely to be high, exasperating the already impacts from proposed actions leaving wastes in the soil and from landfills. USDOE estimates that the releases from both the IDF landfill and River Protection Project landfill will greatly exceed relevant standards. Adding GTCC wastes will add large unknown impacts, which the public and regulators must be allowed to see and comment upon in one EIS.

Appendix S of the Draft TCWMEIS states that USDOE is preparing a draft EIS for GTCC waste and is considering Hanford for a burial site. Page S-15 last paragraph states that "These (GTCC) inventories were not included in the groundwater analysis for this TC&WM EIS because the Draft GTCC EIS is still under development."

USDOE can not piecemeal the analysis in this manner. In its settlement of WA v. Bodman, USDOE committed to perform a cumulative impact analysis for all wastes at Hanford and proposed to be disposed at Hanford. USDOE is failing to meet this obligation by failing to include the impacts from storing, treating and disposing of GTCC wastes at Hanford.

GTCC wastes not only pose serious disposal impacts, they also greatly increase the cumulative potential impacts of trucking wastes to Hanford along specific truck routes which USDOE may use. The public is entitled to see and comment on the proposed cumulative impacts from USDOE's related pending proposals to truck both 3 million cubic feet of LLW and MW as disclosed in the draft TCWMEIS plus the additional highly radioactive, and high risk GTCC wastes to Hanford.

499-46 cont'd

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Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

Because they are highly radioactive – as "hot" as Spent Nuclear Fuel High-Level Nuclear Waste at the surface of the cask (above 200 mrem/hour) – the GTCC wastes create significant increased impacts from trucking the wastes to Hanford. In the USDOE's 1998 draft GNEP (Global Nuclear Energy Partnership) EIS, USDOE estimated that trucking Spent Nuclear Fuel to Hanford for storage – with its similar radiation levels – would result in 816 fatal cancers in adults along the truck routes. Those 816 fatal cancers in adults would be from the radiation emanating from the shipping casks on the trucks even if there were no accident or terrorist attack on any shipment.

Clearly, the truck route matters in regard to exposure. If the trucks are travelling through cities such as Spokane, Portland, Salem, then the exposure will be greater. The impacts from a reasonably foreseeable accident with fire or terrorist attack are also far greater. In the Powerpoint presentation we have submitted accompanying these comments, we show the modeled impacts from either a reasonably foreseeable accident with high temperature fire or terrorist attack (using explosive power estimates from the Department of Defense for readily available terrorist weapons or explosive devices and NRC models for radiation dispersion) at the intersection of Interstate 5 and 205 in Portland.[12] Over a thousand cancer deaths would result, and over 300 square miles of Portland would require evacuation and a never before attempted decontamination effort.

Therefore, as we discuss below in the section on transportation impacts, USDOE must assess the route specific impacts from both the 3 million cubic feet of waste presented in the draft TCWMEIS and the impacts from trucking GTCC wastes to Hanford, along with their cumulative impacts.

499-46 cont'd

8. The risks of transporting radioactive waste to Hanford:

The Draft TCWMEIS fails to properly present and consider impacts from trucking 3 million cubic feet of radioactive wastes to Hanford:

USDOE proposes to truck nearly 3 million cubic feet of radioactive and "mixed" radioactive wastes to Hanford under its "preferred alternatives."

That equals approximately 17,500 truckloads of radioactive wastes heading to Hanford up I-5, I-84, or I-90 – or, more than 2 trucks a day, every day for over twenty years.

Even without an accident or terrorist attack on a truckload of radioactive wastes, these shipments will cause cancer in our communities along the truck routes.[13]

499-47

[12] The full 2004 report on the risks from trucking radioactive RH-TRU to Hanford, similar to GTCC and GTCC-like wastes, is available on our website for reference or available upon request.
[13] Id.

499-47 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

The *Draft TC & WM EIS* analyzed the transportation of RH-LLW from INL to Hanford for disposal. In response to the public's input and concerns about offsite waste disposal at Hanford, DOE has included in this *Final TC & WM EIS* an example of a potential mitigation measure that could be taken by DOE. Specifically, an offsite waste stream containing a significant inventory of iodine-129 (i.e., RH-LLW resins from INL) was eliminated from the analysis. Implementing this mitigation measure reduced the number of shipments analyzed from about 16,600 in the *Draft TC & WM EIS* to about 14,200 (about 2 trucks per day) in this *Final TC & WM EIS*, as presented in Chapter 4, Section 4.3.12, Public and Occupational Health and Safety—Transportation. This mitigation measure has been incorporated into the Waste Management alternatives. As shown in the Summary of this EIS, Section S.5.3; Chapter 2, Section 2.8.3.10; and Chapter 4, Section 4.3.12, it is unlikely that the estimated total public radiation exposures from transporting radioactive waste to Hanford for disposal would result in any additional LCFs.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

USDOE has an obligation under NEPA to consider the route specific impacts from its proposal to truck these wastes to Hanford. Instead, USDOE officials admitted (at the Spokane public hearing in response to questions from Spokane City Council Member and Heart of America Northwest board member Bob Apple) that the TCWMEIS only analyzed what USDOE and SAIC refer to as "a representative route." *499-48*

The "representative route" presented in the TCWMEIS is NOT representative of conditions and potential impacts along the other routes likely to be used for truck shipments to Hanford: Interstate 90 through Spokane, and Interstates 5, 205 and 84 through Portland, Eugene, Salem and other Western Oregon cities and the Columbia Gorge.

The draft TCWMEIS preferred alternative is for trucking and disposing at Hanford of the same quantity of wastes (approximately 3 million cubic feet, or 82,000 cubic meters) analyzed as the preferred alternative in USDOE Final Solid Waste Disposal EIS.

In the Solid Waste Disposal EIS, USDOE acknowledged that "incident free" transportation of the upper bound volume of wastes considered would cause 9 or 10 fatal cancers – in adults – along the transportation routes. ***USDOE failed to consider impacts on children*** and the number of other non-fatal health effects from transportation of wastes.[14]

USDOE 's figure of 9 to 10 fatal cancers in adults was based on transportation figures that reduced the impacts by over 50% compared to its own prior analyses[1], and failed to consider that Remote Handled TRU trucks, with the most radioactive of wastes, would not be able to stay solely on interstate highways, which was the basis of USDOE's analysis. [1] *499-49*

USDOE has reduced the total waste volume from 12 million cubic feet to 3 million. The total number of fatal cancers should, at minimum, be reported by USDOE as one quarter of the number in the SWEIS. That should be 2.5 fatal cancers.

In the USDOE' s 2004 Solid Waste Disposal Final EIS, USDOE's estimate for the same LLW and MW it proposes to ship to Hanford (82,000 m3, approximately 2.9 million cubic feet) would result in approximately 2.5 fatal cancers. This was not calculated for children. The draft TCWMEIS adopts the transportation analysis in the prior Final Solid Waste Disposal EIS along with the estimate of waste volume and the waste streams to be shipped to Hanford for disposal. USDOE continues to assert that the Record of Decision for the Solid Waste EIS and the Waste Management Programmatic EIS (2000) remain in effect, designating Hanford as the disposal site

[14] Final Hanford Solid Waste Disposal EIS, USDOE, Feb. 2004, page S.35: "…9 to 10 LCFs were estimated for the Upper Bound waste volume." LCFs = Latent Cancer Fatalaties. USDOE calculated only for adult exposure. USDOE also used assumption that 10,000 person rem = 6 LCFs (Table 5.145, page 5.251), whereas 50% of people exposed to 200 rem will die of acute radiation exposure; and annual exposures of adults to 15 mrem are estimated by NRC and EPA to cause 3 fatal cancers per 10,000 exposed. That estimate of cancer risk was increased significantly by the National Academy of Sciences BEIR VII Report (Biological Effects of Ionizing Radiation, VII, 2005). The BEIR report is supposed to serve as the basis for risk-dose calculations, but USDOE has refused to utilize BEIR VII for this EIS or for Hanford Clean-Up decisions.

499-48 See response to comment 499-3 for a discussion on the transport and disposal of offsite waste.

499-49 DOE disagrees with the commentor's assertion that the analysis presented in the *Draft TC & WM EIS* relied on the *HSW EIS* (DOE 2004a) and that no new transportation analysis was completed. The *Draft TC & WM EIS* analyses are based on updated inventories of wastes to be shipped from specific points of origin and groundwater, ecological resource, and human health analyses, as well as updated transportation analysis, that are not based on the *HSW EIS*.

Specific to the comment about whether DOE considered impacts on children, there is no existing guidance that recommends dose coefficients for children's exposure to external radiation. The most recent guidance for use of exposure-to-dose coefficients related to external exposure (ionizing radiation) was used in the analysis. This guidance can be found in Federal Guidance Report No. 12, *External Exposure to Radionuclides in Air, Water, and Soil* (Eckerman and Ryman 1993). This guidance provides estimates for an adult, but not for children. For internal exposure to radiation through inhalation and ingestion, EPA currently recommends that assessors calculate chronic exposures by summing time-weighted exposures that occur at each stage of life (EPA 2009). Using this approach, exposure-to-dose coefficients for internal exposure could be determined; however, guidance that provides this information has yet to be developed.

As stated in the National Research Council's Report in Brief on BEIR VII, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* (National Research Council 2006), BEIR VII estimates excess deaths for the sex and age distribution of the U.S. population in terms of the number of excess deaths per million people per absorbed dose, which supports the previously reported dose-to-risk conversion factor estimate for developing LCFs (DOE 2003a). The National Research Council report also shows that the maximum number of excess deaths would be 610 LCFs per million people per person-rem of dose, compared with about 42 out of 100 individuals who are expected to develop solid cancer or leukemia from other causes, assuming a sex and age distribution similar to that of the entire U.S. population. The BEIR VII dose-to-risk conversion factor is essentially equivalent to the estimate of 600 LCFs per million people per person-rem used in the transportation analysis in this *TC & WM EIS*. The health risk effect in the *Draft* and *Final TC & WM EIS* transportation analysis is therefore consistent with BEIR VII in regard to determining the number of LCFs.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

for 82,000 m3 of LLW and MW. On this basis, USDOE claims it need not analyze the alternative of NOT using Hanford for disposal of these offsite wastes.

USDOE's analysis of transportation impacts in the Solid Waste EIS was one of five areas that its internal review documents found to be "technically indefensible." That internal review was the basis of the settlement suspending the record of decision for groundwater analysis and a moratorium on offsite waste. However, Washington State did not ask that the transportation analysis be withdrawn. Nonetheless, USDOE can not rely on the Solid Waste Disposal EIS analysis for TCWMEIS purposes. Inexplicably, USDOE relies on the prior Solid Waste Disposal EIS, fails to perform any new route specific analysis for trucking wastes through the much more populated cities along I-90, I-5, I-205 and the Columbia Gorge compared to I-84 through Eastern Oregon, and, yet, somehow inexplicably arrived at a lower number of cancer fatalities for trucking the same wastes to Hanford.

499-49 cont'd

Site Specific Transportation Analysis Required under NEPA and relevant Hanford specific court decisions:

In 2003, Heart of America Northwest was joined by WA State, Columbia Riverkeeper and others in challenging USDOE's transportation of Mixed TRU waste to Hanford for storage without an Environmental Impact Statement.

In its Order Granting Plaintiffs' Motion for Preliminary Injunction (No. Ct-03-5018-AAM, May 3, 2003), the U.S. District Court for Eastern WA held (at 16, 18) that USDOE had failed to perform a site and route specific environmental impact statement when it sought to rely on a national programmatic EIS without site specific and route specific analyses:

499-50

> It is not, however, just the language in the PEIS which gives the court pause as to whether the PEIS is comprehensive enough to cover the site-specific impacts of treating and storing off-site TRUW at Hanford, and/or whether the PEIS requires supplementation in order to consider new and significant information concerning transportation risk. In April 2003, before DOE decided to ship off-site TRUW to Hanford, it issued a "Draft Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement" ("HSW EIS"). The

499-50 DOE disagrees with the commentor's assertions that no new analysis was completed. Consistent with the Settlement Agreement between DOE and Washington State ending litigation concerning the *HSW EIS* (DOE 2004a) that was signed on January 6, 2006, DOE has updated and revised the *HSW EIS* analyses of various resource areas or reanalyzed them as necessary and provided quality assurance review, as appropriate, to reflect the latest waste inventories and analytical assumptions used for *TC & WM EIS* analysis purposes.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

It is difficult to ignore plaintiffs' argument that DOE intended the 2002 Draft HSW EIS to constitute the future sitewide or project-level NEPA review alluded to in both the May 1997 WM PEIS and the January 1998 ROD, and that the Draft amounts to an acknowledgement by DOE that additional NEPA review was necessary before it could ship off-site TRUW to Hanford. As plaintiffs point out, a Draft HSW-EIS does not end DOE's NEPA review obligation.[4] The plaintiffs say a sufficient Final HSW EIS covering the site-specific impacts of treating and storing off-site TRUW at Hanford and updating transportation risks would satisfy DOE's NEPA obligation.

The decision at 32 and 33 addresses the failure to consider route specific impacts, when, as now with the draft TCWMEIS, USDOE instead chose to analyze only conceptual or representative routes, instead of the actual routes:

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Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

The September 6, 2002 ROD discussed transportation risk and concluded the risks were not significant based on information in the WIPP-SEIS II and the 1990 Environmental Assessment (EA) for Battelle Columbus Laboratories Decommissioning Project. The WIPP-SEIS II did not propose shipment of TRUW from Battelle to Hanford and therefore, DOE had to rely on the 1990 EA which preceded the PEIS by seven years.[1] There is no reference to the 1990 EA in the PEIS, specifically the transportation analysis contained in Appendix E to the PEIS. Indeed, the PEIS selected "conceptual transportation routes . . . which may not be the actual routes that will be used in the future." (PEIS, Vol. IV at p. E-2). The PEIS added that:

> Actual routes will be determined during the transportation planning process.
>
> **Transportation mode and routing decisions will be made on a site-specific basis during the transportation planning process. Sites can use the transportation analyses in this WM PEIS to make site-specific transportation decisions or, if necessary, conduct additional transportation analyses.**
> . . . .

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Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

(Id.) (Emphasis added)."

The 2002 Draft HSW EIS relies on 2000 census data, as opposed to the 1990 census data relied on by the PEIS and WIPP SEIS II, and the 1980 census data relied upon by the Battelle EA. The 2002 Draft HSW EIS observes that the population of Benton County increased from 26.6 percent from 1990 and that the Franklin County population increased 31.7 percent. (Draft HSW EIS, Vol. I at 4.80-4.81). Furthermore, the March 2003 Revised Draft HSW EIS contains a section regarding "Transportation Impacts Within Washington and Oregon of Offsite Shipments." The section calculates the impacts of offsite transportation of solid wastes to and from Hanford. (Revised Draft HSW EIS, Vol. II at H.32-H.38).

Just as there is a "serious question" whether the Draft HSW EIS represents implicit acknowledgement by DOE that the WM PEIS contemplated a sitewide or project-level NEPA analysis before off-site TRUW could be treated and stored at Hanford, there is a "serious question" whether the Draft HSW EIS represents implicit acknowledgement by DOE that reevaluation of transportation risk is necessary because of the recent decision to ship off-site TRUW to Hanford.

"there is a risk of release and exposure from handling and transporting TRUW." (at 32).

The sources of waste in the TCWMEIS and assumptions about the chemical composition and whether//how the waste will be treated prior to shipment to Hanford are areas which we and others have found to be inadequately supported and contain significant errors.

499-51

499-51 Regarding the commentor's concern as to the accuracy of data, DOE reexamined the inventories used in this *Final TC & WM EIS* and determined that the best-available data were used in the analysis, with the understanding that uncertainty still remains. For a more comprehensive discussion of this topic, see Section 2.2 of this CRD.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

In addition, the three million cubic feet / 82,000cubic meters of off-site waste streams have not been properly identified, with the EIS relying on unverifiable estimates, for purposes of: a) projecting truck routes; b) sites and dates for shipping; c) modeling impacts from exposure along the truck routes (incident free); and, d) projecting impacts from accidents or terrorist attacks on trucks carrying hypothetical waste loads to Hanford (The EIS does not use reasonable maximum potential waste types in regard to potential harm, such as RH-TRU shipments, despite the fact that similar shipments may be part of the waste streams trucked to Hanford). The Appendix acknowledges that there is no reliable information but does note that a significant portion may be extremely radioactive "Remote-Handled" wastes and contain large amounts of Transuranic elements just below the threshold which would require disposal in a deep geologic repository.

The contractor noted in Appendix D of the draft TCWMEIS, that the information used to model impacts from offsite waste – which would also affect the ability to project impacts from transportation – is not reliable:

> "The information needed for the EIS was not readily available, so efforts were undertaken to use existing corporate information, supplemented by information from DOE waste managers. The EM program has corporate performance metrics that capture the actual and projected volume of LLW and MLLW for disposal from "baselined" projects. The information was not sufficiently detailed for modeling purposes, e.g. LLW and MLLW are combined, and data on radionuclide or hazardous chemical constituents is not collected and maintained corporately."
> Page D-126.

499-51 cont'd

The contractor's interviews with site managers seeking to ship waste to Hanford, the basis for the waste estimates used in the draft EIS, revealed that a large amount of the waste proposed to be shipped to Hanford will be extremely radioactive Class C and Remote-Handled Wastes. This requires that the TCWMEIS should present a bounding estimate of the potential impacts from incident free exposure to RH wastes along each potential truck route – e.g., trucks going directly past Lewis and Clark High school in Spokane – and of the impacts from a potential accident or terrorist attack involving mixed Remote Handled wastes with a maximum Plutonium inventory.

9. The TCWMEIS fails to address the likely impacts from climate change (global warming):

Projections of increased precipitation and significant precipitation events in Eastern Washington have been forecast by Washington State and independent scientists due to the impacts of global climate change. The forecasts also call for significant reductions in the summer flow of the Columbia River due to decreased snow pack and snow melt.

499-52

These two important sets of projections have not been taken into account by USDOE in preparing the TCWMEIS. Instead, USDOE has assumed a constant value for infiltration from precipitation for ten thousand years, in modeling the migration of contaminants in soil and under caps. This is likely to result in a serious error in forecasting the releases from individual waste sites and the cumulative impacts from releases on groundwater, health and the River (and,

499-52 DOE has reviewed and revised, as necessary, its analyses on the effects of climate change on various resources at Hanford and the possible effects on environmental impacts of the *TC & WM EIS* alternatives. As described in Chapter 6, Section 6.3.4, DOE has reviewed climate studies that forecast general trends in Hanford regional climate change. However, there are no reliable methodologies for projections of specific future climate changes in the Hanford region, and thus such changes have not been quantified in this EIS. To account for this uncertainty, Appendix O, Section O.6.2, describes the effects of enhanced infiltration such as that which may occur during a wetter climate. In the *Draft TC & WM EIS*, Appendix V focused on the potential impacts of a rising water table from a proposed Black Rock Reservoir. Following the retraction of this proposal, the focus of Appendix V in this final EIS was changed to analysis of potential impacts of infiltration increases resulting from climate change under three different scenarios. Appendix V includes sensitivity analyses of potential impacts at Hanford that could result from climate changes that may increase model boundary recharge parameters and the rise of the groundwater table. Additional qualitative discussion of the potential effects of climate change on human health, erosion, water resources, air quality, ecological resources, and environmental justice has been added to Chapter 6 of this final EIS. Additional discussion of the types of regional climate change that could be expected has also been added to Chapter 6, Section 6.5.2, Global Climate Change. The potential impacts of the alternatives on climate change are addressed in Chapter 6, Section 6.5.2, and Appendix G, Section G.5, of this *TC & WM EIS*.

In this EIS, DOE does not assume access control for 10,000 years. For analysis purposes, the period of time assumed for postclosure care is 100 years. For disposal facilities licensed by NRC for the disposal of Class A and Class B LLW without special provisions for intrusion protection, institutional control of access to the site is required for up to 100 years. For hazardous waste management disposal units, RCRA and Ecology hazardous waste regulations require a 30-year postclosure care period; however, due to the types of waste planned for disposal, it was assumed that this period would be extended to 100 years.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

potentially on fauna, since increased precipitation and uptake by plants may lead to increased exposure).

Reduced flow rates in the Columbia River will increase the relative concentrations of contamination in the River as well as in the groundwater flowing into the River (due to decreased River bank storage and River infiltration inland). This will increase the exposure from reasonably foreseeable use of groundwater; river shorelines (e.g., Native Americans exercising their treaty rights to live along and fish the Hanford Reach); consumption of fish, plants and other animals; and the River itself.

Withdrawals of water from the River will be far less likely to be allowed in the future. This will increase pressure on the use of groundwater resources. USDOE erroneously asserts that it will control access to Hanford for thousands of years and that there will be governmental reviews of proposed uses of groundwater which will prevent use in conflict with CERCLA or RCRA decisions. However, under Washington State law, no permission is needed to drill and withdraw significant amounts of water for domestic use by fewer than five households. It is reasonably foreseeable that over the next hundred years, and certainly a thousand years, that people will use the groundwater resource under Hanford. If wastes are not cleaned up via retrieval, the TCWMEIS shows that preferred alternatives of leaving waste in place under caps – the cover up, rather than clean up plan - will result in many cancer deaths.

499-52 cont'd

Under NEPA and new directives from the Council on Environmental Quality, USDOE is obligated to take into account the projected impacts of global warming / climate change in the TCWMEIS. The EIS must be revised to do so.

10. The cumulative impact analysis fails to provide the relevant view of likely human health impact and risk from all projected releases of existing wastes and wastes proposed to be disposed.

TCWMEIS fails to include the full estimated Uranium releases from the US Ecology company operated commercial low-level waste dump in the center of Hanford along with the resulting radiation doses and likely cancers in the cumulative impact analysis for the Hanford Central Plateau and groundwater. This is compounded by the failure to include the full inventory of Uranium, Plutonium, TRU and chemical wastes in the commercial LLW dump.

Washington Departments of Ecology and Health have released an Addendum to the Final EIS for the US Ecology site closure and licensing which estimates that Uranium releases from the US Ecology site alone will result in radiation doses of 22 millirem per year to a reasonably foreseeable resident adult at the fence line of the commercial LLW dump facility, and 107 millirem per year for a resident Native American living within the boundary after a reasonably foreseeable intrusion into the landfill for drilling of a well.

USDOE says that the US Ecology EIS prepared by the State agencies was the basis for the Uranium inventory presented in the draft TCWMEIS.

499-53

499-53 This *TC & WM EIS* does include consideration of materials disposed of at US Ecology. Appendix S explains the process used to develop the inventory data set for the cumulative impact analyses. Listed in that appendix are all modeled disposal sites, i.e., all sites for which inventory was identified and considered to be potential contributors to cumulative impacts on groundwater. The inventories for these sites, including US Ecology, were identified using the most recent information available. For US Ecology, the total uranium increased from 0 kilograms in the draft EIS to 4.51×10^6 kilograms in this final EIS. Estimates of the total uranium inventory (i.e., chemical uranium) were not provided in the original source document. DOE revised the Appendix S inventories to include a calculated total uranium inventory for US Ecology. Note that uranium isotope inventories were included in the analysis for both the draft and this final EIS.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

However, the draft TCWMEIS fails to show levels of Uranium releases or radiation doses from the state forecasted exposures. The fence line of the US Ecology site is either at or beyond the "core zone boundary" utilized as the point of analysis in the draft TCWMEIS for cumulative impacts.

Figures 6-8 and 6-9 show Uranium 238 and Total Uranium levels far above Drinking Water Standards

Uranium 238 is projected in Figure 6-8 to reach concentrations of approximately 3E3 (3 x 10^3), or 3,000 picocuries per liter; or approximately 200 times the Drinking Water Standard (15 picocuries per liter) around the year 3100 and remain in the vicinity of 8E2 for another 7,000 years before rising again to 1E3.

499-53 cont'd

Uranium 238 levels entering the Columbia River are projected to be above the Drinking Water Standard for another 1,500 years.

Plutonium 239 levels in groundwater at the Columbia River shoreline are projected to peak at 300 times the Drinking Water Standard in one thousand years.

11. The EIS is based on Woefully Inaccurate and Inadequate Estimates of Radioactive and Chemical Wastes and Contamination, Seriously Underestimating Health and Environmental Impacts:

Documentation of all hazardous chemical constituents should be included in the EIS (e.g., chemicals known to be disposed in, or releasing from, landfills; and, total uranium).

The chemical inventory is incomplete; certain chemicals are missing or under-reported from the non-tank inventories **(e.g., numerous volatile organic chemicals in burial grounds, or uranium volumes)** and certain chemical analyses appear to be lacking as well. (Uranium, which has to be considered a toxic metal as well as a radionuclide, is under reported for tank discharges and leaks, and entirely missing from chemical toxicity inventory for proposed imported wastes along with volatile organic chemicals).

499-54

The US Ecology company operated commercial Low-Level Waste Landfill located in the center of Hanford's Central Plateau provides a case study in the serious shortcomings of the draft TCWMEIS in regard to inventory and failing to present cumulative health impacts from releases. The US Ecology landfill is between the 200 East and 200 West areas and within the "core zone" lines drawn by USDOE for the draft TCWMEIS analyses and for USDOE's proposed Central Plateau Strategy (which is a formal proposal that USDOE failed to present for the public to review in this EIS). It is close to the ERDF landfill (which is leaching Uranium at rates higher than projected, which the draft TCWMEIS fails to disclose and consider) and adjacent to the contaminated B-C Cribs Control Area.

499-54 Estimates of the total uranium inventory (i.e., chemical uranium) were not provided in the original source document. DOE revised the Appendix S inventories to include a calculated total uranium inventory for burial ground inventories. Note that uranium isotope inventories were included in the analysis for both the draft and this final EIS.

See response to comment 499-53 for a discussion regarding US Ecology.

Specific to the comment that, in general, it was believed that chemical inventories were not analyzed in this EIS, although no specifics were identified except US Ecology, additional text was added to Appendix Q, Section Q.2, in this final EIS describing the screening process used to select a set of COPCs.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

Washington Dept. of Ecology is conducting a MTCA investigation of the documented releases from US Ecology's trenches of numerous hazardous chemicals, particularly volatile organic chemicals (VOCs) that are dangerous to human health and the environment. The WA Dept. of Health is reviewing Uranium release data and reports that it projects uranium release from the landfill to result in doses of 22 millirem per year and 107 millirem per year to an offsite resident adult using groundwater on the Central Plateau and to a resident adult after well intrusion on-site. SEE Addendum to Final EIS for the US Ecology LLW Facility jointly issued by WA Health and Ecology, April, 2010.

The documented high levels of VOC in soil gases escaping from the trenches has been available for over a year.

499-54 cont'd

However, nowhere in the draft TCWMEIS is there any data on these hazardous substances already documented as being released from the US Ecology landfill. Indeed, the inventory in the draft TCWMEIS fails to show ANY of the VOCs as even being present!!!!

The 43 miles of unlined burial grounds operated by USDOE on the Central Plateau are also likely contain numerous VOCs similar to the US Ecology site (which took USDOE and US Navy wastes) – yet, the inventory for the cumulative impact analysis fails to show any VOC other than Carbon Tetrachloride (and fails to show any chloroform, which is the degradation product of Carbon Tetrachloride).

In regard to health impacts from releases, the cumulative impact analysis should show the estimated dose for reasonable maximum exposure scenarios (Native American children exercising treaty rights to live on and utilize the resources on, Hanford's Central plateau and river shore) from all sources. We know that the state agencies estimated the dose from releases of Uranium from this one landfill to be 22 millirem per year, equal to a cancer risk of 6 to 18 fatal cancers for every ten thousand adult males exposed. Children are three to ten times more susceptible to develop cancer from the same dose – which USDOE fails to address.[15] We believe it is genocidal for USDOE to propose actions with cumulative health impacts which would result in cancers in significant numbers of Native Americans exercising treaty rights to live on, and use the resources at, Hanford.

499-55

The following is a list of additional major inventory failings of the draft TCWMEIS, provided by HoANWRC consultant and board member Richard Heggen:

1) The EIS grossly underestimates the actual uranium inventory for both US Ecology and the Environmental Restoration Disposal Facility (ERDF). Page S-91, Table S-50b in the EIS lists US Ecology with 1,820 curies of uranium and ERDF with 54 curies of uranium.

499-56

[15] EPA limit for NESHAP release to air is 10 mrem/year. Based on EPA and NRC pre-BEIR VII radiation standards, 6.8 mrem per year would result in approximately 1 to 2 fatal cancers in every 10,000 adults exposed. EPA now acknowledges that the same dose from a carcinogen will result in 3 to 10 times more cancers in children than in adults (EPA draft guidelines for cancer risk assessment, released March 3, 2003. http://epa.gov/ncea/raf/cancer2003.htm). Under BEIR VII, the risk level should be reported as several times greater than the pre-BEIR VII estimates.

499-55 The *TC & WM EIS* analysis recognizes that uptake rates may be different for children. As described in Appendix K, "Short-Term Human Health Risk Analysis," soil could be inadvertently ingested, resulting in an internal dose. The *Hanford Site Risk Assessment Methodology* (DOE 1995) assumes ingestion rates of 200 milligrams (0.0071 ounces) per day for children and 100 milligrams (0.0035 ounces) per day for adults. In this *TC & WM EIS*, a single rate of 120 milligrams (0.0042 ounces) per day was used. This is the weighted average of the values in the *Hanford Site Risk Assessment Methodology*—ingestion of 200 milligrams (0.0071 ounces) per day over a 6-year period and ingestion of 100 milligrams (0.0035 ounces) per day over a 24-year period.

Appendix Q, Section Q.2.1, describes the hypothetical receptors analyzed in the human health dose and risk analysis. The receptors include an American Indian resident farmer and an American Indian hunter-gatherer. As described in Appendix Q, Section Q.2.2.2, the American Indian resident farmer scenario considers radionuclide and chemical exposures from the drinking of contaminated groundwater, consumption of contaminated plants from a domestic garden, consumption of contaminated domestic livestock, inadvertent ingestion of soil, consumption of contaminated fish, inhalation of contaminated dust, and participation in ceremonial sweat lodge/sauna ceremonies. The American Indian hunter-gatherer scenario is similar, except the exposed adult American Indian is assumed to live a more traditional American Indian lifestyle. For the hunter-gatherer scenario, the domestic garden exposure pathway is replaced by consumption of wild plants; consumption of domestic livestock and game animals, specifically deer, is assumed. An important difference between the American Indian hunter-gatherer scenario and the American Indian resident farmer scenario is that the hunter-gatherer is exposed to contamination from both surface water and groundwater. These exposure scenarios were developed in consultation with American Indian representatives, and DOE believes they adequately represent the range of exposure scenarios for American Indian peoples.

Regarding children's elevated sensitivity to radiation exposure, there is no existing guidance that recommends dose coefficients for children's exposure to external radiation. The most recent guidance for use of exposure-to-dose coefficients related to external exposure (ionizing radiation) was used in the analysis. This guidance can be found in Federal Guidance Report No. 12, *External Exposure to Radionuclides in Air, Water, and Soil* (Eckerman and Ryman 1993). This guidance provides estimates for an adult,

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A March 1998 PNNL report (PNNL-11200) prepared for the US Department of Energy (USDOE) lists a far greater amount of uranium inventory for both facilities on page 3.31, Section 3.5.2.7 as follows: ERDF = 54,300 curies, and US Ecology = 10,900 curies. Although the PNNL report indicates the ERDF estimate is perhaps too high, it is still orders of magnitude greater than the 54 curies provided in the EIS. The EIS must be revised to include the actual uranium inventory. Risk modeling in the EIS must also be revised to accommodate the increased inventory

499-56 cont'd

2) Uranium chemical inventory in kilograms is missing for both ERDF and US Ecology (Page S-141, Table S-76b). The EIS must be revised to include the actual uranium inventory. Risk modeling in the EIS must be revised to accommodate the increased inventory.

499-57

3) Significant uranium inventory is missing from Appendix S. Although curie inventory for uranium chemical inventory is listed for many of the burial grounds, uranium chemical inventory is missing for all but two burial grounds. The two burial grounds are 218-W-4C and 218-W-5. While W-4C has 72.8 curies and 83 kilograms (kg) of uranium, W-5 has 654 curies and only 0.055 kg. It appears the chemical inventory for many burial grounds including W-5 is either missing or grossly underestimated. See table and respond to concerns attached at end of these comments.

499-58

4) Comparing the plutonium inventory kilogram estimates from the Hanford History of the 200 Area Burial Ground Facilities (September 1996 – Westinghouse Hanford Co. – WHC-EP-0912) to the plutonium curie estimates provided in the EIS reveal several discrepancies. While the EIS lists no plutonium curie inventory for 218-W-2A, W-3A, and W-4B, the Westinghouse report lists plutonium inventory at 6.38 kg, 29.32 kg, and 66.47 kg respectively. By comparison, the WHC report lists 218-W-3 plutonium inventory at 68 kg and the EIS has a corresponding 4,930 curies of plutonium for the same burial ground. It appears that thousands of curies of plutonium are missing from above noted burial grounds.

499-59

5) Throughout Appendix S, the relation between radioactive uranium inventory in curies and the chemical uranium inventory in kg varies drastically. The EIS provides no explanation for this wide range of ratios. For example, appendix S table S-43a lists a total of 914 curies uranium (almost all due to three burial grounds) and table S-69b lists a corresponding total of 3,127 kg uranium. This is in contrast to the ratio of uranium curies to kg found in tables S-48a and S-74b where the ratio of 25.45 curies to 106,530 kg is far different and not explained in the EIS. There are many examples of this apparent lack of consistency in the data. At first glance it seems that some uranium inventory is missing.

499-60

6) Appendix S, Table S-26 lists the volume of discharged liquid to ground for 216-B-3 pond at 280 billion liters which translates to 154 billion gallons. However, the 2005 Groundwater Monitoring Plan for the Hanford Site 216-B-3 Pond RCRA Facility (PNNL-15479), Section 1.1.1, page 1.3 lists the total liquid discharge to ground at over

499-61

but not for children. For internal exposure to radiation through inhalation and ingestion, EPA currently recommends that assessors calculate chronic exposures by summing time-weighted exposures that occur at each life stage (EPA 2009). Using this approach, exposure-to-dose coefficients for internal exposure could be determined; however, guidance has yet to be developed that provides this information.

As stated in the National Research Council's Report in Brief on BEIR VII, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* (National Research Council 2006), BEIR VII estimates excess death for the sex and age distribution of the U.S. population in terms of number of excess death per million people per absorbed dose, which supports the previously reported dose-to-risk conversion factor estimate for developing an LCF. The report shows that the maximum number of excess LCFs would be 610 per million people per person-rem of dose, compared with about 42 out of 100 individuals who are expected to develop solid cancer or leukemia from other causes, assuming a sex and age distribution similar to that of the entire U.S. population (National Research Council 2006). The BEIR VII dose-to-risk conversion factor is essentially equivalent to the 600 LCFs per million people per person-rem that is used in the analysis in this *TC & WM EIS*. The health risk effect in the analysis is therefore consistent with BEIR VII in determining the number of LCFs.

DOE respectfully disagrees with the reasoning regarding tribal rights at Hanford. Substantial documentation indicates that the tribes understood at the time of treaty signing that lands were no longer "unclaimed" when they were claimed for the purposes of the white settlers' activities. Most of Hanford had been so "claimed" at the time it was acquired for Government purposes in 1943. DOE is not aware of any judicially recognized mechanisms that would allow these lands to revert to "unclaimed" status merely through the process of being acquired by the Federal Government. The portion of Hanford that remained in the public domain in 1943 (those lands now having underlying BLM ownership), as well as all the acquired lands, was closed to all access initially under authority of the War Powers Act and later the Atomic Energy Act. It is therefore DOE's position that the Hanford Site lands are neither "open" nor "unclaimed."

499-56 DOE has reviewed the estimated ERDF inventory and revised the total uranium inventory from 54 curies to 412 curies. This revised estimate is based on the inventory of total uranium disposed of at the ERDF through March 2010, as reported in the Hanford Waste Management Information System. DOE recognizes this estimate may not represent the total inventory of uranium that

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

one trillion liters = greater than 260 billion gallons. The EIS needs to be revised to include the missing 106 billion gallons from 216-B-3 pond.

499-61 cont'd

7) There is a large difference in the ratio of uranium curies to kilograms between the total numbers for Appendix S and the total numbers for Appendix D (the specific tank farm area with selected discharge areas). The ratio found in appendix S for uranium kg to curies = 70:1 while the ratio for Appendix D = 633:1. This implies missing data or errors in the data. No explanation was found in the EIS. The EIS needs to be revised to either include an explanation or to include all missing data.

499-62

8) The EIS lists the uranium chemical inventory as total uranium as soluble salt. Apparently the EIS omitted insoluble uranium compounds from the inventory data. If so, this is a serious oversight due to the toxicity of uranium as a chemical/metal which is in addition to the toxic effects of uranium due to radioactivity. The EIS needs to be revised to include all forms of uranium in the inventory data. All relevant risk modeling and discussion must be revised to reflect the additional uranium inventory and resulting risks.

499-63

9) The EIS appears to focus strictly on water/liquid related pathways for all risk scenarios. Missing from this EIS is a future failed cover scenario that allows animal and plant life to access contamination remaining in the ground. There is a long history of plants and animals accessing and spreading toxic materials in the ground at Hanford, including radioactive plants (especially long rooted tumbleweeds), radioactive insects, and radioactive animals. In addition, in the future, direct exposure of humans may occur if the waste is exposed through direct contact and air pathways. Although much of the tank farm contamination may be deeper than other areas at Hanford, the EIS lacks information about how USDOE will address and cleanup significant shallow contamination related to the miles of pipelines related to tank farms and other units. The EIS must be revised to include these potentially significant future risk scenarios.

499-64

10) In section 6.4.3.1, Tables 6-31lists only lists mercury as having a potential cumulative impact to Ecological receptors via on-site surface soil. Under ecological risk (Table 2-46) other contaminants are addressed including benzene, toluene, xylene, and formaldehyde; however these limited additional compounds are assumed to only reach the environment through a water pathway. Missing from the ecological risk direct soil exposure (direct contact, ingestion, and air inhalation) are many other significant toxic isotopes, compounds, etc. Many toxic constituents are potentially available to the ecology the future due to either failed landfill covers or through natural or man-made disturbances to the site soil. Revise the EIS to include these additional contaminants and scenarios.

499-65

11) The EIS failed to discuss Land Disposal Restrictions with respect to any scenario that proposes to leave toxic material on site. This would include a comparison of best available technologies to meet equivalent land disposal treatment standards.

499-66

may be disposed of at the ERDF, but it represents the best inventory estimate available at this time. DOE reviewed the *Retrieval Process Development and Enhancements FY96 Pulsed-Air Mixer Testing and Deployment Study* (PNNL-11200), dated August 1996, (Powell and Hymas 1996) and found no inventory data in the document to compare with the inventory estimates analyzed in this EIS. Without the correct document citation, a comparison cannot be conducted.

499-57 Regarding the comment about the lack of uranium inventories in the cumulative impact analyses for the ERDF and US Ecology, estimates of the total uranium inventory (i.e., chemical uranium) were not provided in the original source document. DOE revised the Appendix S inventories to include a calculated total uranium inventory for the ERDF and US Ecology. Note that uranium isotope inventories were included in the analysis for both the draft and this final EIS.

499-58 Regarding the comment about the lack of uranium chemical inventories for a number of the burial grounds, estimates of the total uranium inventory (i.e., chemical uranium) were not provided in the original source document. DOE revised the Appendix S inventories to include a calculated total uranium inventory for the burial grounds. Note that uranium isotope inventories were included in the analysis for both the draft and this final EIS.

499-59 Regarding the comment about the plutonium inventories in the cumulative impacts analysis for a number of burial grounds, DOE conducted a detailed review of available inventory data and believes the inventory estimates analyzed in this EIS represent the best-available data. The primary source of referenceable inventory data for the burial grounds used in this EIS was the *Summary of Radioactive Solid Waste Received in the 200 Areas During Calendar Year 1995* (Anderson and Hagel 1996). As discussed in the introduction to this source document, the inventory data contained within included not only the inventory disposed of in 1995, but also the cumulative inventory through 1995. DOE's review of *The History of the 200 Area Burial Ground Facilities* (Anderson 1996), which is referenced in the comment, concluded that it may not be the best source for burial ground inventory data. The following statement is an excerpt from the Anderson (1996) preface: "Much of the information is not associated with referenceable documentation, and comes from the author's experiences and associations with others during the time spent in the burial grounds which covered a quarter of a century." However, to address the example provided by the commentor, the 4,930 curies of plutonium estimated by

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

12) The EIS failed to provide a specific description and diagrams of all of the structures/equipment included in the "SST" system. The EIS must be revised to include a complete description of the entire SST system. ***499-67***

13) Missing in the EIS are miles of pipelines including the old SST cross-site pipelines that extend beyond the SST tank farm fencelines to interconnect with cribs, trenches ponds, vaults, and process facilities. Although USDOE included some selected cribs and trenches located beyond the SST fencelines, there is no mention of the large system of buried SST pipelines that remain in the ground. The EIS failed to address the contamination associated with these old abandoned pipelines. In the past, many if not most of these old pipelines were removed from service due to leaks, and plugging problems that rendered the lines inoperable. In a few cases the leaks were discovered when liquid waste formed wet areas above the defective piping. Revise the EIS to include a description of these structures and all estimates of associated leaked and plugged inventory remaining in the pipelines. Additionally, include a description of how the past leaks were remediated. ***499-68***

14) The EIS fails to discuss the realities of tank sampling at Hanford. All tank core samples stop short of the bottom of the tank to avoid damaging the tank steel shell, which is well beyond the engineered design life and the condition of which is unknown. Several cores are taken from each tank and indicate that the layering of toxic tank sediments/constituents is uneven and therefore the information from a few cores is not very representative of the specific toxic nature of an individual tank. Finally, the original wastes were added to tanks in a liquid form and heavier materials concentrated in the bottom of each tank. Since no sample data is available for the bottom layers of any tank, drawing any conclusions relating to the heavier toxic materials including all the radionuclide content would be flawed. Revise the EIS to address this fact and include revised estimates of the residual heavy radionuclides projected to remain in the SSTs. ***499-69***

15) There is a lack of sufficient characterization for many units at Hanford. Specifically there is very little characterization relating to burial grounds. This is especially a problem for the older burial grounds that lack records of materials dumped in the burial grounds. Additionally the older burial grounds operated with few restrictions and received a wider range of toxic materials than some of the newer burial grounds. Missing from the EIS is a basis for the estimated contamination listed in the EIS. A cross check of documents found discrepancies in a number of burial grounds (see comments #3 and #4). Revise the EIS to include the basis for burial ground estimates in the EIS. ***499-70***

16) The EIS fails to include a discussion of specific field sampling used to verify the results of modeling used in the EIS. Revise the EIS to include adequate modeling verification with field samples sufficient to validate the models used in the EIS. ***499-71***

Anderson and Hagel (1996) converts to 67 kilograms (148 pounds) of plutonium when the appropriate specific activity (curies/grams) factors are applied; this is approximately the same inventory estimate provided in *The History of the 200 Area Burial Ground Facilities* (Anderson 1996). Therefore, specific to the comment made, DOE sees no discrepancy in this case.

499-60 Regarding the comment about the lack of uranium chemical inventories for a number of the burial grounds, estimates of the total uranium inventory (i.e., chemical uranium) were not provided in the original source document. DOE revised the Appendix S inventories to include a calculated total uranium inventory for the burial grounds. Note that uranium isotope inventories were included in the analysis for both the draft and this final EIS.

499-61 Appendix S, Table S–26, includes an estimate of 282.7 billion liters (74.7 billion gallons) that was discharged to 216-B-3 Pond. The source of this estimate was SIM (Corbin et al. 2005), which DOE believes represents the best-available data at the time of this EIS's publication. Other estimates have been developed using a variety of methods and assumptions. A comparative analysis of the different estimates is difficult because (1) the B Pond is divided into several segments, and the historical records are not clear as to which portions of the pond were in operation during different discharge regimes; and (2) assumptions about overflow and evaporation from the ponds during discharge vary. In general, DOE chose the SIM inventory for analysis in this EIS because it was considered the most comprehensive and internally consistent reference for this calculation. SIM provides estimates of the uncertainty of discharges, and the uncertainty for the B Pond source was estimated at 25 to 50 percent, which is consistent with the variation quoted by the commentor. It should also be noted that the time series of water discharges from this source were used as inputs to the MODFLOW regional-scale flow model, which produced a flow field in satisfactory agreement with historical waste-level measurements (agreement within approximately 2 meters [6.5 feet] across all areas of the site throughout the operational period).

499-62 Regarding the comment about the lack of uranium chemical inventories in the cumulative impacts analysis inventories provided in Appendix S, estimates of the total uranium inventory (i.e., chemical uranium) were not provided in the original source document. DOE revised the Appendix S inventories to include a calculated total uranium inventory for the burial grounds. Note that uranium isotope inventories were included in the analysis for both the draft and this final EIS.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

12. How much High-Level Nuclear Waste will USDOE remove from leaky Single Shell Tanks?

THE PROBLEM:

53 million gallons of deadly liquid High-Level Nuclear Waste are stored in 177 aging underground tanks. 35 million gallons are in the oldest Single Shell Tanks (SSTs), which have already leaked over a million gallons. USDOE is seeking Washington State agreement to delay the deadlines for emptying the SSTs by 22 years, from 2018 to 2040.

THE OPTIONS:

USDOE evaluated removing:

- 90% of tank wastes;
- 99% of tank wastes;
- 99.9% of tank wastes

USDOE's PREFERRED ALTERNATIVE:

Removing 99% of tank wastes.

THE IMPACTS:

The EIS shows very significant increases in radioactive contamination of groundwater over thousands of years from all alternatives, but the removal of 99.9% of tank wastes decreases contamination significantly compared to removal of 99% or 90%. The tough to remove residues have a disproportionate amount of the radioactivity in the tanks.

USDOE's own analysis shows that the cancer risk from drinking well water miles away (at the Core Zone Boundary) due to the residues in tanks under USDOE's preferred alternative – leaving 1% of the tank wastes and capping the areas instead of cleaning up past leaks – would be approximately 50 times the State's cancer risk cleanup standard in the year 3600. Even if 99.9% of the wastes are removed and only two tanks farms are cleaned up, the cancer risk from the well water is nearly 10 times the State's cancer risk standard.[16] *499-72*

HOANW'S RECOMMENDATION:

USDOE must remove 99.9% of the tank wastes, or remove to the limits of technical capabilities. This must be followed by a formal commitment that USDOE will characterize contamination caused from leaks and discharges from the tank systems and commit to a risk based retrieval (permanent remedy) of contaminated soils instead of continuing to pursue just "capping" vast areas of the tank farms and liquid waste discharge crib areas. USDOE's current plan amounts to "cover-up" instead of "clean-up." *499-73*

[16] (TCWMEIS Figure S-18 and S-14. S-14 shows 99.9% retrieval (Alt. 4) contributes a lifetime fatal cancer risk in the year 3050 which is nearly 1 E-4 (1 in 10,000), or ten times the total cancer risk from all sources allowed under MTCA (which is 1E-5). If 99% is retrieved, the fatal cancer risk never drops below 1 E-5 over the next ten thousand years. This is solely due to residuals and retrieval leaks – not including contamination from past deliberate discharges and other sources.

499-63 Regarding use of the term "soluble salts" for describing the total uranium inventories, the term "(soluble salts)" in the table has been deleted in this final EIS to avoid confusion. The inventories provided in the *Draft TC & WM EIS* did represent total uranium, not just the soluble salt form. Please see response to comment 499-62 regarding the perception that some of the uranium chemical inventories in the cumulative impacts analysis inventories provided in Appendix S are underreported.

499-64 Facility closure activities and configurations of engineered barriers, including caps, are described in Appendix D of this *TC & WM EIS*. The analysis assumes failure of the facility cover (barrier). The closure designs and depth of the waste are such that biointrusion into facilities would be a small component of the direct human intrusion and groundwater release scenarios evaluated in this EIS. Methods applied for evaluation of direct human intrusion are presented in Appendix Q, Section Q.2.3, while results of the analysis are presented in Sections Q.3.1.1.8 (Tank Closure alternatives), Q.3.2.1.4 (FFTF Decommissioning alternatives), and Q.3.3.1.4 (Waste Management alternatives). Direct-intrusion exposure pathways include worker inhalation and direct radiation and the complete set of residential farming pathways. Only a small fraction of the ecological populations at the site would be exposed to waste, given the closure designs and depth of the waste. There is no basis for quantitative comparison of risk to ecological receptors exposed by direct contact to waste in failed landfills under the different alternatives.

Cleanup activities for shallow contamination are presented in Appendix D. Potential impacts of subsurface pipelines associated with the tank farms are evaluated in this EIS under the ancillary equipment category. Impacts of ancillary equipment removal from the BX and SX tank farms are evaluated under Tank Closure Alternative 4; from all tank farms, under Tank Closure Alternatives 6A and 6B.

499-65 Appendix D, Section D.1.1, Current Tank Inventory of Radioactive and Chemical Constituents, discusses the process by which chemicals and radionuclides are determined and evaluated in this EIS. The evaluation of impacts of air releases included chemicals such as benzene, toluene, xylene, and formaldehyde, as indicated in Chapter 4, Table 4–4. This EIS does not assume that these compounds would reach the environment only through a water pathway. Data are available for these constituents in the Hanford Site Evaluation Surveillance Data Reports for 2004–2006, and these data were considered in the cumulative impacts

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

13. How – *or if*– the 149 Single Shell Tanks and High-Level Nuclear Waste leaks will be cleaned up after the wastes are removed

THE PROBLEM

Over a million gallons of High-Level Nuclear Waste has leaked from Single Shell Tanks (SSTs), and *billions* of gallons of waste was discharged from tanks into the soils near the "tank farms".[17] The contamination is spreading rapidly through soil to groundwater and will move towards the Columbia River.

USDOE must legally "close" the tanks and tank farms after the wastes have been removed (with options ranging from removing 90% to 99.9% of the wastes). Legal closure includes cleaning up the contamination in the soil column and groundwater; and, either adding a cement grout to tanks with dirt caps on top of the tank farms and contamination (called "landfill" closure), or, removing the tanks and pipe systems and cleaning up the contamination in the soil (called "clean closure). Washington State's hazardous waste law says that landfill closure can only be used after practical efforts to cleanup contamination have been attempted.

Until fairly recently, USDOE claimed that tank leaks posed no significant environmental risk. However, characterization of tank leaks in the SX Tank Farm found that gamma radiation emitting Cesium 137 had moved deeply to the depth of groundwater. Cesium 137 is far less mobile in soil and groundwater than many other radionuclides. USDOE issued a report which acknowledged,

> "(T)he SX Tank Farm vadose zone work essentially disproved some long-held assumptions that the contamination from the tanks did not migrate and therefore was not a significant environmental risk."[18]

Unfortunately, USDOE's preferred alternative still reflects the old views that tank leaks are not a significant risk. USDOE's preferred alternative in the TCWMEIS is to leave forever the bulk of the contamination from tank leaks and deliberate discharge under caps, instead of cleaning up the contamination.

THE OPTIONS:

- Not investigating the leaks & wastes in trenches; not cleaning up or capping the tanks ("no-action alternative")
- Adding a cement grout to the tanks & leaving them in place; not investigating or cleaning up the leaks & wastes in trenches; capping the tanks ("landfill closure")
- Investigating and cleaning up only two of the tank farms and leaving the other tank farms and their contamination under caps

[17] "Historical Vadose Zone Contamination from A, AX and C Tank Farms"; RPP 7494, Rev. 0; Aug. 8, 2001; Fluor Federal Services for USDOE. Report documents 3.8 billion gallons of deliberate discharges to the cribs, trenches and ditches associated with the A, AX and C Tank Farms as tank wastes were decanted.

[18] DOE/RL-98-48, Vol. II; **State of Knowledge** Rev. 0; *GW/VZ Integration Project Background Information and State of Knowledge;* June 30, 1999 4-52

assessment, although only the worst cases are presented in Chapter 6, Table 6–32. As stated in Appendix P, only the potential impacts of airborne releases during operations and the potential impacts of groundwater discharges under the various alternatives are evaluated in this *TC & WM EIS*. The purpose of the risk analysis is to compare the alternatives quantitatively. The risk analysis is not intended to fully characterize the risk, as might occur in an ecological risk assessment under laws such as CERCLA; therefore, every exposure pathway and its incremental contribution to a potential impact is not quantified.

499-66 Chapter 8 of this *TC & WM EIS* identifies the laws, regulations, and other requirements that potentially apply to the alternatives. Specifically, Section 8.1.4 identifies and summarizes the hazardous waste and materials management requirements, including the land-disposal-restriction requirements (40 CFR 268).

499-67 This *TC & WM EIS* provides a detailed description of the SST system in Appendix E, Section E.1.1.1.1, Tank Farm Facilities, including the primary components of the tank farm system in the 200-East and 200-West Areas of Hanford. Table E–1 identifies the distribution of SSTs among the tank farms.

499-68 Appendix D, Section D.1.2, Tank Ancillary Equipment Waste, provides a discussion of the inventories for the ancillary facilities, including the transfer piping associated with the SST and DST farms. Tables D–9 through D–12 provide the radioactive and nonradioactive inventories for the SST and DST ancillary equipment.

499-69 Appendix D, Sections D.1.1, Current Tank Inventory of Radioactive and Chemical Constituents, and D.1.1.4, Uncertainty in Best-Basis Inventories, provides discussions of the tank waste inventories and the uncertainties in the inventory estimates. DOE believes the inventories used in this EIS represent the best and most accurate data available at this time.

499-70 As discussed in Appendix S, "Waste Inventories for Cumulative Impact Analyses," DOE conducted a detailed review of available inventory data and believes the inventory estimates analyzed in this EIS represent the best-available data. Section S.3.5, Analysis of Sites with Missing Inventory, describes from a macro perspective the availability and uncertainties of the cumulative impacts analysis data, including the data for the burial grounds. DOE agrees there is minimal characterization of the burial ground waste, but has provided this insight to give the reader a sense of the uncertainties in the cumulative impacts analysis inventory estimates.

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- Removing the tanks and investigating and cleaning up the soil contamination in all the tank farms ("clean closure").

USDOE'S PREFERRED ALTERNATIVE

Dirt caps ("landfill closure") over the tank farms without removing tanks or pipelines; and without, investigating or cleaning up the contamination from tank leaks and discharge of tank wastes.

THE IMPACTS:

The EIS shows that the contribution to groundwater contamination and cancer risks for future site users from tank leaks would be very high for thousands of years – growing worse over time. Capping does not prevent the contamination from spreading.

For example, the EIS predicts that in the year 3890, Uranium from tank farm releases under USDOE's preferred alternative would contaminate groundwater below the areas that are expected to be open for public use to levels 10x higher than currently acceptable standards. [19]

HOANW'S RECOMMENDATION:

USDOE must remove the tanks ("clean closure") and investigate and remediate the soil contamination from tank leaks. Abandoning the contamination from tank leaks and deliberate discharges is not acceptable.

499-74

Cumulative Impacts Without Adding More Waste or Considering Tank Wastes:

Maximum Peak Year Concentrations of the COPCs from Non–*TC & WM EIS* Sources at the Core Zone Boundary and the Columbia River Nearshore

- Table U-2

Contaminant	Max concentration Central Plateau Inner (year)	Max concentration River shore (year)	DW Standard or benchmark
Plutonium (inc Pu239, 240)	2,660 (11,848)	4,250 (2983)	15 pCi/L
I-129	50.9 (4043)	9.1 (4540)	1. pCi/L
Chromium	2540 (2216)	16,100 (1978)	100

USDOE projects that Plutonium 239 levels at the River shore will increase to 300 times the Drinking Water Standard in the next thousand years under USDOE's proposed actions, including from unlined discharge and burial grounds that USDOE plans to cap, instead of cleaning up

[19] TCWMEIS at 6-109.

499-71 DOE disagrees with the supposition that the *Draft TC & WM EIS* fails to include specific field-sampling data. Field-sampling data from the following sources were used as stated in the draft EIS: (1) over 5,000 boring logs to support lithologic encoding of the regional-scale flow model (Appendix L, Section L.4.3.2); (2) approximately 1,800 groundwater wells to calculate the regional-scale flow model (Section L.6.1); and (3) approximately 140 vadose zone boreholes to calibrate the vadose zone model, as well as regional-scale groundwater plume measurements for the BY Cribs, BC Cribs, 216-T-26 Crib, and the REDOX and PUREX waste sites (Appendix N, Section N.3.4). Furthermore, in Appendix U, modeled contaminant plumes are compared against field measurements for the COPCs. DOE's view is that the overall level of characterization data for Hanford supports differentiation among the alternatives, which is a key feature of a NEPA analysis.

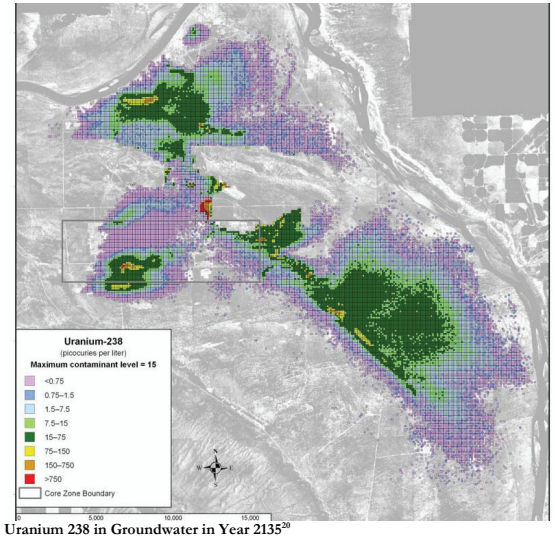
499-72 At this time, DOE is implementing an extensive, ongoing cleanup program at Hanford, as required under RCRA, CERCLA, and/or the TPA, a legal agreement between DOE, Ecology, and EPA. The TPA identifies cleanup actions and schedules, called milestones. The TPA agencies completed negotiations on several Hanford cleanup projects, including the establishment of 29 additional and/or accelerated groundwater and Columbia River protection milestones and target dates.

499-73 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. Tank Closure Alternatives 6A and 6B evaluate 99.9 percent retrieval of the tank waste and clean closure of the SST system. The decision on the selected course of action and supporting rationale will be documented in DOE's ROD for this EIS.

499-74 The impacts of different levels of tank waste retrieval and of different types of SST system closure are addressed in the *TC & WM EIS* analyses. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of the tank waste and clean closure of all or part of the SST system. This closure includes the tank system, along with the vadose zone as impacted by the tank farms (i.e., past leaks). However, as discussed in the Summary, Section S.1.3.2, and Chapter 1, Section 1.4.2, of this *TC & WM EIS*, DOE will not make decisions on groundwater remediation, including the remediation of groundwater contamination resulting from non-tank-farm areas in the 200 Areas, because that is being addressed under the CERCLA (42 U.S.C. 9601 et seq.) process. See response to comment 499-6 regarding factors influencing future DOE decisions.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

New plumes from tank leaks, residues and discharges will grow for thousands of years under USDOE's plans to NOT cleanup tank leaks, waste discharge trenches and cribs, and to leave 1% in tanks (so-called "Landfill Closure") Uranium as an Example:



Uranium 238 in Groundwater in Year 2135[20]
Dark red >50x Drinking Water Standard (DWS)
DWS is set at level at which 1 adult male in 10,000 dies of cancer. This is just one contaminant out of many which will greatly exceed the Drinking Water Standard.

The draft TCWMEIS fails to provide maps or charts disclosing the cumulative risk from all contaminants to Native American children and other reasonably foreseeable exposed populations over time. It is very foreseeable that the scarcity of water, including restrictions

499-75

[20] **Figure 6–65. Alternative Combination 2 Spatial Distribution of Cumulative Groundwater Concentration for Uranium-238 During Calendar Year 2135**

499-75 The long-term human health impacts analysis of this *TC & WM EIS* estimates impacts on a set of four onsite receptors and the offsite population to provide a reasonable basis for evaluation of the alternatives. The estimates of excess lifetime radiological risk presented in this EIS use risk coefficients that are integrated over age and gender using age-specific intake rates and weights that represent all members of the population. With respect to estimation of dose, it is recognized that children may form a sensitive group; regulatory guidance is evolving toward detailed consideration of such groups. The current basis of impact assessment data, e.g., radiation dose conversion coefficients, is not sufficiently developed to support estimates of impact on this sensitive subpopulation. The *Implementation Guide for Use with DOE M 435.1-1* (DOE G 435.1-1) directs that calculations for performance assessment of LLW facilities use dose conversion factors for adults. In addition, the EIS impacts analysis presents extensive evaluation of the potential impacts on the groundwater resource, including estimates of contaminant concentrations in groundwater and of human health impacts related to groundwater use.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

on further Columbia River withdrawals and the projected decrease in River flow due to climate change, will lead to use of the immense groundwater resource under Hanford.

499-75 cont'd

Uranium 238 in Year 3890 under Alt 2 - Uranium into River:

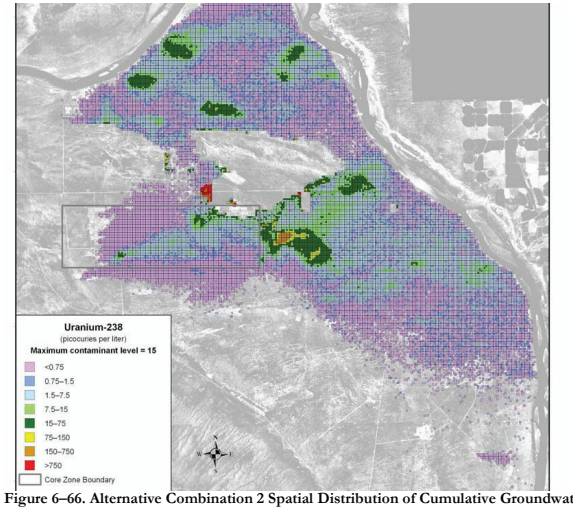


Figure 6–66. Alternative Combination 2 Spatial Distribution of Cumulative Groundwater Concentration for Uranium-238 During Calendar Year 3890 . Discussion page 6-70.

Note that the area USDOE uses to report groundwater contamination levels is what it refers to as the "Core Zone Boundary", shown in charts as the box on the Central Plateau. This exceeds the 200 Area fence lines, and is a significant distance from the boundaries of the regulated hazardous waste units – allowing for significant dilution in groundwater before reaching the location USDOE is reporting on. Hazardous waste laws, however, require meeting the drinking water standard at the boundary of the unit itself – not allowing USDOE to contaminate large areas outside the units.

499-76

It is not realistic for USDOE to assume that the location of wells for drinking and irrigation will be where USDOE has drawn this line, since the area outside the fence line today will be unrestricted public access and use… and, it is foreseeable that there will be uses within the 200 Areas when the fences disappear.

499-76 For the alternatives groundwater impacts analysis, three lines of analysis were considered: the barrier boundaries, the Core Zone Boundary, and the Columbia River nearshore. The peak groundwater contaminant concentrations (during the 10,000-year period of analysis) and maximum contaminant concentrations as a function of time are reported for these lines of analysis. Information on the spatial distributions of contaminants for the entire unconfined aquifer is provided in Chapter 5 of this *TC & WM EIS*. These lines of analysis were chosen to: (1) represent the potential near-, mid-, and far-field groundwater impacts; (2) meet Ecology's SEPA requirements; and (3) provide a point of comparison with anticipated analyses for permitting requirements. DOE's views are that the three lines of analysis allow an unbiased comparison of the potential impacts of the alternatives, meet the anticipated needs of the cooperating agencies, and provide a reasonable point of comparison for future studies.

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See Figure 6–78. Alternative Combination 3 Cumulative Concentration Versus Time for Uranium-238:

Uranium 238 over time in groundwater: increases on Central Plateau to 100 x DWS in 1,000 years. Sources include tank residues, leaks, and *billions* of gallons discharged to cribs.

Heart of America Northwest's review has found that USDOE has omitted billions of gallons of discharges from tanks and numerous other sources of buried or discharged Uranium from its analysis of cumulative impacts in the TCWMEIS.

499-77 **499-77** Regarding the concern about the lack of uranium chemical inventories, estimates of the total uranium inventory (i.e., chemical uranium) were not provided in the table or the original source document. DOE revised the Appendix S inventories to include a calculated total uranium inventory for those sites that reported uranium isotopes. Note that uranium isotope inventories were included in the analysis for both the draft and this final EIS. This change does not impact the figure in Chapter 6.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

14. How to treat the High-Level Nuclear Waste?

THE PROBLEM:

The 53 million gallons of liquid High-Level Nuclear Waste at Hanford need to be treated and turned into a stable glass form, through a process called vitrifcation. The current vitrification plant under construction (called the Waste Treatment Plant, or WTP) is $8 billion over budget and 8 years behind the 2011 schedule for opening in the Hanford Clean-Up Agreement (TPA). For $12 billion, it is only planned to have the capacity to treat half of the volume from the High-Level Waste tanks.

USDOE has planned to separate the highest radioactive wastes with 90% of the radiation into 10% of the volume of the wastes to be vitrified as "High Activity Waste." This glass would be stored until sent to a deep geologic repository. USDOE proposes to bury the other 90% of the waste volume (called Low Activity Waste, or "LAW")) – which still has a tremendous amount of radioactivity and chemical waste –, in a landfill at Hanford. The LAW portion of WTP is largely complete, but, it only has melter capacity to treat half of this waste stream in coming decades. Whether to vitrify or find another way to solidify LAW waste is a major controversy, referred to as "supplementary treatment."

THE OPTIONS:

- Use only the vitrification capacity currently being built at the Waste Treatment Plant (WTP) – this will take until 2095 and require replacing the plant after 60 years.[21]
- Supplement the Low Activity Waste vitrification portion of the WTP with another LAW plant with four melters, instead of just two. This would allow treatment to be completed around 2045.[22]
- Supplementing WTP with thermal treatment for the 50% of the LAW volume which WTP will not vitrify by 2050 using "bulk vitrification"; "steam reforming";, or non-thermal treatment such as "cast stone," which involves mixing wastes with grout. None of these will protect groundwater as well as vitrified LAW.
- Remove or not remove Technetium-99 (Tc99) and sulfate from wastes before treatment – Tc99 is a major source of future groundwater contamination.

USDOE'S PREFERRED ALTERNATIVE

To separate the wastes into High-Level and Low Activity Waste streams; and, choose after the year 2015 whether to treat the other 50% of the LAW waste using vitrification, steam reforming, bulk vitrification or cast stone.

[21] Alternative 2A. Page S-23. Note, we use 2095 end date because the Alternative starts up vitrification in the year 2018. WTP is not slated to begin operations until the end of 2019; and, this alternative assumed waste from nearly 20 tanks would never be vitrified, but classified as TRU and sent to WIPP. The reclassification has been removed from USDOE's preferred alternatives per notice in the Federal Register.
[22] Alternative 2B. Page S-23.

Response side of this page intentionally left blank.

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THE IMPACTS

Early startup of the LAW portion of the Vitrification Plant could enable USDOE to retrieve more waste from leaky Single Shell Tanks prior to 2022. None of USDOE's alternative include this possibility.

Vitrification of LAW waste is the least problematic portion of the WTP, while the other technologies that USDOE wants to spend years researching have significant drawbacks, particularly for future contamination of groundwater and cancer risk if LAW is buried in a landfill at Hanford. If USDOE does not plan to start design and construction of a second LAW plant before 2015, the timelines for emptying tanks will be stretched out significantly.

HOANW'S RECOMMENDATION:

USDOE should plan to start up the LAW vitrification portion of WTP prior to 2019; and start funding a second LAW facility in 2012 in order to have it ready to operate by 2022. The "supplemental treatment" options should be discarded as they are less effective and protective of the environment. The Hanford Advisory Board and the State of Washington also object to the supplemental treatment options for these reasons; however, Washington recently gave tentative approval to allow USDOE to take until after 2015 to decide. This does not give USDOE a basis for failing to present in the TCWMEIS the reasonable alternative of early startup of the LAW facility or the construction of new Double Shell Tanks to ensure that wastes are retrieved from SSTs prior to 2040.

USDOE must address the potential impacts from its delaying retrieval of SSTs from 2018 to 2040, including the risks from leaks and catastrophic failure or accidents.

499-78

499-78 As discussed in the *TC & WM EIS* Summary, Chapter 1, and Chapter 2, this EIS analyzes additional waste treatment capability that includes expanding the vitrification process capability currently being constructed in the WTP or supplementing the WTP's capability with supplemental treatment technologies. Thus, decisions to be made by DOE regarding whether to treat all waste in the WTP, as is or expanded, or to supplement its capacity by adding new treatment capability depend on demonstrating the feasibility of supplemental treatment technologies, including supplemental treatment waste form performance (durability) for long-term groundwater protection.

Appendix E, Section E.1.3.3.1, discusses the DOE Technology Readiness Assessment that included Business Case No. 7 (LAW First and Bulk Vitrification with Tank Farm Pretreatment), i.e., early startup of the LAW treatment process. However, at the time of the *Draft TC & WM EIS* preparation, DOE had not made a decision on whether to support implementation of this business case. Since then, DOE has commissioned an external technical review of the system planning for alternative supplemental treatment of LAW at Hanford (Kosson et al. 2008). The report (Kosson et al. 2008) from this review concluded that, although the current schedule for completion of the WTP LAW Vitrification Facility and supporting facilities could support early treatment of LAW in 2014, such early startup would require an interim pretreatment capability and the means for disposition of secondary waste. Since 2008, DOE has been evaluating the transition of the WTP from construction to commissioning. Information on this strategy is provided in Appendix E, Section E.1.3.3.2, of this *Final TC & WM EIS*. The *2020 Vision* (WRPS and BNI 2011) evaluates some of the elements identified in earlier DOE reports, but focuses on commissioning of the WTP project and activities essential to starting up the LAW Vitrification Facility, Analytical Laboratory, and BOF, as well as the Pretreatment Facility and HLW Vitrification Facility. For more information regarding the *2020 Vision*, please see Appendix E, Section E.1.3.3.2.

With regard to DOE's contingency planning for potential tank leaks, Appendix E, Sections E.1.1.1.1.2 through E.1.1.1.2.6, provide insight into the site's tank farm operations, maintenance, surveillance and monitoring, and safety programs that DOE has instituted to ensure that, if new tank leaks develop, they do not contribute to environmental impacts. Regarding the construction of new waste tanks, DOE currently has no plans to do so; however, this *TC & WM EIS* does analyze the impacts of constructing and operating new DSTs, if needed, under Tank Closure Alternatives 2A and 5. Additionally, as discussed in

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

15. Additional significant comments regarding Cumulative Impacts:

1. Points of compliance and analysis of groundwater contaminant levels and health risks should be disclosed at unit boundaries; not taking credit for dilution of contaminants in groundwater at the edge of what USDOE designates the "Core Zone Boundary". It is important to present River shore data as well. *499-79*
2. Cumulative impacts should be analyzed and disclosed for exposure to all sources at the point of highest contamination where it is reasonably foreseeable that there will be future wells, buildings, intrusions – without assuming that there will be a fence or demarcation of a "Core Zone Boundary" surrounding the 200 Areas in 100 or 2,000 years. *499-80*
3. USDOE should present in the Summary and in the body of the EIS projected future maximum concentrations for all potential contaminants rather than reporting concentrations in groundwater which occurred in the past while liquid wastes were being discharged straight to the soil. These past concentrations are of historic interest, but are not relevant to the impacts from proposed actions. The tables presenting maximum concentrations should be prospective, rather than retrospective – otherwise, USDOE decision makers, regulators and the public are denied the ability to see projected impacts from current wastes and proposed actions. *499-81*

16. Decommission the Fast Flux Test Facility, a prototype breeder nuclear reactor, by fully removing the core and restoring the site:

THE PROBLEM:

In 2001, as a result of massive public outcry, the FFTF, a 400 megawatt nuclear reactor at Hanford, was finally deactivated. However, it still stands at Hanford and it is time for finalizing its decommissioning. *499-82*

THE ALTERNATIVES

For decommissioning the reactor:

- Entombing the FFTF reactor in cement
- Removing all of the above surface structures and restoring the site

For removing & treating radioactive sodium and highly radioactive components:

- Shipping the sodium and components for treatment at Idaho National Lab (INL) and reshipping it back to Hanford
- Treating the sodium at Hanford, with some of it reused in the vitrification plant

USDOE'S PREFERRED ALTERNATIVE:

Entomb the reactor without dismantlement and removal. Treat the sodium at Hanford, but send the extremely radioactive pieces of the FFTF to INL for treatment.

THE IMPACTS:

The risks from trucking the radioactive sodium back and forth to Idaho could be significant, and there is no approved shipping cask for the highly radioactive components to be trucked. *499-83*

Section E.1.2.2.8, this EIS analyzes the impacts of the construction, operation, and deactivation of four WRFs, each with three 568,000-liter (150,000-gallon) tanks, under all Tank Closure alternatives except Alternatives 1, 2A, and 6A. The WRFs could be used to facilitate retrieval of waste from the SSTs and miscellaneous underground storage tanks to the DST system, as well as to condition the waste through dissolution, dilution, and size reduction, if necessary.

499-79 Please see response to comment 499-76 regarding maximum contaminant concentrations at the lines of analysis.

499-80 The alternatives analysis and the cumulative impacts analysis both use points of analysis so that they can be combined and compared across each alternative in a similar fashion, as required by NEPA. These points of analysis include the Core Zone Boundary and the Columbia River nearshore; for human health impacts analysis, the Columbia River is also included. The points of analysis were identified in the *Technical Guidance Document* (DOE 2005), signed in March 2005 by DOE and Ecology, for use in the cumulative impacts analysis. This approach ensured that all sources within the Core Zone Boundary were captured together to enhance reader understanding of the interaction of the sources within the 200 Area's Central Plateau and the Columbia River nearshore, as well as the interaction of all sources across Hanford.

499-81 Tables in this *TC & WM EIS* provide information on the peak concentrations of various COPCs. Footnotes to these tables specify that this peak occurred in the past for some COPCs. However, the relationship of past to future COPC concentrations is presented in the time-versus-concentration plots provided in this EIS.

499-82 This EIS will support decisions regarding the end state of FFTF's aboveground, belowground, and ancillary support structures.

499-83 DOE acknowledges that no DOT-approved transport casks capable of holding the FFTF RH-SCs are currently available, as indicated in Chapter 2, Section 2.5.1.2, FFTF Decommissioning Alternatives, and no transport of these components would occur until such a cask is available.

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The site would not be restored and available for Tribal Treaty or conservation purposes under USDOE's preferred alternative. Washington State requires energy facilities to be decommissioned with site restoration – as Oregon also did with the Trojan Nuclear Reactor site on the Columbia River. However, the draft TCWMEIS fails to discuss Washington's energy site restoration requirements pursuant to RCW Chapter 80.50 and WAC 463-72-040. (this is another failure in regard to adoption of the TCWMEIS for state SEPA purposes). *499-84*

The draft TCWMEIS also fails to compare and justify the proposal to leave the reactor significantly in place despite USDOE's Records of Decision to fully remove the nine reactors lining the Columbia River. *499-85*

HOANW'S RECOMMENDATION for REVISING THE PREFERRED ALTERNATIVE: The Washington State standard for decommissioning nuclear reactors requires removal and site restoration. Oregon did this for the Trojan reactor. Do not put more radioactive waste on the road unnecessarily – treat the waste at Hanford. *499-86*

17. Significant Public Involvement Flaws Marked the Comment Period on the Draft TCWMEIS. A New Comment Period is Necessary on a Revised Draft TCWMEIS Which Cures the Major Flaws, Inaccuracies and Inadequacies of the Current Draft:

Public review and comment on the draft TCWMEIS got off to a rocky start. Recognizing the importance of the TCWMEIS for both decision making and public knowledge and input regarding the impacts of the major decisions for how to cleanup the most contaminated area in the western hemisphere, Assistant Secretary Triay and Office of River Protection Manager Olinger committed in the spring of 2009 to a very extensive comment period. This comment period, it was understood, would allow for the detailed public and advisory board review necessary to offer comments on a 6,000 page environmental impact statement governing decisions as diverse as High-Level Nuclear Waste tank closure to decommissioning of the FFTF Reactor and use of landfills for on-site and off-site waste. An extended comment period was crucial to allow for review of the draft, followed by preparation of Citizens' Guides and materials for public hearings and workshops. *499-87*

Despite years of delay and time to plan, USDOE's EIS management did not respond to requests for a collaborative effort to plan for public hearings and workshops until two months of the comment period had elapsed, and we had complained (shortly after Christmas) to USDOE Headquarters about the failure to collaboratively plan with stakeholders for when and where hearings and other public involvement efforts would occur.

The first hearing was held with far less than 30 days of notice to regional stakeholders and the public – preventing us from preparing and mailing Citizens' Guides and conducting other information outreach to encourage attendance and comment. USDOE's own mailed notice for the hearing was nothing short of awful, and criticized by all regional stakeholders involved in review in collaboration with the Hanford Advisory Board's Public Involvement Committee.

499-84 In response to the commentor's statement regarding the regulations or requirements that apply to FFTF decommissioning, Chapter 8 of this *TC & WM EIS* provides both a listing and a short description of the laws, regulations, and requirements that may apply to the proposed actions, including FFTF decommissioning.

499-85 The RODs referred to by the commentor did not address or determine the end state for FFTF. This *TC & WM EIS* addresses proposed actions to retrieve, treat, and dispose of Hanford tank waste; decommission FFTF; and expand or upgrade waste management capabilities to support ongoing and planned waste management activities for on- and offsite waste to facilitate environmental cleanup activities at Hanford and other DOE sites.

499-86 Chapter 8 of this *TC & WM EIS* provides both a listing and short description of the laws, regulations, and requirements that may apply to the proposed actions, including decommissioning of FFTF.

499-87 DOE's public involvement process for this EIS was based on CEQ and DOE regulations for implementing NEPA; DOE Order 451.1B requirements; and applicable DOE NEPA guidance (available at http://energy.gov/nepa). While DOE is not bound by the terms of the TPA public involvement plan in conducting NEPA processes at Hanford, DOE is well aware of those procedures and factored them into the *TC & WM EIS* public involvement plan, which was prepared in collaboration with Ecology, a cooperating agency.

In response to the commentor's request for more-extensive collaboration in the *TC & WM EIS* public hearing planning process, as well as DOE's desire to communicate with and involve the public in this process, DOE stakeholder teleconferences were held on December 30, 2009, and January 5 and 6, 2010. Public hearing dates and locations were identified and discussed, and it was agreed that additional public hearings would be held in Spokane, Washington, and La Grande and Eugene, Oregon. Prehearing workshops were also discussed. In addition, DOE held a 1-hour open house prior to each public hearing to allow the public to meet informally with members of the *TC & WM EIS* team, ask questions, and learn more about this EIS. Informative posters and factsheets were provided at these open houses. It was further agreed during the DOE stakeholder teleconferences that no workshops other than the HAB workshop held on December 15, 2009, would be held. A suggestion was made during one of the teleconferences to move the planned January 26, 2010, public hearing in Richland, Washington, to meet the 30- to 45-day notification goal under the TPA

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- USDOE should commit to advance review of draft notice mailings (email and USPO) by the Hanford Advisory Board Public Involvement Committee and other stakeholders 30 days in advance of the start of a major comment period. USDOE should not claim that NEPA documents are not subject to TPA Community Relations Plan and other state and federal public involvement and notice requirements, deadlines and processes when the proposed actions will require TPA adoption, or adoption via permits, etc…

499-87 cont'd

In contrast to the poor collaboration for the first two months of the comment period, USDOE's ORP then committed to hold seven hearings across Washington and Oregon – which was a major public education and involvement success.

Over 600 members of the general public attended seven hearings in Oregon and Washington. Through Heart of America Northwest's holding pre-hearing workshops in adjoining rooms with USDOE support, more than half the attendees were able to have the information needed to testify and have their questions answered. (USDOE and State officials attended and participated in a number of those pre-hearing workshops).

Evaluations and surveys of attendees show that USDOE's notices failed to provide meaningful notice of the impacts of the proposed actions and failed to inform and encourage attendance. Indeed, few people attending the hearings came because of USDOE's mailed or emailed notices, and fewer than ten percent even reported seeing USDOE's notices.

- Notices for impact statements, like notices for TPA actions, must include a clear description of impacts and how the proposed actions may affect public values and concerns, and be designed to communicate that at first glance in order to encourage the public to read the notice and attend hearings. USDOE's notices, even after revision, failed to provide any indication to the public of the impacts from USDOE's proposed actions. Environmental Impact Statements are supposed to provide the public with that critical information – and, to meet State SEPA requirements, the Summary must provide that information as well as notice.

499-88

The evaluations and surveys of attendees showed that over 75% of the public attending the hearings did so because of the notice received from Heart of America Northwest and Heart of America Northwest Research Center via Citizens' Guides and fact sheets mailed and emailed; phone banks; presentations in communities or on campuses. These results show the importance of collaboration with citizen groups.

- USDOE failed to provide access to the comments presented at the Portland hearing and to the presentations and answers to public questions despite repeated requests from citizen groups. This failure to provide timely access to information critical for preparation of our comments and those of other citizens and citizen groups has undermined our ability to comment and violated both NEPA rules, and ultimately violated the Freedom of Information Act.
- Members of Heart of America Northwest and the Rosemere Neighborhood Association requested a copy of the Portland hearing transcript and a record of the

499-89

community relations plan (the January/February timeframe for public hearings was announced at the December 15, 2009, HAB meeting). During the call, the Hanford communities indicated their support for the January 26 public hearing date and their opposition to changing it. In response to a request that the Seattle public hearing not be scheduled for a week when schools were out, the hearing date was moved to March 8, 2010. DOE also held hearings in locations that encouraged university student attendance and participation, such as Eastern Oregon University.

The commentor suggests that the hearing notices could have been improved and should have been reviewed by stakeholders in advance of their mailing. The purpose of the mailers was not to educate the public on the draft EIS and its content, but to provide information to interested parties regarding the scheduled meetings (date, time, location); the *TC & WM EIS* mailers served that purpose. DOE provided, and continues to provide, other opportunities for public education related to this *TC & WM EIS*. As noted above, DOE's public hearing format included a 1-hour open house prior to each hearing to assist the public in learning more about this EIS and its preliminary findings, and informative posters and factsheets were provided at each open house. *TC & WM EIS* project information is also available to the public on Hanford's website (http://www.hanford.gov).

499-88 Notice of the comment period and hearings was published in the *Federal Register*; mailings were sent to interested parties; and notices were placed in local newspapers. Please see response to comment 499-87 regarding the purpose of the mailers and format of the public hearings.

Consistent with "Adoption — Procedures" (WAC 197-11-630), Ecology conducted its own independent review of the *Draft TC & WM EIS* for the purpose of adopting this EIS, wholly or in part, to satisfy SEPA requirements and support future permitting actions. However, SEPA procedural requirements for preparation of environmental documents (e.g., circulation, commenting, hearing requirements) are not required to be met before Ecology can adopt this EIS.

499-89 All comments on the *Draft TC & WM EIS* that were made during the public comment period, whether given orally at hearings or sent via mail or email, and their approved responses are included in this CRD, a separate volume of this *Final TC & WM EIS*. DOE has posted this final EIS, including this CRD, on the Hanford website (http://www.hanford.gov) and the DOE NEPA website (http://energy.gov/nepa), and a Notice of Availability will be published in the *Federal Register*.

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answers to public questions given by USDOE and Washington state officials at the hearings. These requests were denied.
Access to the transcript and to be able to review both comments by the public and state officials; and, to review the responses given by USDOE and Washington's representatives to questions was essential for preparation of our comments. A Freedom of Information Act Request was filed with a request for expedited response and a waiver of fees (since the information would be used in workshops, webinars, fact sheets and Guides to assist the public in commenting before the end of the comment period, a fee waiver was entirely justified). USDOE formally denied both the waiver of fees and expedited response --- leaving the public without the information and records which we believe were important for our preparation of comments.

499-89 cont'd

- Failure to provide timely access to records which the public believes are essential to preparing informed comments warrants extension of the comment period and penalties against USDOE officials for failing to provide information.
  - A significant cause of the failures to provide essential information appears to be USDOE's contractual reliance on SAIC, its contractor for the EIS. If transcripts are completed for USDOE and delivered to SAIC, they are subject to FOIA.
  - It is inappropriate to ask the public to send comments on a federal agency environmental impact statement to a private contractor, instead of directly to the federal agency. In this case, it was wrong to require people to submit comments electronically to an address "@SAIC" instead of directly to USDOE.
  - SAIC officials revealed incredible biases bringing into doubt their qualification to prepare this EIS and certainly precluding their ability to fairly receive and evaluate comments. A senior manager of SAIC wrote a rude email to our organization revealing that he equated advocacy for cleanup with anti-nuclear views and failing to recognize facts vetted by Ecology and USDOE. USDOE officials apologized for this, but SAIC has never apologized, nor shown that it will evaluate comments in an unbiased manner.

499-90

Submitted by Heart of America Northwest and Heart of America Northwest Research Center 1314 NE 56th St. #100 Seattle, WA 98105 office@hoanw.org ; or, contact Gerry Pollet, J.D., Executive Director gerry@hoanw.org (206)382-1014 Resources for citizens reviewing the EIS or seeking to comment on other Hanford Clean-Up issues are available at www.hoanw.org

Both the open house and question-and-answer period preceding each *TC & WM EIS* hearing were provided by DOE as a mechanism to educate the public on this EIS. They were not meant to be mechanisms for collecting or generating comments. Any requests for information submitted to DOE under the Freedom of Information Act were handled through the established DOE administrative process in accordance with Freedom of Information Act requirements (5 U.S.C. 552 et seq.). The transcripts of all the public hearings were posted on ORP's website when they were available.

499-90 DOE acknowledged the public's need for more time to review the *Draft TC & WM EIS* by extending the public comment period 45 days, for a total comment period of 185 days. All references supporting this EIS were made available to the public in official DOE reading rooms. Per DOE Order 451.1B, although contractors may assist in DOE's NEPA implementation, the legal obligation to comply with NEPA belongs to DOE. Further, per DOE NEPA regulations (10 CFR 1021.310), DOE shall include a disclosure statement executed by any contractor (or subcontractor) under contract with DOE to prepare the EIS document, in accordance with 40 CFR 1506.5(c). While Science Applications International Corporation conducted the analyses and preparation of this EIS, its work was performed under DOE's direct guidance and close scrutiny, and both the *Draft* and *Final TC & WM EIS* were reviewed and approved by DOE.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

Selected Inventory Data from Appendix D, TC&WM EIS

Parameter	SST Tank	SST Ancillary Equipment	Past SST Leaks	Cribs/Trenches Appx D only	Totals Appx D Only
Pu curies	66,900	590	72	594	68,156
Tc99 Ci	15,500	93	312	142	16,047
Total U Ci	875	9.9	19.7	6.21	910.8
U – Kg *	542,000	5,160	25,400	3,990	576,500
Ratio of U Ci to Kg	619:1	521:1	1,289:1	642:1	633:1

In comparison the following totals are from Appendix S:

Pu	= 76,626	ci
Tc99	= 691.8	ci
Total U	= 3,073	ci
U (chem.)	= 213,752	Kg

Appendix S ratio of U ci to Kg = 70:1

- the EIS failed to indicate the specific type of uranium – it could be just soluble salt or a total including insoluble compounds as well? Perhaps this is explained somewhere in the text, but it should be clarified on the separate tables.

There are some numbers that just don't add up - such as the uranium chemical inventory compared to the curies. Why do we have a higher curie count in appendix S when the total uranium Kg numbers are lower compared to Appendix D?

499-58 cont'd

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Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

Columbia Riverkeeper•Heart of America Northwest•Sierra Club Cascade Chapter •Oregon Chapter of the Sierra Club• Washington Physicians for Social Responsibility•Oregon Physicians for Social Responsibility•Spokane Riverkeeper•Republicans for Environmental Protection, Washington Chapter•Northwest Environmental Defense Center•Friends of the Columbia Gorge•The Lands Council•Center for Environmental Law & Policy•Oregon Toxics Alliance• Rosemere Neighborhood Association• Eastern Washington Voters•Hanford Challenge •Alliance for Democracy, Portland Chapter• Hanford Watch• Hells Canyon Preservation Council •Olympic Environmental Council•Silver Valley Community Resource Center

April 29, 2010

The Honorable Steven Chu
Secretary of Energy,
U.S. Department of Energy
1000 Independence Ave., SW
Washington D.C. 20585

The Honorable Inés Triay
Assistant Secretary for Environmental Management
U.S. Department of Energy
1000 Independence Ave., SW
Washington D.C. 20585

RE: End Waste Import/Storage Mission at Hanford

Dear Secretary Chu and Assistant Secretary Triay:

On behalf of the undersigned organizations, we are writing to request that the U.S. Department of Energy (DOE) withdraw its 2000 and 2004 Records of Decision selecting Hanford as a disposal site for large volumes of radioactive low-level waste (LLW) and mixed low-level waste (MLLW) from across the Nation. The Department's own draft *Tank Closure and Waste Management Environmental Impact Statement* (TC&WM EIS) clearly demonstrates that importing and burying off-site waste at Hanford poses serious human health and environmental impacts. ***499-91***

We join the State of Oregon Department of Energy's formal request, submitted to the Department on March 23, 2010. Oregon's letter discusses both the impacts and the flawed process relied upon by DOE in issuing a Record of Decision before analyzing the impacts at Hanford from importing and disposing of off-site waste.

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499-91 Regarding the commentor's concern about the transport of LLW and MLLW from other DOE sites to Hanford for disposal, DOE will be deferring the decision on sending LLW or MLLW from other DOE sites to Hanford for disposal (with some limited specific exceptions), at least until the WTP is operational, subject to appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

In accordance with CEQ regulations (40 CFR 1502.9(c)) and DOE regulations (10 CFR 1021.314(c)), DOE prepared an SA to evaluate information previously presented in the *Draft TC & WM EIS* that has been updated, modified, or expanded to determine whether a supplement to the draft EIS is warranted. DOE concluded, based on analyses in the SA, that the updated, modified, or expanded information developed subsequent to the publication of the *Draft TC & WM EIS* does not constitute significant new circumstances or information relevant to environmental concerns and bearing on the proposed action(s) in the *Draft TC & WM EIS* or their impacts. Further, DOE has not made substantial changes in the proposed action(s) that are relevant to environmental concerns. Therefore, in accordance with CEQ regulations (40 CFR 1502.9(c)) and DOE regulations (10 CFR 1021.314(c)), DOE determined that a supplemental or new *Draft TC & WM EIS* was not required. See Chapter 1, Section 1.8.2, for more information.

Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

Against this backdrop, we urge DOE to:

a) withdraw its prior decisions selecting Hanford to dispose of off-site waste;
b) issue a new formal decision that DOE will not add more waste to Hanford;
c) commit that DOE will conduct a new environmental impact statement if DOE revisits this decision after 2022; and
c) commit to issuing a new, revised draft of the TC&WM EIS for public comment which does not propose adding off-site waste and cures the numerous defects in the current draft, as the Department was advised by its Hanford Advisory Board (March 4, 2010).

The Department's claims that it prioritizes cleanup of Hanford and will honor a voluntary moratorium on disposing of off-site waste at Hanford until the vitrification plant is operational (estimated for 2022) have no credibility so long as the Department continues to insist that the TC&WM EIS include disposal at Hanford for 3 million cubic feet of off-site waste. The promised moratorium on adding off-site waste until 2022 does nothing to diminish the severe impacts to groundwater, the Columbia River, and human health projected by DOE itself in the draft TC&WM EIS. The Department's insistence that it will implement its decision made in 2000 to add that waste – prior to any site specific impact analysis – does, however, greatly diminish the Department of Energy's credibility.

Thousands of citizens have sent in comments on the TC&WM EIS objecting to the Department's insistence that it will use Hanford to dispose of off-site waste, and hundreds turned out at the public hearings held in Washington and Oregon. The people of the Northwest, including many of the members of our organizations, responded to the analysis put forth by the Department in the TC&WM EIS with unified objections to disposing of off-site waste at Hanford.

499-91 cont'd

The latest information, disclosed to the public in the TC&WM EIS, confirms that the assumptions underlying DOE's 2000 decision have not withstood the test of time. As the Oregon Department of Energy stated in its letter:

> Potential site-specific impacts [of importing LLW and MLLW] were finally assessed and documented with the release late last year of the draft Hanford Tank Closure Waste Management Environmental Impact Statement (TC&WM EIS). This document clearly shows that the adverse impacts of disposing of additional off-site waste at Hanford, especially if it contains certain mobile and long-lived radionuclides, would be significant. The analysis in the draft TC&WM EIS shows that no mater where at Hanford DOE proposes to dispose of off-site waste, the impacts exceed standards and are unacceptable. Moreover, the impacts from Hanford-origin wastes in these same areas already exceed standards under the most aggressive cleanup considered, leaving no room for any additional impact from off-site wastes.

The Hanford Advisory Board also issued formal consensus advice to the Department urging DOE to issue a formal Record of Decision that DOE will not add off-site waste to Hanford, stating, in part:

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Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

> Importation of this waste is projected in the draft TC&WMEIS to increase the contamination levels in groundwater by as much as tenfold above the impacts projected for key contaminants of concern for on-site waste. It could reach a cancer risk level for groundwater in excess of one hundred times Washington State's cleanup risk level for cleanups and landfills.
>
> The draft TC & WM EIS does not include a reasonable alternative to adding more waste to Hanford . . . The draft document clearly shows both alternatives (for where DOE would dispose of off-site waste) analyzed by DOE have contaminants above legal standards due to quantities and composition of the projected wastes disposed. DOE should have and did not consider an alternative that did not import waste for disposal at Hanford.[1]

The Department's draft TC&WM EIS fails to consider and disclose the route specific impacts from trucking 3 million cubic feet of waste to be disposed at Hanford, and fails to meet the legal requirement under the National Environmental Policy Act to disclose to the public that the Department has a pending related proposal to import and dispose of highly radioactive "GTCC" wastes at Hanford – which would greatly increase the cumulative environmental and health impacts. The Department's failure to disclose these plans in TC&WM EIS and in materials discussing the EIS has greatly harmed the Department's credibility, and increased public resolve to oppose the Department's plans to import and dispose of more waste at Hanford.

As evidenced by the overwhelming public outcry at the TC&WM EIS hearings, citizens of the Pacific Northwest will not tolerate off-site waste exacerbating Hanford's existing threats to the Columbia River and people of the Northwest. The Department faces certain litigation if it does not withdraw its decision to use Hanford as a national radioactive waste dump.

In light of these serious issues, we urge the Department to remove consideration of off-site waste in the draft TC&WM EIS and to issue a Record of Decision that off-site waste will *not* be added to Hanford.

499-91 cont'd

Sincerely,

Brett VandenHeuvel
Executive Director
Columbia Riverkeeper

Gerry Pollet
Executive Director
Heart of America Northwest

Sierra Club Cascade Chapter

Oregon Sierra Club

[1] Hanford Advisory Board (HAB) Advice 229, March 4, 2010, Page 11 (parenthetical added).

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Commentor No. 499 (cont'd): Gerry Pollet, Executive Director, Heart of America Northwest

Spokane Riverkeeper

Republicans for Environmental Protection, Washington Chapter

Northwest Environmental Defense Center

Friends of the Columbia Gorge

The Lands Council

Center for Environmental Law & Policy

Oregon Toxics Alliance

Rosemere Neighborhood Association

Eastern Washington Voters

Hanford Challenge

Alliance for Democracy, Portland Chapter

Hanford Watch

Hells Canyon Preservation Council

Washington Physicians for Social Responsibility

Oregon Physicians for Social Responsibility

Olympic Environmental Council

Silver Valley Community Resource Center

CC: Governor Chris Gregoire
Governor Ted Kulongoski
Senator Patty Murray
Senator Maria Cantwell
Senator Ron Wyden
Senator Jeff Merkley

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