Commentor No. 145: Frank Zucker

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: 3/8/2010

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)*?

I find it disturbing that we have to keep coming to these hearings to remind the DOE, now run by a Nobel physicist, about lessons that we should all have learned in kindergarten – and that they're now teaching in pre-school:
- If you make a mess, clean it up!
- Before you bring out new toys, put away your old ones!
- Don't run with scissors!

Specifically, I urge the DOE to reconsider their preferred options:
- clean up 99.9% of the tank waste - don't leave the worst 1% in the tanks to leak + kill future generations.
- Clean up the contaminated soil - clean closure, not sweeping it under the rug.
- Start vitrification as soon as possible, and start planning for building more such plants immediately, not in five years.
- Don't ship parts of the FTFF back + forth to Idaho - that's running with scissors
- Don't bring in more waste unless you clean up what you've got + can show you can clean up more waste.

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

Name/Nombre: Frank Zucker

Address/Dirección: 1612 N ~~East~~ 39TH ST

City, State, Zip Code/Ciudad, Estado, Zona Postal: SEATTLE WA 98103

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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

145-1

145-1 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*.

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. 146: Jack Smith

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: 5/8/10

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)*?

Woody Guthrie was a wonderful singer. He sang songs of the Columbia. If he were here today he would write a song to the DOE. It would say "Shame, Shame Shame."

I concur: Removal should be to the amount possible - At least 99.9%

Transfer between state MUST be stopped

Shame Shame Shame

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

Name/Nombre: Jack Smith

Address/Dirección: 9728 - 3rd Ave NW

City, State, Zip Code/Ciudad, Estado, Zona Postal: Seattle WA 98117

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E-mail: TC&WMEIS@saic.com

146-1

146-2

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146-2 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. 147: Victor Odlivak

U.S. DEPARTMENT OF ENERGY

Comment Form
Formulario para comentarios

Thank you for your input
Gracias por su participación

Date/Fecha: 8 March 2010

PLEASE PRINT / FAVOR DE ESCRIBIR CLARAMENTE

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Hanford began in the 1940's to create plutonium for the atomic bombs dropped in WW II. At present this is the most polluted place in the entire western hemisphere. All this radioactivity needs to be cleaned up. No offsite waste is to be imported to Hanford. All waste presently there needs to be cleaned up 100 percent including water, building materials, solids, effluents, soil etc. It is especially important to prevent air and ground water contamination going down to the deepest aquifer, i.e. one mile below the ground. Entombment is not sufficient for the FFTF facility. It needs to be removed totally. All reactors need to be totally shut down now.

Thank you for listening.

147-1

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

Name/Nombre: Victor Odlivak

Address/Dirección: Seattle, WA 98103 (21 Years)

City, State, Zip Code/Ciudad, Estado, Zona Postal: email: victor@convertto linux.com

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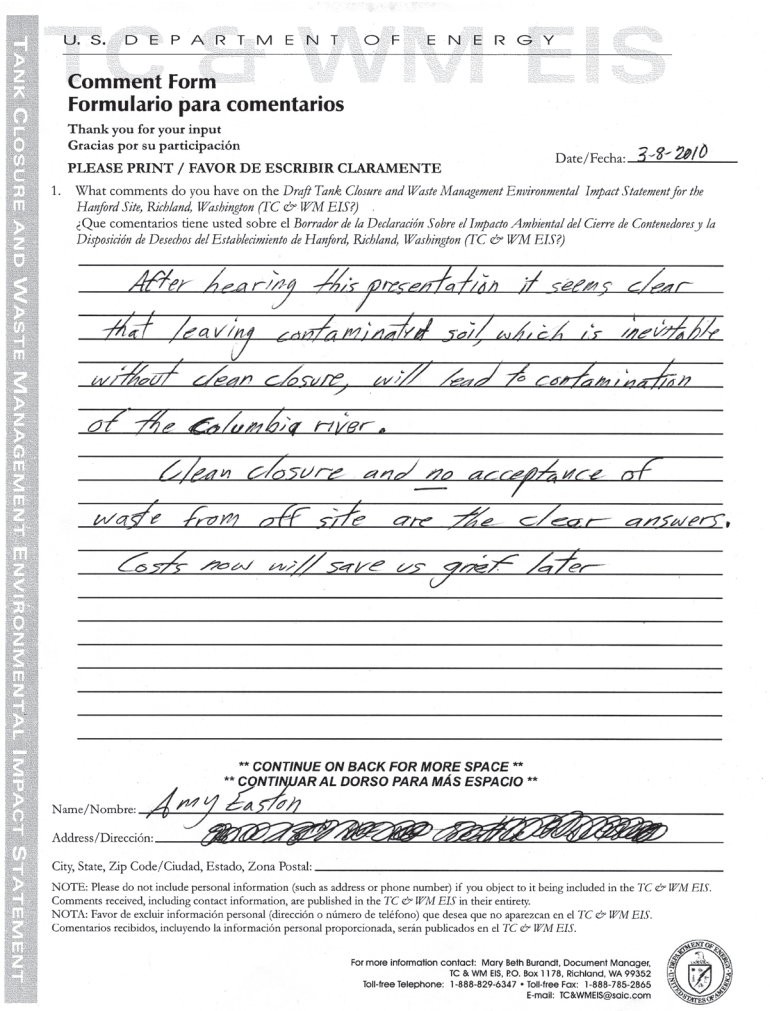
E-mail: TC&WMEIS@saic.com

147-1 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.

147-2 Shutting down all nuclear reactors is not within the scope of this *TC & WM EIS*. This 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. The disposal of other wastes, including waste associated with commercial nuclear power generation, is beyond the scope of this EIS.

Commentor No. 148: Amy Easton



TANK CLOSURE AND WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

TC & WM EIS

U.S. DEPARTMENT OF ENERGY

Comment Form
Formulario para comentarios

Thank you for your input
Gracias por su participación

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Date/Fecha: 3-8-2010

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After hearing this presentation it seems clear that leaving contaminated soil, which is inevitable without clean closure, will lead to contamination of the Columbia river.

Clean closure and no acceptance of waste from off site are the clear answers.

Costs now will save us grief later

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

Name/Nombre: Amy Easton

Address/Dirección: [redacted]

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

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E-mail: TC&WMEIS@saic.com

148-1

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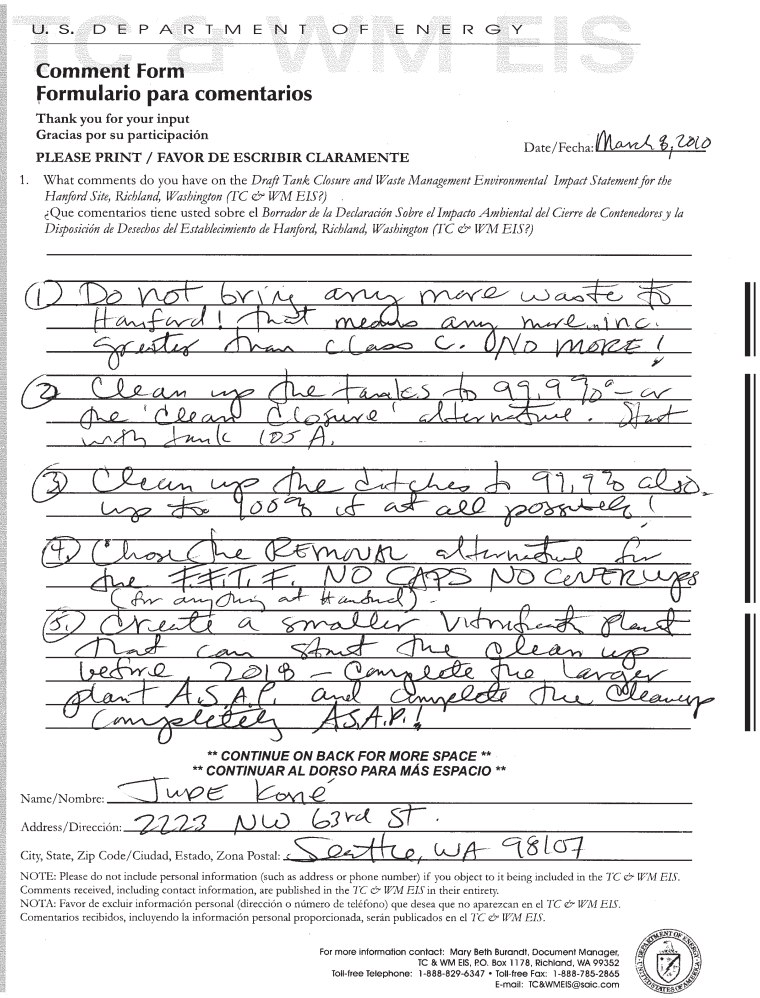
148-1 The clean closure alternatives considered for the SST system are represented by the Base and Option Cases of Tank Closure Alternatives 6A and 6B; selective clean closure is represented by Tank Closure Alternative 4. For both Base Cases, the assumption is that the SST system would be cleaned to 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]).

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.

148-2 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.

148-3 Both DOE and Congress are committed to the cleanup efforts at Hanford, and DOE continues to seek funding for these efforts.

Commentor No. 149: Jude Kone



U.S. DEPARTMENT OF ENERGY

TC & WM EIS

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Date/Fecha: March 8, 2010

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(1) Do not bring any more waste to Hanford! That means any more, inc. greater than class C. D/NO MORE!

(2) Clean up the tanks to 99.9% — or the 'Clean Closure' alternative. Start with tank 105 A.

(3) Clean up the ditches to 99.9% also. up to 100% if at all possible!

(4) Chose the REMOVAL alternative for the T.F.T.F. NO CAPS NO CENTURYS (for anything at Hanford)

(5) Create a smaller Vitrification plant that can start the clean up before 2019 — Complete the larger plant A.S.A.P. and complete the cleanup completely A.S.A.P.!

149-1

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

Name/Nombre: Jude Kone

Address/Dirección: 2223 NW 63rd St.

City, State, Zip Code/Ciudad, Estado, Zona Postal: Seattle, WA 98107

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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.

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.

149-2 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*.

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

Commentor No. 149 (cont'd): Jude Kone

placement. However, closure of these CERCLA past-practice units is not part of the proposed actions for this EIS. Closure of these units would be addressed at a later date.

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.

149-3 DOE is working diligently to bring this facility, the WTP, online to treat the tank waste at the site as soon as possible, as well as to clean up Hanford. 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, the Analytical Laboratory, and 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.

Commentor No. 150: Leslie Reilly

Comment Period Through March 19, 2010
Comment Title PUBLIC COMMENT ON THE *DRAFT TANK CLOSURE & WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT*

Submit your comments at the Seattle hearing on Monday, March 8 (Seattle Center, Northwest Rooms at 7pm)

If you cannot attend the hearing, please place your comment in one of the pre-addressed envelopes provided

Name (optional) Leslie Reilly
Address 1110 E. Spring St. Seattle, WA 98122
Telephone 847-915-0435 Email REILYL1@SEATTLEU.EDU

Comment:
Just recently moving to Seattle from Chicago. I've never been aware of the problems at Hanford. How can this be such a huge issue but stay so quiet. This going to affect future generations even more than it effects us. As children we learn that we need to clean up the messes that we make. In adulthood, how is this any different? We created deadly waste and the only acceptable answer is to clean it up. Clean all of it up. It hurts everyone, and everything in the Pacific Northwest. It just is plain and simple.

150-1 **150-1** 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. 151: Howard Jess

Comment Period Through March 19, 2010
Comment Title PUBLIC COMMENT ON THE *DRAFT TANK CLOSURE & WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT*

Submit your comments at the Seattle hearing on Monday, March 8 (Seattle Center, Northwest Rooms at 7pm)

If you cannot attend the hearing, please place your comment in one of the pre-addressed envelopes provided

Name (optional) Howard Jess

Address 4336 E Mercer Way, Mercer Island WA

Telephone [redacted] Email hjess@yahoo.com

Comment:

I would like DOE officials to imagine that they, their children and grandchildren for generations were to make Hanford & the areas downstream their HOME. Really visualize that and then DO THE RIGHT THING.

151-1 **151-1** Comment noted.

Commentor No. 152: Rachelle Peebles

Comment Period Through March 19, 2010
Comment Title PUBLIC COMMENT ON THE *DRAFT TANK CLOSURE & WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT*

Submit your comments at the Seattle hearing on Monday, March 8 (Seattle Center, Northwest Rooms at 7pm)

If you cannot attend the hearing, please place your comment in one of the pre-addressed envelopes provided

Name (optional) Rachelle Peebles

Address 20407 68th Ave. West #A-101 Lynnwood, WA 98036

Telephone _____ Email rachellepeebles@yahoo.com

Comment:

I've just learned about the toxic waste site going on in Hanford about a month ago. I'm a student at [redacted]. It's sad to hear of the toxic wastes that are harming the environment upon which we live, and the "down-winders" that are affected and getting ill by the toxic wastes. I think that now that a huge mess was caused in the trisciting, the best thing to do is clean up the messes caused. It also does not prove to be beneficial, to continue using Hanford as a toxic waste dump, or a national waste dump. The site is too close to the river (Columbia), which can carry wastes to all sorts of locations, and cause even more harm. We only have one earth to live upon, and we need to take care of it. Our generation, and the generations to follow, rely upon that fact and determination.

152-1

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152-1 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.

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Commentor No. 153: Joelle Puccio

Comment Period Through March 19, 2010
Comment Title PUBLIC COMMENT ON THE *DRAFT TANK CLOSURE & WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT*

Submit your comments at the Seattle hearing on Monday, March 8 (Seattle Center, Northwest Rooms at 7pm)

If you cannot attend the hearing, please place your comment in one of the pre-addressed envelopes provided

Name (optional) Joelle Puccio, RN

Address 119 Harvard AVE #207

Telephone (206) [redacted] Email jppuccio@hotmail.com

Comment:

My Dad grew up in Kennewick. All my cousins and family are still there. I have lived in WA my whole life. As a nurse in neonatal intensive care, I am always thinking about future generations. The proposed plan to add more waste and incompletely remove old waste is unacceptable. We are going down in history as the generation that sold out our species for money and convenience. Please vote for ① clean closure, ② no new waste production/importation, and ③ keep working on cleanup until we have finished.

153-1

153-1 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.

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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.

This document addresses the environmental impacts of storage, retrieval, treatment, and disposal of tank waste and final closure of the SST system. It also evaluates the impacts of the decommissioning of FFTF, 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. 154: Thomas Buchanan

Comment Period Through March 19, 2010
Comment Title PUBLIC COMMENT ON THE *DRAFT TANK CLOSURE & WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT*

Submit your comments at the Seattle hearing on Monday, March 8 (Seattle Center, Northwest Rooms at 7pm)

If you cannot attend the hearing, please place your comment in one of the pre-addressed envelopes provided

Name (optional) THOMAS BUCHANAN
Address C03 NW 75th St. SEATTLE 98117
Telephone (206) Email CLRTOM@EARTHLINK.NET

Comment:

I DON'T WANT THE DOE "NATIONAL REPOSITORY FOR NUCLEAR WASTES" LOCATING AT HANFORD, WASHINGTON UNTIL THE 99.99% OPTION OF CLEANING UP THE WASTES FIRST AT THE SITE. THE IMPACT OF 17,000 trucks of WASTES ON AMERICAN HIGHWAYS, WITH THE POTENTIAL OF ACCIDENTS, LEAKAGE, HIGH TEMPERATURE FIRES ARE VERY SERIOUS!

THE RADIOACTIVE + CHEMICALLY TOXIC LEAKS IN THE SOIL, SLOWLY MOVING TO THE COLUMBIA, WITH RADIOACTIVE TRITIUM, URANIUM + TECHNICIAM 99 ALREADY BUBBLING UP INTO THE COLUMBIA RIVER, THIS LEAKAGE IS ALSO UNACCEPTABLE

154-1

154-1 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.

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 during incident-free operations or postulated accidents. This *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.

Commentor No. 155: Thomas F. Robinson

Comment Period Through March 19, 2010
Comment Title PUBLIC COMMENT ON THE *DRAFT TANK CLOSURE & WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT*

Submit your comments at the Seattle hearing on Monday, March 8 (Seattle Center, Northwest Rooms at 7pm)

If you cannot attend the hearing, please place your comment in one of the pre-addressed envelopes provided

Name (optional) Thomas F. Robinson
Address 1371 31st Ave S, Seattle, WA 98144
Telephone _____ Email tom.seattle@gmail.com

Comment:
The current EIS does not propose to clean up enough waste. ~~Rpg~~ In the future there will be fatal amounts of iodine and carbon tetrachloride, according to your own maps in the present EIS. This is unacceptable!!
Please keep cleaning up while drafting a more comprehensive EIS.

155-1

155-1 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. 156: Margaret McLane

Comment on the *draft Tank Closure & Waste Management EIS:*

The government needs to develop a new Manhattan project – to figure out what to do with all our toxic waste. They put endless dollars into developing nuclear weapons, now they need to put the dollars into cleaning it up.

The nuke waste is going to be toxic & deadly for centuries, so figure out what to do with it! Hanford is an environmental disaster, and it seems that you've decided to give up on cleaning it up, and bring more waste in instead. Clean up Hanford, and don't bring any more waste onsite until you've done so!

Margaret McLane

156-1

156-1 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. 157: Tony Chhay

Comment Period Through March 19, 2010
Comment Title PUBLIC COMMENT ON THE *DRAFT TANK CLOSURE & WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT*

Submit your comments at the Seattle hearing on Monday, March 8 (Seattle Center, Northwest Rooms at 7pm)

If you cannot attend the hearing, please place your comment in one of the pre-addressed envelopes provided

Name (optional) Tony Chhay

Address

Telephone Email CHHAYTOP@yahoo.com

Comment:

While watching Obama campaign during the 2008 election he talked about a cleaner environment. Has your organization talked to his administration? The Hanford issue needs to go beyond the Pacific Northwest since it deals with a federal issue and federal laws.

157-1

157-1 Operations at Hanford are affected and, in many cases, regulated by numerous Federal legal requirements addressing environmental compliance, remediation, planning, preservation, and waste management. The major Federal laws and regulations and Executive orders that potentially apply to the alternatives analyzed in this *TC & WM EIS* are presented in Chapter 8.

Commentor No. 158: Michael Hodapp

Comment Period Through March 19, 2010
Comment Title PUBLIC COMMENT ON THE *DRAFT TANK CLOSURE & WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT*

Submit your comments at the Seattle hearing on Monday, March 8 (Seattle Center, Northwest Rooms at 7pm)

If you cannot attend the hearing, please place your comment in one of the pre-addressed envelopes provided

Name (optional) Michael Hodapp
Address 2306 S Hill St, Seattle, WA 98144
Telephone [redacted] Email ichaelm@yahoo.com

Comment:

My name is Mike Hodapp. I've been a resident of Seattle for 6 years and currently run a youth mentoring program in Seattle. I'd like to see the DOE adopt a Hanford cleanup alternative that fully protects the Columbia River, prevents further groundwater contamination, and minimizes human health risk. To this extent, I strongly believe that USDOE should remove 99.99% of waste, adopt clean closure of the tank farms, and not accept off-site waste at Hanford. I've read the EIS Summary and the Oregon Dept of Ecology's alternative proposal in their response to the EIS. I support the Oregon Proposal as a more level headed alternative to cleanup than any of the alternatives listed in the EIS. Voters and citizens of Washington State have been clear. We want a cleanup that protects future generations and that properly remediates dirt and groundwater that's already been contaminated. In addition, we don't want Washington state to become a dumping site for imported nuclear waste.

Thank you,
Mike Hodapp
Seattle, WA

158-1

158-1 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*.

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 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. 159: Lane Rasberry

Comment Period Through March 19, 2010
Comment Title PUBLIC COMMENT ON THE *DRAFT TANK CLOSURE & WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT*

Submit your comments at the Seattle hearing on Monday, March 8 (Seattle Center, Northwest Rooms at 7pm)

If you cannot attend the hearing, please place your comment in one of the pre-addressed envelopes provided

Name (optional) LANE RASBERRY
Address PO Box 45303
Telephone [redacted] Email LANE@BLUERASBERRY.COM

Comment:

I CARE ABOUT THE CLEANUP OF THE HANFORD SITE BUT I DO NOT FEEL THAT MAKING A DECISION ON THE ENVIRONMENTAL IMPACT IS THE MOST PRESSING ISSUE AT THIS TIME.

IT IS MOST IMPORTANT RIGHT NOW TO COLLECT THE INFORMATION NECESSARY TO BE ABLE A DECISION, AND THE INFORMATION THAT YOU DO NOT HAVE AND CANNOT GET WITHOUT TAKING ACTION IS THE SET OF INFORMED OPINIONS FROM THE GENERAL PUBLIC. ALTHOUGH I AM GLAD TO SEE SO MANY PEOPLE HERE TONIGHT, IT IS A STATEMENT OF FACT THAT THE MAJORITY OF STAKEHOLDERS IN THE ISSUE EITHER DO NOT KNOW THAT THE HANFORD SITE EXISES OR DO NOT KNOW THE EXTENT OF ITS SIGNIFICANCE.

PLEASE DO NOT MAKE A RASH DECISION ONLY TO HAVE THE NEXT GENERATION SECOND GUESS YOU AND UNDO YOUR EFFORTS, AS ALREADY HAS HAPPENED THROUGH SEVERAL GENERATIONS. I PROPOSE THAT YOU, TO BETTER REACH THE PUBLIC, PRODUCE AND FACILITATE LAYMAN-FRIENDLY EDUCATIONAL RESOURCES SUCH AS DOCUMENTARIES, WEBSITES, YOUTUBE ACCOUNTS, AND BLOGS TO DESCRIBE HANFORD NEWS AND ISSUES.

159-1

159-1 The public hearings on the *Draft TC & WM EIS* were intended not only to collect comments, but to inform and educate the public as well. In addition to a DOE presentation at the beginning of each public hearing, an hour was provided before each hearing to allow the public to ask questions of staff who supported the development of this EIS. Posters and factsheets were made available at each hearing as well. The Hanford website is also available (http://www.hanford.gov) to inform the public of project activities, including development of this *TC & WM EIS*.

Commentor No. 160: Irene Kochendorfer

Comment Period Through March 19, 2010
Comment Title PUBLIC COMMENT ON THE *DRAFT TANK CLOSURE & WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT*

Submit your comments at the Seattle hearing on Monday, March 8 (Seattle Center, Northwest Rooms at 7pm)

If you cannot attend the hearing, please place your comment in one of the pre-addressed envelopes provided

Name (optional) IRENE KOCHENDORFER
Address Seattle - WASH - 98122
Telephone _____ Email _____

Comment:

Please do what you have agreed to do in the past—
1- Clean up Hanford tanks
2- Clean up the tank waste using the clean closure standard
Please Please. Do not add more waste to Hanford =
We have contaminated one beautiful State enough — Energy is energy —

160-1

160-1 DOE directs the commentor to Chapter 2, Section 2.5.2.6, which describes Tank Closure Alternatives 6A and 6B, both of which call for clean closure of the tank farms. Under these alternatives, all 12 SST farms in the 200-East and 200-West Areas would be clean-closed following deactivation. Clean closure of the tank farms would involve removing all SSTs, associated ancillary equipment, and contaminated soil to a depth of 3 meters (10 feet) below the tank base, all of which would be managed as HLW. Where necessary, deep soil excavation would be conducted to remove contamination plumes within the soil column.

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. 161: Bryan Croeni

Comment Period Through March 19, 2010

Comment Title PUBLIC COMMENT ON THE *DRAFT TANK CLOSURE & WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT*

Submit your comments at the Seattle hearing on Monday, March 8 (Seattle Center, Northwest Rooms at 7pm)

If you cannot attend the hearing, please place your comment in one of the pre-addressed envelopes provided

Name (optional) Bryan Croeni

Address 20068 10th Ave NW, Shoreline, WA 98177

Telephone ([redacted]) [redacted]-[redacted] Email bryan.croeni@gmail.com

Comment:

It is the governments responsibility to return the land to the condition in which it was found (i.e. clean closure). A full clean-up is the only acceptable option. **161-1**

No additional waste should be transferred to this damaged and environmentally sensitive (i.e. on the Columbia river) site. **161-2**

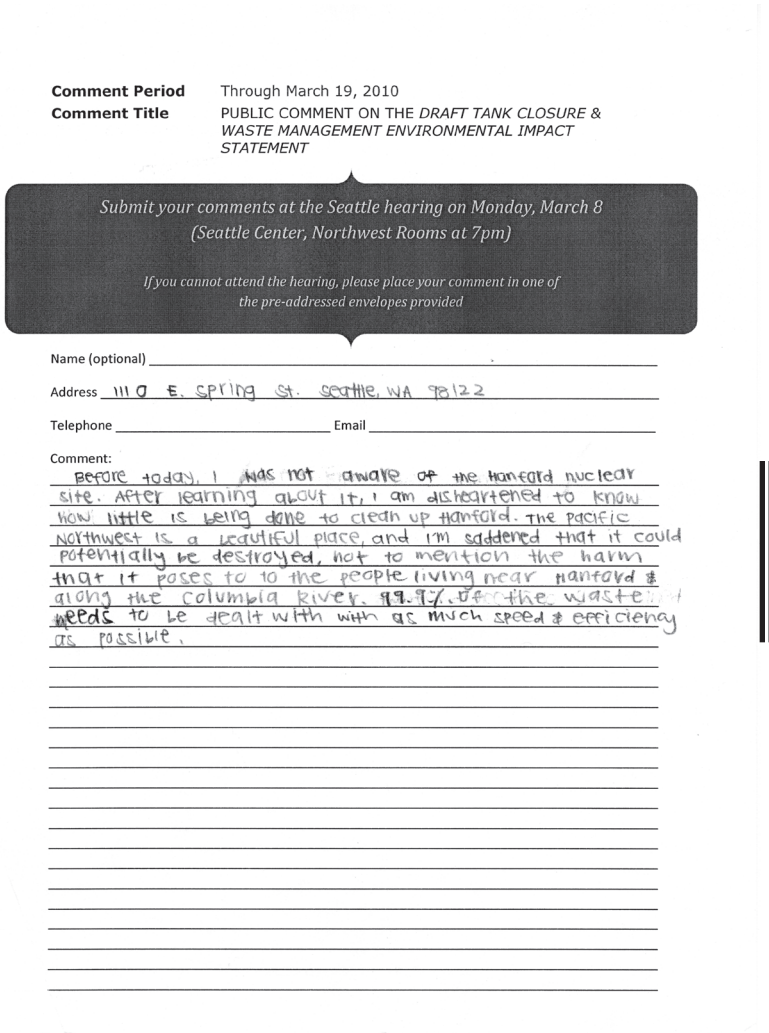
This land must be made safe for future generations, in 10 years, 100 years, 1000 years and 10,000 years. **161-1 cont'd**

161-1 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). 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*.

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. 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.

161-2 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. 162: Anonymous



Comment Period Through March 19, 2010
Comment Title PUBLIC COMMENT ON THE *DRAFT TANK CLOSURE & WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT*

Submit your comments at the Seattle hearing on Monday, March 8 (Seattle Center, Northwest Rooms at 7pm)

If you cannot attend the hearing, please place your comment in one of the pre-addressed envelopes provided

Name (optional) _____

Address 1110 E. Spring St. Seattle, WA 98122

Telephone _____ Email _____

Comment:

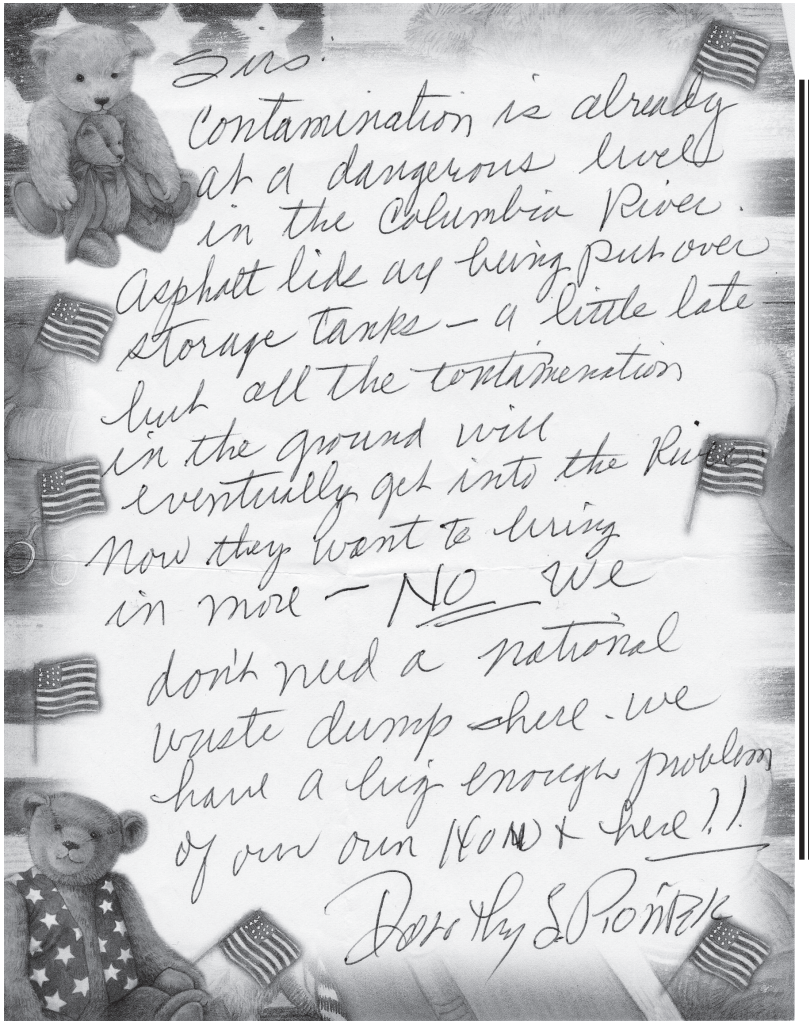
Before today, I was not aware of the Hanford nuclear site. After learning about it, I am disheartened to know how little is being done to clean up Hanford. The Pacific Northwest is a beautiful place, and I'm saddened that it could potentially be destroyed, not to mention the harm that it poses to the people living near Hanford & along the Columbia River. 99.9% of the waste needs to be dealt with with as much speed & efficiency as possible.

162-1

162-1 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.

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*.

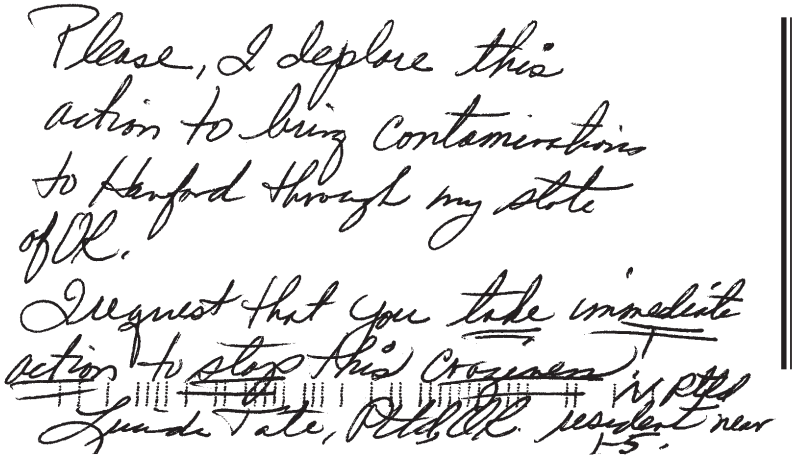
Commentor No. 163: Dorothy Piontek



163-1

163-1 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.

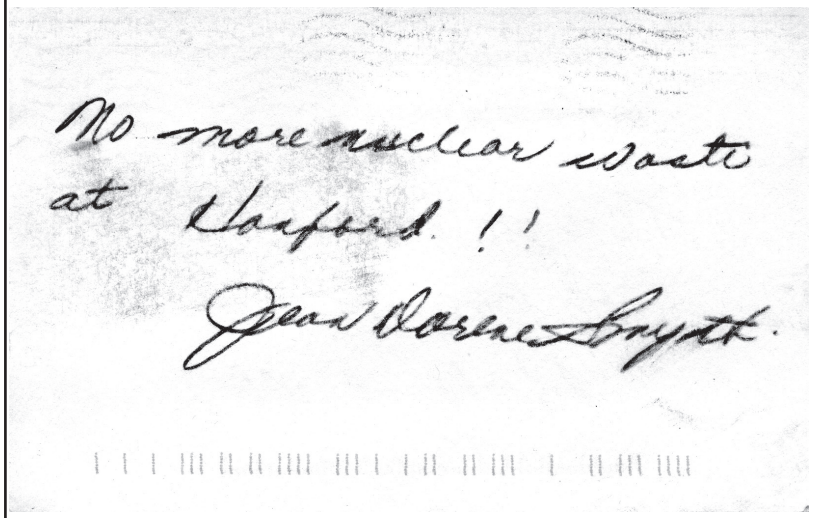
Commentor No. 164: Lucinda Tate


Please, I deplore this action to bring contamination to Hanford through my state of OR.
I request that you take immediate action to stop this craziness
Lynda Tate, Ashland OR resident near I-5.

164-1

164-1 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.

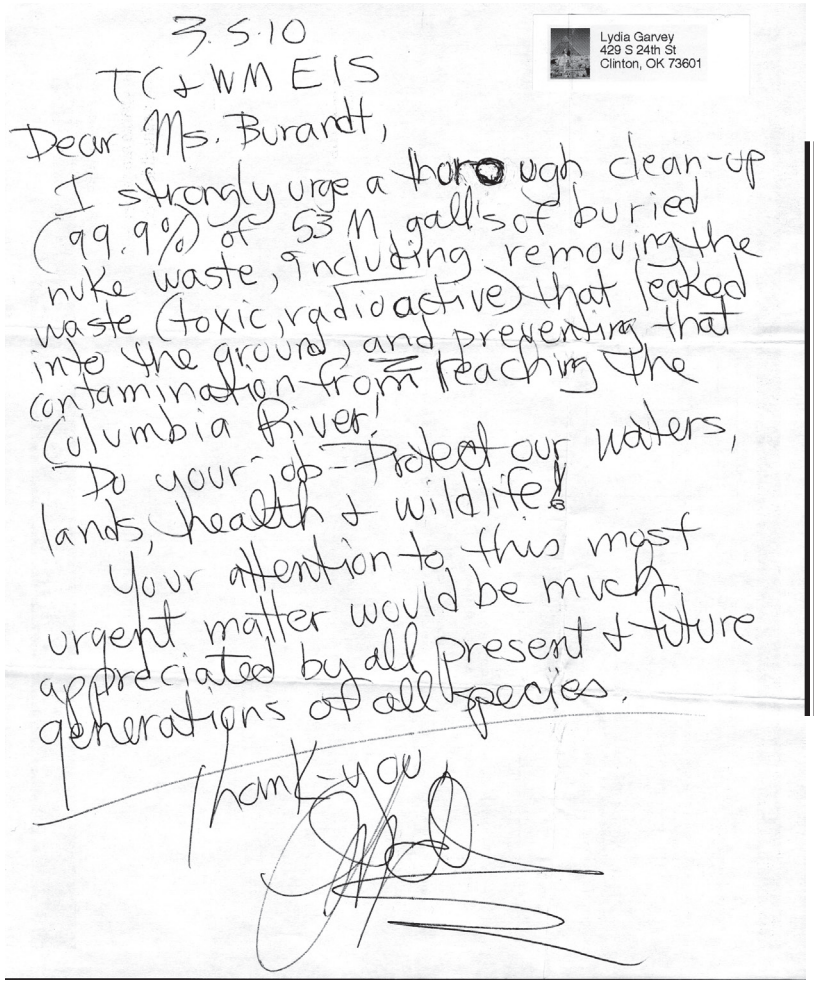
Commentor No. 165: Jean Dorene Smyth



165-1

165-1 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. 166: Lydia Garvey



3.5.10
TC+WM EIS
Dear Ms. Burandt,
I strongly urge a thorough clean-up (99.9%) of 53M gallons of buried nuke waste, including removing the waste (toxic, radioactive) that leaked into the ground and preventing that contamination from reaching the Columbia River.
Do your job - Protect our waters, lands, health & wildlife!
Your attention to this most urgent matter would be much appreciated by all present & future generations of all species.
Thank-you

Lydia Garvey
429 S 24th St
Clinton, OK 73601

166-1

166-1 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*.

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. 167: Beth Standen

From: Beth Standen [bethstanden@earthlink.net]
Sent: Thursday, March 11, 2010 3:33 PM
To: tc&wmeis@saic.com
Subject: Hanford

I am writing to inform you that I oppose using Hanford as a national radioactive waste dump. *167-1*

167-1 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. 168: Marylia Kelley, Executive Director, Tri-Valley CAREs

Tri-Valley CAREs

Communities **A**gainst a **R**adioactive **E**nvironment

2582 Old First Street, Livermore, CA 94551 • (925) 443-7148 • www.trivalleycares.org

Peace Justice Environment since 1983

March 11, 2010

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

Re: Comment on Draft Tank Closure & Waste Management Environmental Impact Statement (TCWMEIS)

To Whom It May Concern:

Tri-Valley CAREs (TVC) is a non-profit organization founded in 1983 by Livermore, California area residents to research and conduct public education and advocacy regarding the potential environmental, health and proliferation impacts of the Department of Energy's Lawrence Livermore National Laboratory. On behalf of our 5,600 members, Tri-Valley CAREs submits the following comments on the Draft Tank Closure & Waste Management Environmental Impact Statement (TCWMEIS) for the Hanford Nuclear Reservation.

The Hanford Site is a nuclear production complex on the Columbia River in Washington. Today, Hanford is already the most contaminated site in the Western Hemisphere. Yet, the U.S. Department of Energy (DOE) proposes dumping even more radioactive wastes, endangering public health and environment. The draft TCWMEIS evaluates the environmental impacts of DOE's preferred alternatives for cleanup and of using Hanford as a national mixed and low level radioactive waste dump, once vitrification plant is "operational." This preferred alternative presents unacceptable risks. In drafting the TCWMEIS, DOE blatanly ignores the public's interest, fails to analyze reasonable alternatives, and proposes to make Hanford a national radioactive waste dump without fully cleaning up the existing contamination. *168-1*

I. The Proposed Alternative Results in an Unacceptable Level of Contamination to the Local Environment

Over a million gallons of deadly liquid High-Level Nuclear Waste have already leaked out from Single Shell Tanks (SSTs), contaminating the groundwater and heading towards the Columbia River. In order to further prevent this High-Level Nuclear Waste from leaking out of SSTs, DOE proposes to remove 99% of tank wastes. While this "preferred alternative" will reduce the level of future contamination, removal of only 99% of tank wastes will not significantly decrease existing contamination. Under DOE's preferred alternative of removing only 99% of the tank wastes, cancer risk from groundwater contamination would be 50 times the State's cancer risk standard! Granted that removal of 99.9% of tank wastes will still be 10 times the State's cancer risk standard, there is a significant reduction of cancer risk if DOE were to remove 99.9% of tank wastes. Therefore, we recommend that DOE remove 99.9% of tank wastes in order to significantly decrease groundwater contamination. *168-2*

168-1 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.

168-2 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. 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 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. 168 (cont'd): Marylia Kelley, Executive Director, Tri-Valley CAREs

II. The DOE Must Remove the Tanks and Investigate and Remediate the Soil Contamination Already Emanating from Tank Leaks

There is 35 million gallons of High Level Nuclear Waste stored in the oldest SSTs. Over a million gallons has already leaked. Further, billions of gallons of waste have been discharged from tanks into the soils near the SST "tank farm." This poses a significant environmental and health risk, since contamination from these tank leaks is spreading rapidly through the soil to the groundwater and is moving towards the Columbia River. The risk of cancer, as a result of groundwater and soil contamination, is increasing significantly and will only grow worse over time. This dire problem requires only one solution: that DOE remove the SSTs and clean up the soil contamination in SST tank farms. However, the TCWMEIS does not reflect that DOE understands the serious negative repercussions that may result from SST leaks, and fails to provide an effective solution to this problem. DOE's preferred alternative makes no mention of cleaning up the contamination; instead, DOE proposes to leave forever the bulk of the contamination from SST leaks and deliberate discharge along with the SST themselves under dirt caps. Without cleaning up the present contamination and preventing future SST leaks, the contamination will continue to spread, and result in serious environmental and health risks to those not only living in the surrounding areas, but also to those living hundreds of miles away (especially if the contamination spreads to the Columbia River). Therefore, we recommend that DOE remove the SSTs and investigate and remediate the soil contamination from SST leaks. "No Cleanup" of the leaked waste is an unacceptable standard.

168-3

III. Proper Treatment of Hanford's High-Level Nuclear Waste

The 53 million gallons of liquid High-Level Nuclear Waste at Hanford needs to be treated and turned into a stable glass form, through a process called Vitrification. The current vitrification plant, Waste Treatement Plant (WTP), is still under construction, and will have the capacity to treat only half of the volume of Low Activity Waste (LAW) from the tanks. Decision on how to treat the other half of LAW waste is pending. DOE's preferred alternative proposes to wait until after 2015 to make this critical decision of either using vitrification, or using supplemental treatment options, like steam reforming, bulk vitrification, or cast stone to treat LAW. The implications for waiting until 2015 means that the radioactive waste will continue, thereby increasing the already grim problem of soil and groundwater contamination. Further, the supplemental treatments have significant drawbacks, particularly for future contamination of groundwater and cancer risk if LAW is buried in a landfill at Hanford. Therefore, we recommend that DOE should start funding a second LAW facility in 2012 in order to have it ready to operate by 2022. Further, DOE should discard the supplemental treatment option since they are less effective and less protective of the environment.

168-4

IV. How and Where to Dispose of Radioactive and Hazardous Waste

DOE proposes two "waste management" alternatives for waste generated from on-site cleanup activities, both of which include using Hanford as a national waste dump when DOE operates the vitrification plant. DOE proposes to dispose of all the wastes in the currently existing 200 East landfill (and not construct a second landfill at 200 West), which will add 3 million cubic feet of radioactive and radioactive toxic waste. The TCWMEIS, however, fails to include an alternative of not using Hanford as a national radioactive and mixed radioactive waste dump. Even without using either landfill as a national radioactive and "mixed" radioactive hazardous waste dump, DOE's analysis shows that either landfill location will cause high contamination and cancer risks for thousands of years! Using the 200 East landfill at Hanford as a radioactive and hazardous waste dump will increase radioactive contamination and cancer risk levels over the next thousand years by tenfold, to 100 times WA State's cancer risk standards for toxic cleanup sites! In order to prevent this unacceptable increase in contamination and cancer risk levels, we recommend that DOE consider not using Hanford as a waste dump site. Further, DOE should limit wastes in Hanford landfills to amounts and types of Hanford clean-up wastes which will not cause future leakage and violate cancer risk standards.

168-5

168-3 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.

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.

This *TC & WM EIS* evaluates the long-term impacts of different potential approaches to closing the SST farms, ranging from no closure to complete clean closure. As discussed in this *TC & WM EIS*, the modeled responses of the groundwater system (as indicated by the concentration of contaminants as a function of time at the Core Zone Boundary) support the finding that past leaks from SSTs are an important factor in determining future outcomes.

168-4 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. 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.

168-5 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.

Commentor No. 168 (cont'd): Marylia Kelley, Executive Director, Tri-Valley CAREs

V. Risks of Transporting Radioactive Waste to Hanford

DOE proposes trucking nearly 3 million cubic feet (or more than 2 trucks a day, every day for twenty years) of radioactive and "mixed" radioactive wastes to Hanford under its preferred alternatives. This has severe negative implications for the public since they will be exposed to the radiation from the trucks along the routes. These shipments of radioactive waste cause fatal cancer in the communities along the truck routes that would be greatly compounded by a reasonably foreseeable traffic accident or terrorist attack involving one of the trucks, especially in a population center. Such event would result in hundreds of square miles of contamination, evacuation of those areas, and over a thousand fatal cancers.

In addition, the draft TCWMEIS fails to address several important questions regarding the routes for the transport of radioactive wastes. For example, will there be radioactive waste transported from California? If so, when will the waste from CA be shipped and what routes will be taken to transport this waste? Will shipment of waste from CA be examined in a separate NEPA document? Will there be public hearings on shipments of waste from CA to Hanford?

168-5 cont'd

VI. Final Thoughts

Cleanup of the Hanford Nuclear Reservation is essential to prevent the spread of contamination, which currently endangers public health and environment in Washington and beyond. Further, existing wastes will create so much contamination that adding more waste is unconscionable. Therefore, DOE needs to analyze additional sites and strategies besides using Hanford as a national radioactive waste dump site. Implementing the preferred alternatives would set a dismal precedent for dealing with future radioactive waste. Thus, this decision has significant impacts on other DOE operated facilities around the country, including our local site, Lawrence Livermore National Laboratory.

We look forward to the agencies response to our concerns and questions and a more thorough alternatives and analysis in the final TCWMEIS. Thank you for your consideration.

Sincerely,

Iti Talwar
Legal Intern, Tri-Valley CAREs

Scott Yundt
Staff Attorney, Tri-Valley CAREs

Marylia Kelley
Executive Director, Tri-Valley CAREs

2582 Old First Street
Livermore, CA 94551
Telephone: (925) 443-7148
Email: marylia@trivalleycares.org

Response side of this page intentionally left blank.

Commentor No. 169: Gretchen Randolph

From: Gretchen Randolph [aha4kids@sterlink.net]
Sent: Thursday, March 11, 2010 8:57 PM
To: tc&wmeis@saic.com
Subject: Citizen comment: Handford as the National Radioactive Waste Dump

No, do not turn Hanford into the National Radioactive Waste Dump. This is utterly stupid, and will risk the lives and health of all of us in the Northwest. It isn't enough that we can't even contain the radioactive water leaking toward the Columbia River, you want to add more of the most toxic poison know to mankind to our area. Plus, you are creating more radioactive trucks driving across our country. How safe is that? Can you guarantee to keep those away from innocent people. Not to mention the extreme cost of producing energy with nuclear plants. *169-1* *169-2*

We have wind power, solar power and so many other options for energy. Don't let this happen. Stop, Georgia from building more nuclear plants. Let them keep their radioactive waste in Georgia. Fight the moneyed interests that try to turn your department away from being our government, working to protect our citizens. *169-3*

My Senator and my state rep are working on bills to stop the designation of Hanford as the National Waste Dump. Do your part within the Department to clean up Hanford, and not trash our beautiful NW.

Gretchen Randolph, Ph.D., PMHNP
grandolph@addportland.com
http://www.addportland.com

169-1 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.

169-2 Transportation of radioactive materials and waste to or from Hanford must comply with DOT regulations in "Other Regulations Relating to Transportation" (49 CFR Subtitle B), as well as state and local regulations. These regulations include requirements for inspecting and surveying packages, containers, and transport conveyances (truck and rail) prior to offsite transport. In addition, Hanford's *PHMC Radiological Control Manual* contains requirements for transportation and receipt of radioactive material that include surveying and decontaminating trucks, railcars, and any onboard packages as necessary (Fluor Hanford 2006). Other DOE sites have their own radiological control manuals and implementing procedures for ensuring trucks and railcars leaving their sites meet contamination requirements.

169-3 Comment noted.

Commentor No. 170: Kevin March

From: Anne and Kevin March [amarch@eoni.com]
Sent: Friday, March 12, 2010 9:07 AM
To: tc&wmeis@saic.com
Subject: Hanford

Dear Mary Beth Burandt, US Dept. of Energy

Please do the right thing. Since they do not seem to be interested in cleaning the radioactive plume beneath Hanford from leaking tanks, their hand must obviously forced in this matter. The region will forever be altered if this plume is allowed to reach the Columbia. There should not even be a question about the right thing to do in this matter. *170-1*

And yet the DOE is looking to allow more wastes being brought to Hanford from outside the region in 2022? Absurd and inane.

I obviously strongly oppose this idea of adding waste to the already leaking and toxic mess that is Hanford and request that you use your power to do the right thing, also forcing the DOE to clean up the mess before even thinking of adding more toxicity. *170-2*

Thank you for your consideration.

Kevin March
206 Main Ave.
La Grande, OR 97850
amarch@eoni.com

170-1 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.

170-2 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 recognizes the potential negative impacts on Hanford groundwater that this 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 EIS.

Commentor No. 171: Jan Castle

From: Jan Castle [jancastle@comcast.net]
Sent: Friday, March 12, 2010 3:24 PM
To: tc&wmeis@saic.com
Subject: Comments

These comments are in addition to my statements given at the USDOE hearing in Portland, OR on Feb. 10, 2010. Regarding the TC&WMEIS.

Tank wastes

USDOE should retrieve a minimum of 99% of waste from each tank and determine on a tank by tank basis what methods are required to remove as much of the last 1% as is technically feasible.

As tanks are emptied, soil under and around the tanks should be tested, excavated and treated to the standard of "clean closure" rather than "landfill closure." I understand the concerns for worker safety, and the magnitude of the challenge as expressed at the hearing by Mary Beth Burandt. But DOE's own research shows such devastating effects on the Columbia River, over the course of thousands of years, that these challenges simply must be met. I am looking for much more of a "can do" attitude from DOE, and an acknowledgement that it is simply morally inconceivable to leave the wastes in place. If the scope and safety of this excavation and treatment project is beyond what DOE knows how to handle today, the necessary resources must be employed to find new methods. Two resources which may be of value are these:

171-1

1. **Amory Lovins** of the Rocky Mountain Institute, who has worked extensively with the US Army to make it's operations far more energy efficient and sustainable.

www.rmi.org
1820 Folsom Street
Boulder, CO 80302-5703
(303) 449-5226

2. **Janine Benyus** of the Biomimicry Institute, who pioneered the idea of looking at how nature solves a given problem, and finding a way to imitate it.

*www.**biomimicryinstitute**.org*
257 West Front Street
Missoula, MT 59802-4301
(406) 728-4134

171-2

171-1 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. 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. 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*.

171-2 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 the 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.

This EIS analyzed supplemental LAW treatment capability by building new treatment facilities that are either part of (expanded LAW capacity) or separate (bulk vitrification, steam reforming, or cast stone) from the WTP. As discussed in Chapter 2, Section 2.12, DOE does not have 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.

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

Commentor No. 171 (cont'd): Jan Castle

Vitrification of high level wastes

USDOE should plan to start up the LAW portion of the WTP as soon as it's done, and start planning and funding a second LAW facility in 2012, have it operational in 2022, to target vitrification of all wastes by 2040. USDOE should decide now to discard the "supplemental treatments" as they are not as effective as vitrification. *171-3*

Hanford as a national radioactive waste dump

This is unacceptable. Hanford's mission is clean-up and I expect it to be cleaned up to the highest extent that is technically feasible, not turned into a dump that will continue to contaminate the Columbia River, and the groundwater at Hanford, for thousands of years.

It is unacceptable to have nuclear waste trucked through our communities in either eastern or western Oregon on their way to Hanford. DOE is in violation of NEPA requirements for simultaneous disclosure of all actions by separating this EIS from the one about GTCC wastes. Shipment of these wastes alone would constitute an unacceptable risk to our citizens, just by exposure in passing traffic. The Portland area experiences traffic gridlock under many circumstances, thus insuring exposure to adults and children without their knowledge or consent. Your studies do not include exposure risk to children, or accidents or sabotage of either GTCC or lower level waste shipments. *171-4*

The US government is bound by treaties with sovereign nations to return the Hanford land to native use, and by the Endangered Species Act to protect salmon. *171-5*

The decision to make Hanford a national radioactive waste dump was made based on a flawed EIS, so the decision should be rescinded and reexamined. Based on the evidence in this EIS of the effect on the river and groundwater, it is clear that this plan should be abandoned. Because of these issues, this plan would be legally indefensible in a court of law, which is where it would surely end up if not withdrawn. As a taxpayer, I do not want money wasted on fruitless legal battles, I want it spent on solutions. *171-6*

Only clean-up waste that will not leak should be stored in landfills at Hanford. Plutonium and other Transuranic wastes in the soil should be dug up, treated, and disposed of in deep geological repositories. DOE should consider removing other wastes from soils to a regulated commercial radioactive waste facility which is not above a river or drinkable groundwater. *171-7*

Decommissioning the FFTF

The Washington standard for decommissioning nuclear reactors requires removal and site restoration; this should be done. The sodium and components should be treated at Hanford, rather than being shipped to Idaho and back. *171-8*

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, and 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.

171-3 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.

171-4 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.

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.

171-5 DOE respectfully disagrees with the tribe's position regarding tribal rights at Hanford. There is substantial documentation indicating that the tribes understood at the time the treaty was signed that the 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.

Commentor No. 171 (cont'd): Jan Castle

Thank you for the opportunity to comment on the Tank Closure and Waste Management EIS.

Jan Castle
16181 Parelius Circle

Lake Oswego, OR 97034

The portion of Hanford that remained in the public domain in 1943 (those lands now under U.S. Bureau of Land Management ownership) as well as all the acquired lands were closed to all access initially, first under authority of the War Powers Act and then under the authority of the Atomic Energy Act. Therefore, it is DOE's position that Hanford lands are neither "open" nor "unclaimed."

In addition, DOE recognizes that it must comply with the Endangered Species Act. This is acknowledged in Chapter 8, Section 8.1.6, of this *TC & WM EIS* and is further discussed in the ecological resources sections of this EIS.

171-6 DOE recognizes the potential negative impacts on Hanford groundwater posed by the offsite waste. 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.

171-7 Chapter 1, Section 1.4.1, states that DOE has committed to disposing of LLW at Hanford in lined trenches, a change from the past disposal practice of using unlined trenches. DOE ensures that disposal activities are protective of the environment and meet regulatory requirements. (See Appendix E, Section E.3.3, for the evolution of past disposal practices.)

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.

171-8 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 descriptions of the laws, regulations, and requirements that may apply to the proposed actions, including FFTF decommissioning.

Commentor No. 172: Anne M. Jess

From: Anne Jess [annemjess@yahoo.com]
Sent: Friday, March 12, 2010 7:43 PM
To: tc&wmeis@saic.com
Subject: EIS comment

March 12, 2010.

My name is Anne Jess and I live on Mercer Island, WA. I have lived in Washington State since late 1981.

Here are my comments about the DRAFT Tank Closure and Waste Management EIS for the Hanford site:

- DOE should remove and treat all (99.9%) of the tank waste.
- DOE should expand the ability of the Waste Treatment Plant (the vitrification facility) to immobilize more waste by building more glass melters. This would allow stabilization of the waste until other future disposal options can be determined.
- DOE should dispose of treated tank waste on-site for now. If another waste site is developed off-site, then DOE could revisit that decision then.
- DOE should completely remove the underground waste storage tanks and some of the contaminated soil beneath the tanks. DOE should NOT leave the tanks and contaminated soil in place.

172-1

- DOE should NOT accept offsite waste and add it to Hanford's waste inventory.

In other words,

Do a complete CLEAN CLOSURE of the tanks at Hanford, and the contaminated ground underneath
and
DO NOT bring OFF-SITE WASTE to Hanford.

172-2

Please help clean up the toxic waste from our Washington "back yard."

Thank you for including these comments for the EIS review.

Anne M Jess
Mercer Island, WA

172-1 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. 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 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 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.

This *TC & WM EIS* addresses alternatives for on- and offsite disposal of treated tank waste, depending on the waste type. However, the scope of this EIS does not include making a decision on the ultimate disposition of HLW and any transportation related to such disposition. 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.

172-2 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. 173: Eldon Ball

From: Eldon Ball [eldonball@juno.com]
Sent: Friday, March 12, 2010 8:06 PM
To: tc&wmeis@saic.com
Subject: national radioactive waste dump

Hanford should never be considered as a radioactive waste dump! The present radioactive waste, that was supposed to be cleaned up by now, is leaching toward the Columbia River. If the river becomes contaminated, it would endanger the health of 1 million people living down river! The national radioactive waste dump should be in the Great Basin so it would not leach to the ocean. We had chosen a site in Nevada years ago. Use it! Thanks. *173-1* *173-2*

Sincerely,

Eldon Ball, 3200 NE 140th St., #11, Seattle, WA 98125

173-1 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.

173-2 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. 174: Elinor A. Graham

From: Steve Gary or Ellie Graham [gramgary@earthlink.net]
Sent: Friday, March 12, 2010 11:33 PM
To: tc&wmeis@saic.com
Subject: draft EIS

March 12, 2010

To US Dept of Energy

Re: Draft Tank Closure & Waste Management EIS for Hanford

I am a pediatrician who spent the first 13 years of my life (1943-56) living in small towns around Walla Walla in the path of radiation exposure from Hanford. I developed lung cancer, although I never smoked, at age 52. Most of my childhood friends have had at least one form of cancer. We need to clean up Hanford in a manner which reduces this risk for people living in the Tri-Cities area and everyone downstream on the Columbia. *174-1*

I am appalled at your draft plan for cleaning up Hanford and for advocating even more radio-active waste be brought to that site where there is currently inadequate containment of existing waste and significant evidence of contamination of water in the Columbia as well as well water in the surrounding area. *174-2*

We must have a plan that: *174-3*

- Removes 99.9% of the tank wastes or to the limits of technical capabilities.
- Insures that existing tanks that are leaking are closed and the soil remediated.
- Starts the LAW vitrification immediately and expands this capability.
- Does not add more waste to the Handford site.

Peoples lives are in your hands and you need to act responsibily to provide maximal protection for those lives as you correct past mistakes.

Yours,

Elinor A. Graham MD, MPH
5124 S. Graham St.
Seattle, WA 98118
xxx-xxx-xxxx

174-1 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").

174-2 DOE publishes an annual Hanford groundwater monitoring report documenting conditions in groundwater across the site. This *TC & WM EIS* contains a comprehensive assessment of groundwater contamination that includes a prediction of current conditions and comparison with field measurements (Appendix U).

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.

174-3 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. 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.

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. 175: Ed Martiszus

From: ed martiszus [martiszus@yahoo.com]
Sent: Saturday, March 13, 2010 7:08 PM
To: tc&wmeis@saic.com
Cc: office@hoanw.org
Subject: Future Hanford Plans

I have been asked to make comments on Hanford future. I want to say that Hanford has been contaminated more than any area within the range of the Hubble telescope. The people of the Northwest have suffered enough. I know I have been a RN in Oregon for over 32 years. I cleaned up the human debris from Hanford every day on the job. Early on I put 2+2 together about all the environmental reports on radioactive releases and what I was seeing at the bedside. *175-1*

This area (Columbia Basin) is contaminated with all the radiation, air, land, and water pathways have already been established to continually expose the population into the forseeable future. That is a crime. Especially when it is linked to making illegal nuclear weapons. To walk away and say "good luck" to the Northwest is irresponsible and criminal. Due process has been violated, human rights have been violated, accountability and liability is in order in a nation that struts around the world stage lecturing others about "the rule of law". Let's see some rule of law. The tank farm is another area that will not be ignored. Gravity dictates Portland, OR be concerned. Portland draw water from wells along the Columbia River when it isn't using Bull Run. I have heard talk that they already have plutonium contamination in them. So what we have now is a column of toxic/radioactive material directly connected to the Columbia. The high level truckloads 17,500. I ask what is the dose at the rear tailgate? What is the dose if I get passed three time s week in traffic? I have to end this, but I could go on and on. I read the transcripts of the Hanford Health Effects Subcommittee. Heartbreaking tale of genocide along the Columbia. I also know about the fact that by US-DOE's calculationssometime in the future you will only be able to stand next to the Columbia River for 8 hours out of the year. The most advanced, state of the art technology needs to be employed to isolate toxic/radioactive wastes while we try to figure out a way to move to more stable iootopes

175-2

175-3

175-4

175-5

175-6

Ed Martiszus, RN

175-1 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.

175-2 The purpose of Chapter 3, Section 3.2, of this *TC & WM EIS* is to provide a succinct discussion of the Hanford affected environment as a whole and as relevant to the entire scope of proposed actions and alternatives considered in this EIS. Key areas discussed include radiation, air, land, and water impacts. To prepare this chapter, DOE used existing documentation. For example, DOE annually publishes compilation and assessment reports of groundwater monitoring data (Hanford site groundwater monitoring reports, the latest of which is available at http://www.hanford.gov/page.cfm/SoilGroundwaterAnnualReports) and of multimedia environmental monitoring data (Hanford Site environmental reports [Poston, Duncan, and Dirkes 2011]), which were used to prepare Chapter 3. The commentor is directed to those documents for an indepth discussion of current conditions at the site.

175-3 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. 175 (cont'd): Ed Martiszus

175-4 Approximately 14,200 truck shipments would occur during transport of LLW and MLLW from offsite sources to Hanford under the Waste Management alternatives (see Chapter 4, Table 4–151, Waste Management Alternatives – Estimated Number of Shipments). 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. If a person were stuck in traffic three times next to this shipment, then the cumulative dose would be 30 millirem. The dose would be less if the shipment were contact-handled radioactive waste or if the person were stuck 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.

175-5 DOE respectfully disagrees with the commentor's assertion that, in the future, an individual will be able to stand next to the Columbia River for only 8 hours per year. Elevated doses reported in the *Draft TC & WM EIS* for the Columbia River nearshore location are due to non–*TC & WM EIS* sources from which impacts would have occurred in the past or would occur in the near future and for which no remediation or access control was assumed in the analysis. Access to the site is controlled, and these doses, estimated as part of a comprehensive analysis, have not and would not occur. In addition, DOE is implementing an extensive cleanup program at Hanford under RCRA, CERCLA, and the TPA. Implementation of these cleanup projects will significantly reduce impacts of sources identified as non–*TC & WM EIS* sources in the draft EIS.

175-6 This EIS analyzed supplemental LAW treatment capability by building new treatment facilities that are either part of (expanded LAW capacity) or separate (bulk vitrification, steam reforming, or cast stone) from the WTP. As discussed in Chapter 2, Section 2.12, DOE does not have 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.

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

Commentor No. 175 (cont'd): Ed Martiszus

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, and 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.

Commentor No. 176: Kathy Andrew

From: Kathy Andrew [kandrew@eoni.com]
Sent: Sunday, March 14, 2010 10:14 PM
To: tc&wmeis@saic.com
Subject: Comment for Draft TC & WM EIS

Dear Ms. Burandt,

Please accept this comment for the Draft TC & WM EIS for Hanford:

It is very clear to those living in this area that Hanford is not an appropriate site for storage of nuclear waste generated in other parts of the country. It is located extremely near to a large waterway which is vital for the entire Northwest region. The Columbia is already severely endangered by nuclear toxicity currently in the environment. It is simply ridiculous to compound toxicity problems which can be argued to be the worst in the world by bringing even more nuclear waste to the site. Additionally, because waste currently stored in the tanks will take until the middle of this century to vitrify at the proposed plant, it does not seem there is any realistic excess capacity for the vitrification plant. *176-1*

I also believe that the nuclear contamination at Hanford should be cleaned up to the absolute best of our ability i.e., 99.9% removal and vitrification of waste in the tanks, as well as the remediation of the impacted soil and groundwater. I realize that at this point remediation options may be limited, and that developing new technologies and procedures for cleaning up the soil and groundwater poses many challenges. However, we cannot do any less; and it is by rising to these sorts of challenges that humanity progresses. Our nation would benefit in numerous ways. First and obviously, we would not be living in a dangerously toxic environment (it was my understanding from the study itself that conditions will only get worse in the near future if nothing is done to clean up impacted soil and groundwater). Secondly, we would derive significant economic benefits. Jobs would be created in research and environmental cleanup, and much-needed new technologies would be created. And thirdly, we would be showing our children and grandchildren how to behave responsibly towards problems we have created. A "Can Do" attitude is really the only option for the conundrum of Hanford!! *176-2* *176-3*

With Best Wishes,

Kathy Andrew

176-1 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 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.

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.

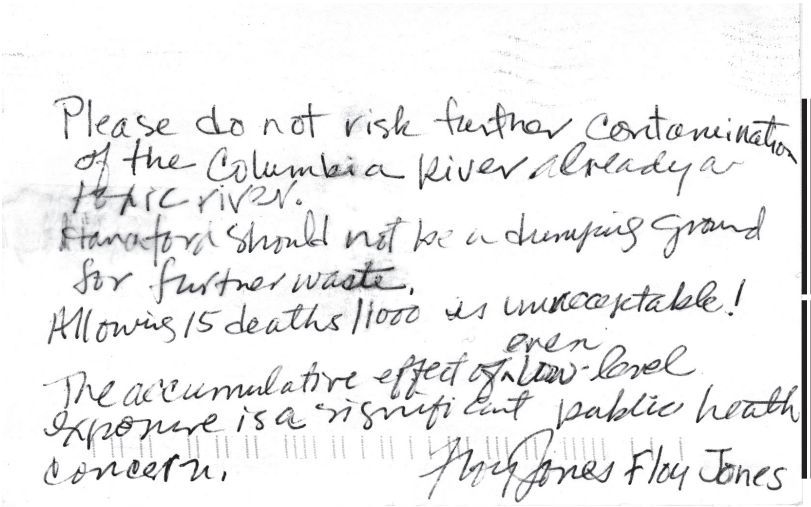
DOE is not proposing treatment of offsite waste at the WTP or any facility at Hanford, only disposal.

176-2 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. Options for tank waste treatment encompass a variety of technologies, including vitrification. DOE decisions based on the data presented in this EIS will be documented in a ROD or a series of RODs, issued no sooner than 30 days after publication of EPA's Notice of Availability for this *Final TC & WM EIS* in the *Federal Register*.

176-3 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 Number 177 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 127.

Commentor No. 178: Floy Jones



Please do not risk further contamination of the Columbia River already a toxic river. Hanaford should not be a dumping ground for further waste. Allowing 15 deaths/11000 is unacceptable! The accumulative effect of even low-level exposure is a significant public health concern. Floy Jones Floy Jones

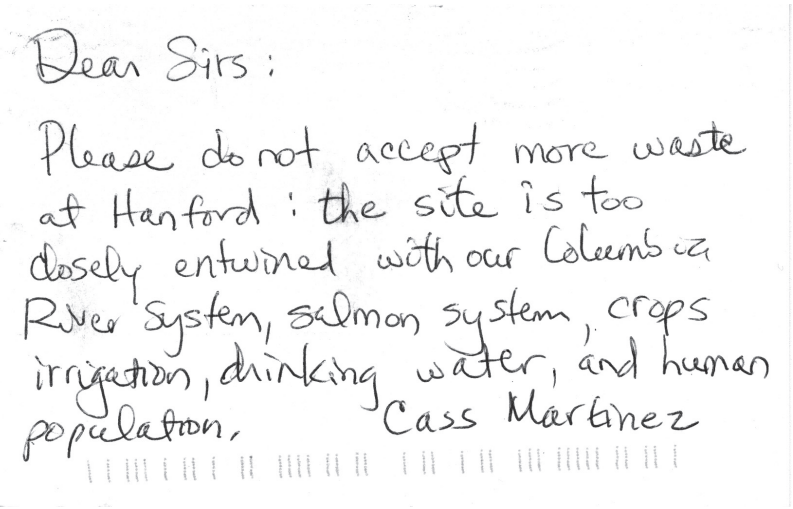
178-1

178-2

178-1 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.

178-2 DOE respectfully disagrees with the commentor's assertion that this *TC & WM EIS* supports an estimate of 15 deaths per 11,000 individuals over the long term. The long-term dose assessment completed for this EIS estimates dose and risk for individuals over the long term, but does not accumulate impacts across generations. While even low doses are of concern, this *TC & WM EIS* is consistent with ICRP guidance that uncertainties of future medical technology and of population size, makeup, and behavior are so great that accumulation of low doses over long timeframes would not provide a reasonable basis for decisions on radiation protection (Valentin 2007).

Commentor No. 179: Cass Martinez



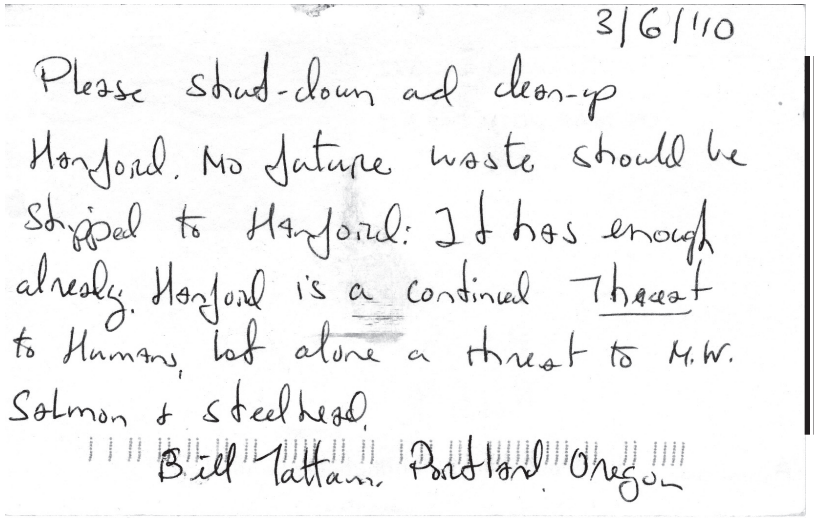
Dear Sirs:

Please do not accept more waste at Hanford: the site is too closely entwined with our Columbia River system, salmon system, crops irrigation, drinking water, and human population.

Cass Martinez

179-1 **179-1** 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. 180: Bill Tattam



3/6/10

Please shut-down and clean-up Hanford. No future waste should be shipped to Hanford. It has enough already. Hanford is a continued Threat to Humans, let alone a threat to M.W. Salmon & steelhead.

Bill Tattam. Portland Oregon

180-1

180-1 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.

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. 181: Jane Howell

From: Jane Howell [jhowell@eou.edu]
Sent: Monday, March 15, 2010 1:33 PM
To: tc&wmeis@saic.com
Subject: Hanford Comments

My name is Jane Howell, I live in La Grande and attended your Hanford meeting at EOU. I am not much of a public speaker so I am voicing my concerns in this email.

1. I do not want Hanford to be the National Depository for Nuclear waste. The Columbia river is the gateway to the northern west coast and the effects that the waste could have on the Northwest is too extreme for Hanford to be a safe place for more waste. *181-1*
2. I do not want anymore waste to come to Hanford ever! We have too much waste to deal with now and the land is too fragile to take on more.
3. I want to have the waste that is currently in the holding tanks and in the ditches at Hanford to be cleaned to the 99.9% *181-2*
4. I am concerned about the years it will take to do anything and want to know what is happening now to protect people and the Columbia.
5. Do the right thing for the people, animals and our water supply. We are all counting on the Government to be safe in the solidification process! *181-3*
6. Please do not allow hypothetical solutions to protect our mother earth. Stop playing with fire and figure out the real solution to our national nuclear waste problem.
7. I do not want bio-hazardous materials trucked down the freeway like any other product. If people want to use bio-hazardous materials they need to discover onsite solutions. *181-4*

Jane Howell
307 N Ave
La Grande, OR
97850
xxx.xxx.xxxx

181-1 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.

181-2 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*.

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 would be addressed at a later date.

181-3 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 environmental cleanup activities at Hanford and other DOE sites. See response to comment 181-2 regarding future DOE decisions.

181-4 DOE assumes the commentor is referring to radioactive waste as "bio-hazardous materials." The transportation of radioactive materials must comply with DOT regulations, while the packages containing the materials must comply with NRC regulations, as described in this *TC & WM EIS*, Appendix H, Section H.3.

Commentor No. 182: Tom Seppalainen, Philosophy Department, Portland State University

From: Tom Seppalainen [seppalt@pdx.edu]
Sent: Monday, March 15, 2010 4:17 PM
To: tc&wmeis@saic.com
Subject: EIS Comment
Attachments: Hanford TCWM EIS from PSU PhiloDept.pdf

Please see attch for a public comment (I'll also have a hard-copy sent)

Best regards,

Tom

--

Tom Seppalainen
Chair
Department of Philosophy

xxx xxx xxxx office
xxx xxx xxxx fax
seppalt@pdx.edu
www.philosophy.pdx.edu

Office hours:

Monday 11am-1pm
Thursday 9am-10am

Neuberger Hall, 393B
724 SW Harrison
Portland, Oregon 97201
PO Box 751
Portland, Oregon 97207-0751

Response side of this page intentionally left blank.

Commentor No. 182 (cont'd): Tom Seppalainen, Philosophy Department, Portland State University

Portland State UNIVERSITY

College of Liberal Arts and Sciences
Philosophy

Post Office Box 751
Portland, Oregon 97207-0751

503 725 3524 tel
503 725 8984 fax

March 12, 2010

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

Dear Ms. Burandt:

Pertaining to the recent Tank Closure and Waste Management Environmental Impact Statement conducted by the US Department of Energy for the Hanford site, we are contributing a public comment for the following points:

- Further investigation of broader regional well-being is called for in such a review of environmental impacts. In particular, the EIS insufficiently recognized the perspectives and values of both the Native community and citizens in this region. *182-1*
- More generally, long term value sets were not included in this EIS. As this has been the case throughout the history of decision making at Hanford, it is due time to include such elements, even in 'technological' reviews. This is particularly crucial given the effects on many future generations and the degree of contamination. *182-2*
- We are also concerned about proposals to transport more waste to Hanford without sufficient citizen input and discussion. The community deserves a significant opportunity to represent concerns about the high threats of civilian exposure and possible massive evacuation in the case of a transportation accident. *182-3*
- Finally, further research and development should be conducted for tank waste retrieval, technetium immobilization, and ground water contamination modeling. The investment in such R&D would prove a shift in technique from "doing it quickly" to "doing it right". *182-4*

We appreciate the extended public comment period and the opportunity to contribute to this locally- and globally-significant project.

Sincerely,

Tom Seppalainen, Ph.D.
Chair

182-1 The perspectives and values of both the American Indian community and the citizens in this region are among the factors driving the current ORP mission to clean up the chemical and radioactive wastes left behind from the previous Hanford mission of defense-related nuclear research, development, and weapons production activities. DOE recognizes that the tribes feel a strong connection and association with their surrounding environment. For example, DOE appreciates receiving the Nez Perce Tribe's narrative, which provides its perspectives. DOE included this narrative in this *Final TC & WM EIS* as part of a new appendix (Appendix W), with references to this appendix added in the main volume of this EIS. Also, this EIS includes a number of analyses of the potential impacts of the various alternatives on the local American Indian population over the short term (see Appendix J) and long term (see Appendix Q).

182-2 Chapter 8 of this *TC & WM EIS* identifies the laws, regulations, and other requirements that potentially apply to the alternatives. Throughout this EIS, the standards established by EPA, Ecology, NRC, DOE, and others, as applicable to the particular subject matter, are identified, and the results of the impact analyses are compared with these standards.

As discussed in the Summary, this *TC & WM EIS* analyzes additional waste treatment capability, including expanding the vitrification process capability currently being constructed in the WTP (i.e., constructing a second vitrification plant 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. This demonstration process is discussed in further detail in Appendix E of this *TC & WM EIS*.

182-3 For the *Draft TC & WM EIS*, eight public hearings were held within a 185-day comment period for members of the public to express their concerns and ask questions.

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. 182 (cont'd): Tom Seppalainen, Philosophy Department, Portland State University

182-4 This EIS analyzed supplemental LAW treatment capability by building new treatment facilities that are either part of (expanded LAW capacity) or separate (bulk vitrification, steam reforming, or cast stone) from the WTP. As discussed in Chapter 2, Section 2.12, DOE does not have 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.

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, and 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.

Commentor No. 183: Nancy Kroening

From: nancy newkirk [greeniefrost@yahoo.com]
Sent: Monday, March 15, 2010 4:36 PM
To: tc&wmeis@saic.com
Subject: Comments on EIS

Dear People:

Following are my comments re: the EIS re: putting more nuclear waste at Hanford:

Please drop all consideration of using Hanford as a national radioactive waste dump. (In fact, the Statement should be re-issued to include an alternative in which Hanford is not receiving off-site radioactive wastes). There has not been anywhere enough progress at the Hanford site to warrant even considering placing more waste there, in my opinion! *183-1*

The Environmental Impact Statement shows that existing wastes at Hanford will create so much contamination that adding more wastes would be "way bad" due to soil, water, and air contamination and the ability of the contractors to deal with any of it. I noted when we passed by there that there is FOOD growing downwind of Hanford! We eat that food! *183-2*

I stress that the Department of Energy must cleanup the contamination from High-Level Nuclear Waste tank leaks and billions of gallons of discharges that occur NOW.

They need to empty the tanks to 99.9% & fully remove the tanks from the ground instead of leaving them there to recontaminate the groundwater & the Columbia River over the next thousand years. *183-3*

Our family has a big interest in this because our grandchildren spend time in Richland, WA, right next door to Hanford.

The people of Washington spoke loudly and clearly when they voted to NOT have more waste at Hanford. I want the federal government to honor the people's wish. *183-1 cont'd*

Thank you.

Nancy Kroening, 123 East Calavar Road, Phoenix, AZ 85022

183-1 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 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.

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.

183-2 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.

183-3 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. 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

Commentor No. 183 (cont'd): Nancy Kroening

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. 184: Vivian Adams

From: vha@icehouse.net
Sent: Monday, March 15, 2010 6:37 PM
To: tc&wmeis@saic.com
Subject: Hanford Reach

Dear USDOE:

Please remove Hanford from your consideration as a national waste dump. Look for a further alternative that would not endanger a river. *184-1*

Please do not reopen FFTF. It should be dismantled entirely. *184-2*

Thank you for your consideration of my comments.

Vivian Adams
3526 S Cook St
Spokane, WA 99223
vha@icehouse.net

184-1 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.

184-2 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. The scope of this *TC & WM EIS* is to address the final decommissioning of FFTF.

Commentor No. 185: Martha Lightfoot

From: Martha Lightfoot [martha.lightfoot@gmail.com]
Sent: Monday, March 15, 2010 7:31 PM
To: tc&wmeis@saic.com
Subject: Handford Nuclear Waste Site

I believe that all of the existing waste at Handford should be cleaned up- 99.9 or 100%. Including all structure above and under ground, all dry casks, all soil, all water. *185-1*

I do not believe that Handford should become a nuclear waste repository for the country. The area around the Hanford site is already so contaminated the DOE itself says they have never tackled such a large clean-up. To add more waste would simply compound an already difficult situation. To not clean it up and simply add more waste on top of it is unconscionable, and callous in its disregard for human life & public health, and for the earth and the water supply that would be contaminated forever in human terms. *185-2*

I do not support the trucking of radioactive waste across the country. The danger involved to innocent people even if everything goes according to plan is too high. The potential risk of accidents, the vulnerability to attacks, the radiation danger to the drivers and the people, especially children and pregnant women, whose paths may cross that of the trucks is too great. *185-3*

I do not support any federal or state subsidies for new nuclear power. I support putting that money into truly renewable forms of energy, and into cleaning up and safeguarding existing nuclear waste. The only way to safely deal with nuclear waste is to stop making it. *185-4*

Martha Lightfoot, Portland Oregon.

--

Growth, control, and repose. These three need to exist in balance to make for a good forest of thought. The difficult task for the caretaker of the forest is to ensure watering the right areas, trimming back unaesthetic overgrowth, being cautious of the growth of weeds, transplanting less-thriving species to find greater strengths, and planting new seeds. But most important, ultimately knowing when to leave the forest alone. John Maeda

185-1 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. 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*.

185-2 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. The analyses contained in this EIS are based on the best-available, referenceable waste inventory estimates DOE could find and/or develop. These radioactive and chemical inventories are presented in Appendices D and S. In general, 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 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.

185-3 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

Commentor No. 185 (cont'd): Martha Lightfoot

appropriate NEPA review. For a more comprehensive discussion on the transport and disposal of offsite waste, see Section 2.1 of this CRD.

185-4 Funding or subsidizing renewable energy sources and 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. 186: Catherine Kettrick

From: Catherine Kettrick [catherine@performanceschool.org]
Sent: Monday, March 15, 2010 8:25 PM
To: tc&wmeis@saic.com
Subject: Clean up Hanford

Do not bring any more radioactive waste to Hanford. What is there now is leaking and heading to the Columbia River. It will poison the river, kill fish, cause cancers, pollute the water we use for irrigation, transportation, recreation. *186-1*

Clean up Hanford, please.

Sincerely

Catherine Kettrick, Ph.D., CSC
Director, The Performance School
xxx-xxx-xxxx

186-1 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. 187: William Vertal

From: William Vertal [raymondovichmm@yahoo.com]
Sent: Monday, March 15, 2010 8:45 PM
To: tc&wmeis@saic.com
Subject: hanford

The proposal to add to the hazardous material at the Hanford facility is completely unacceptable. There is a list of major high risk and deadly issues that should be dealt with first: *187-1*

40 miles of unlined trenches that will be left with high risk material that may be left untreated and with no accounting of the material.

Plutonium that may leach into the Columbia River and increase in toxicity to 300 times drinking water standards.

With the knowledge we have of the risks and costs of taking on a new material or waste without having an understanding of proper disposal or recycling seems unfathomable in this century.

W S Vertal / Forest Grove, OR

Raymondovich

187-1 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 (which include cribs, trenches [ditches], and unlined solid-waste trenches), as well as sources of plutonium, is being addressed under CERCLA, 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 during the SST closure process. The cumulative impacts analysis for this *TC & WM EIS* (see Appendix U and Chapter 6) includes the vadose zone of the 200 Areas in addition to other areas of Hanford.

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. 188: Kathy M. Haviland

From: Kathy Haviland [kathymhaviland@yahoo.com]
Sent: Monday, March 15, 2010 9:36 PM
To: tc&wmeis@saic.com
Subject: Submission of Comment

I wish to add my name to the list of citizens who are opposed to the Department of Energy's intent or "preferred " decisions at the Hanford site.

It is nothing less than inhuman to not clean up the million gallons of radioactive waste that has already leaked from the High-Level Waste tanks or the forty miles of unlined soil trenches.

I support dismantling the FFTF reactor and not entombing it.

I am totally against any more nuclear waste being deposited at Hanford.

Sincerely,

Kathy M. Haviland
107 NE 43rd Street
Seattle, WA 98105

188-1

188-1 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*.

As stated in Chapter 1, Section 1.4.2, of this EIS, the groundwater contamination in the non-tank-farm areas within 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. Contamination in the vadose zone resulting from tank farm past leaks would be addressed in the SST closure process. The cumulative impacts analysis for this *TC & WM EIS* (see Appendix U and Chapter 6) includes the vadose zone of the 200 Areas in addition to the other areas of Hanford.

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. 189: Robert W. Batty, Washington State Chapter, Republicans for Environmental Protection

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March 12, 2010

Mary Beth Burandt
EIS Document Manager
DOE Office of River Protection
PO Box 1178
Richland Washington 99352

RE: Draft TC&WM EIS Comments

I. INTRODUCTION SUMMARY

This letter is the official comments letter on the Draft Hanford Tank Closure and Waste Management Environmental Impact Statement (hereinafter "EIS") dated 10/16/09 submitted by the Washington Chapter of Republicans for Environmental Protection ("WAREP"). While we acknowledge DOE's and Washington Ecology's hard work in developing and publishing the draft EIS, we have concluded that there are deficiencies in it that, if eliminated, would provide a clearer, more effective path toward accomplishing the DOE's Mission at Hanford which, in the words in the Cover Sheet to the EIS is now "focused on the cleanup of those wastes [from earlier Hanford activities] and ultimate closure of Hanford". We believe failure to focus on the above-referenced mission is a primary risk in following some of the preferred alternatives proposed by DOE and our comments are geared toward keeping that focus aligned with that Mission. Toward that end our primary recommendations (developed in detail below) are as follows:

A. Failure to Provide all Alternatives With a "No Offsite Waste" Option

We believe the EIS is deficient on its face in that 5 of the alternatives in Table S-1 (numbers 3A through 5) are proposed with offsite waste included. We believe that alternatives 3A through 5 should, at a minimum include no-offsite-waste sub-alternatives. Failure to do so forces those evaluating the EIS to choose possibly less beneficial alternatives in order to achieve a no-offsite-waste goal, which is a primary concern for many other parties as further discussed at section I.C. below. If offsite waste treatment must remain in the EIS (we think it is best eliminated per paragraph I.C. below), the alternatives that include it should include no-offsite-waste sub-alternatives. Note that the underlined Mission Statement above says nothing about processing offsite waste.

189-1

189-1 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. None of the Tank Closure alternatives, including Alternatives 3A through 5, include specific provisions for receiving offsite waste. Rather, the receipt of offsite waste is addressed as a component of Waste Management Alternatives 1 through 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. 189 (cont'd): Robert W. Batty, Washington State Chapter, Republicans for Environmental Protection

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B. WAREP's Preferred Alternative is #6B (Using "Option Case" vs. "Base Case" Sub-Alternative) for Tank Closure

As further developed in Section IV. of this letter below, WAREP has selected Alternative #6B (using the "Option Case" vs. "Base Case" sub-alternative) as its preferred choice for Tank Closure. If Alternative #4 had been presented with a no-offsite-waste sub option, we would have considered it more carefully, but our concern in that respect, expressed at I.C. below, led us to remove it from consideration summarily due to the primacy of the offsite waste concern. Thus our belief that the EIS fails to provide all reasonable alternatives per I.A. above. We have also added a risk management recommendation to the alternative #6B implementation plan (adding DST s to the process if delays cause increased risk of SST failure).

189-2

C. Elimination of Offsite Waste In-Shipment, Processing and Storage from the Process

While WAREP shares the concerns of the many groups and individuals about offsite waste issues, its primary concern in this response to the EIS is that including offsite waste substantially increases the risk that the delays and other problems it adds will result in the Cleanup objectives for Tank Closure to not be achieved. In addition to technical concerns, public support for any cleanup plan will be severely hampered if offsite waste is included. While the moratorium on shipping in offsite waste until the Waste Treatment Plant (WTP) is completed, as discussed below, is a good step, it does not carry sufficient weight in that form to engender confidence that it will not become an impediment to the primary focus (Tank Cleanup). We believe elimination of offsite waste treatment is in the best interest of the DOE, State of Washington and everyone affected by the Cleanup Plan for Hanford. We are encouraged by the similarity of our views with those of Washington Ecology and, consequently, it appears that we will be able to work closely with them in follow up work on this letter. See section V. of this letter below for more details about the need to eliminate offsite waste In-Shipment, Processing and Storage from the process.

189-3

D. WAREP's Preferred Alternative is #3 (using the "Hanford Option" for disposition of Bulk Sodium and RH-SCs) for FFTF Decommissioning

As more fully developed at Section VI. of this letter below, WAREP believes the removal of all the structures under FFTF Decommissioning alternative #3 would eliminate some very dangerous and long half-life contaminants that would be left under the other 2 alternatives.

189-4

189-2 See response to comment 189-1 for a discussion on the transport and disposal of offsite waste.

DOE does not believe that construction of additional DSTs would be warranted under Tank Closure Alternative 6B. The 28 existing DSTs at Hanford are active components needed to complete waste treatment. The construction of additional DSTs was only considered under alternatives where the existing DST capacity was insufficient to support the proposed treatment schedule (Tank Closure Alternative 5) or required replacement because the design life of these facilities would be exceeded (Tank Closure Alternatives 2A and 6A).

189-3 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.

189-4 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. 189 (cont'd): Robert W. Batty, Washington State Chapter, Republicans for Environmental Protection

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March 12, 2010
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II. BACKGROUND

Republicans for Environmental Protection (REP) is an Organization of Republicans who believe that "Conservation is Conservative" and pursuing environmental issues is not fundamentally at odds with the historical and philosophical underpinnings of our party. WAREP is the Washington State Chapter of REP and, while REP is supportive of the concepts in this letter, it is the sole product of WAREP. In 2006, after a review of many potential environmental issues, the Executive Committee of WAREP adopted Hanford Cleanup as its number one focus. The author of this letter and other members of WAREP have attended "State of the Site" meetings and Public Hearings over the past several years and have reviewed the Site Status reports for 2006 and 2007, in addition to the EIS that is the subject of this letter. We expressed concerns similar to those in this comments letter in a March 27, 2009 letter to DOE and Ecology and have received responses to that letter from DOE and other sources that have assisted in developing our approach.

The author of this letter was president of WAREP from 9/06 to 2/10 and has now resigned that position to form a WAREP task force devoted exclusively to Hanford Cleanup, which will remain under the oversight of the Executive Committee of WAREP. That task force will have the job of monitoring implementation, for WAREP, of the EIS that is finally adopted and maintaining communication with the implementing agencies. We do not share the antipathy against DOE and Ecology that was apparent in the most recent Public Hearings and want to work through the system to achieve accelerated results toward the stated mission. That being said, we will focus diligently on that mission and that might result in strong disagreement with implementation actions and in bringing outside pressure to bear when necessary to achieve our goal of ensuring Hanford cleanup.

While WAREP understands that cost considerations are not normally a major part of the EIS process, it did take costs into account, especially in deciding that the very costly alternative 6A would not be our preferred alternative for Tank Closure. As a conservatively oriented organization, we feel it is our duty to consider costs in our analysis and believe it is important to achieve the objectives in the most cost efficient manner.

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Commentor No. 189 (cont'd): Robert W. Batty, Washington State Chapter, Republicans for Environmental Protection

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III. FAILURE TO INCLUDE A "NO OFFSITE WASTE" OPTION FOR ALL ALTERNATIVES

We are very concerned by DOE's inclusion of importing, processing and storing offsite waste in several alternatives. In addition to the poor judgment that shows as discussed in section V of this letter below, we believe inclusion of offsite waste has resulted in the EIS itself being defective in not providing all reasonable alternatives. As discussed more fully in section IV of this letter below, a reasonable person might be forced to select a preferred alternative solely to eliminate off-site waste when another alternative without off-site waste might result in more effective cleanup. We discuss that more fully for Alternative #4 below. While this might be felt to be a result with any presentation of alternatives, bear in mind that processing offsite waste is not stated in the underlined mission statement in the EIS so is not mission critical and the EIS should not be forcing a constrained choice of alternatives just to eliminate it.

189-5

WAREP recognizes that the "Purpose and Need for Agency Action" on page S-10 of the EIS includes a reference to off-site waste disposal and related "Decisions to be Made" based on that. However, we believe those parts of the purpose and decision sections will, if addressed now, reduce the likelihood of achieving the other purposes significantly enough that those portions of the Purpose and Decision sections of the EIS should be eliminated.

An adequate EIS measures the impacts of all reasonable alternatives available to achieve a stated purpose and need. By failing to include specific alternatives without off-site waste in-shipment, processing and storage, DOE has not analyzed all reasonable alternatives leading to the ultimate closure of the Tank Farm at Hanford. By not including these alternatives, DOE hasn't met its NEPA obligations and has artificially constrained its choice of alternatives to meet the purpose of the Project. As long as the purpose of the project includes the ultimate closure of the Tank Farm, alternatives that do NOT add to the existing problem by importing more waste must be fully developed, considered, and ultimately selected as the recommended alternative.

IV. WAREP's PREFERRED ALTERNITIVE IS #6B

189-2 cont'd

A. Primary Reasons for Selecting Alternative #6B

Our primary reasons for selecting Alternative #6B (All Vitrification with Separations; Clean Closure) are as follows:

189-5 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 alternatives for the regional disposal of LLW and MLLW were analyzed in a previous EIS. DOE issued a ROD (65 FR 10061; February 25, 2000) for the *WM PEIS* (DOE 1997) choosing Hanford and NNSS as the regional locations for the disposal of LLW and MLLW from across the DOE complex. In the *WM PEIS*, DOE indicated that additional analyses would be prepared to implement these programmatic decisions. This *TC & WM EIS* analyzes 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. See response to comment 189-4 regarding future DOE decisions.

Commentor No. 189 (cont'd): Robert W. Batty, Washington State Chapter, Republicans for Environmental Protection

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1. 99.9% Cleanup Objective

   While seemingly only slightly more effective than 99% cleanup, we believe that the .9% difference can leave a significant residual risk to the Columbia River watershed and other cleanup beneficiaries, warranting a 99.9% cleanup objective. Note that alternative #4 also shows a 99.9% cleanup but we dismissed alternative #4 summarily because of the inclusion of offsite waste in that alternative as a result of the factors discussed in section V. of this letter below.

2. Clean Closure

   While we agree that there are some technical and cost advantages to selective clean/landfill closure, that option was only presented in Alternative #4, which also includes offsite waste processing so we dismissed it summarily because of the factors in Section V. of this letter below.

3. "Option Case" vs. "Base Case"

   WAREP believes that the "Option Case" is the preferable sub-alternative to the "Base Case" in alternative 6B because the additional clean closure of the 6 adjacent cribs and trenches under the "Option Case" significantly lowers the post closure risk of dangerous elements getting into the ground water and therefore eventually into the Columbia River.

B. Suggested Addition of New DSTs as a Risk Management Technique

In all of the alternatives, we believe there is a significant risk that the Single Shell Tanks (SSTs) might fail before the selected plan eliminates the waste in them. However, only alternatives #5 (which includes off-site waste so we dismissed summarily) and alternative #6A (which we dismissed as too costly and too delayed) envisages new Double Shell Tanks (DSTs). Accordingly, we believe that alternative #6B should have a DST risk management process added, stating that new DSTs will be built to the extent needed to transfer waste from failed SSTs.

C. Illustration of Impact of Off-Site Waste Processing on the Decision Process

In our analysis we concluded that Alternative #4 was a promising alternative but the inclusion of offsite waste in it caused us to summarily dismiss it for the reasons noted at section V of this letter below. The impact of that inclusion further supports our position in section III of this letter above that the failure to include no off-site waste sub-alternatives in alternatives #3A-5 is a deficiency in the EIS itself.

189-2 cont'd

Response side of this page intentionally left blank.

Commentor No. 189 (cont'd): Robert W. Batty, Washington State Chapter, Republicans for Environmental Protection

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V. ELIMINATION OF OFFSITE WASTE IN-SHIPMENT, PROCESSING AND STORAGE FROM THE PROCESS

We strongly believe that elimination of off-site waste from all of the alternatives and especially the selected alternative is in the best interest of all parties for the following reasons:

A. Off-Site Waste Processing is not "Mission Critical" to the Cleanup Objectives

The plain language of the underlined mission statement in section I of this letter above does not support inclusion of it in the cleanup effort. We challenge DOE to provide a logical reason why including offsite waste processing is "mission critical" to the cleanup effort in its response to the EIS comments letters. Absent that, we see no support logically for including offsite waste processing and disposal as part of any of the alternatives.

B. Public Opinion Overwhelmingly Disapproves of Bringing in and Processing Offsite Waste Before the Cleanup Objectives are Achieved

I-297 (admittedly invalidated by a federal court) and public testimony in recent Hearings on this EIS shows the public is strongly opposed to bringing in waste from offsite. In the Spokane meeting, a moratorium on off-site waste until the WPT is operational was stated by DOE and Ecology but we found no reference to that in the EIS. At a minimum, we think it should be added to the EIS and elevated to the status of the other conditions in the EIS so it has the same force and effect as all other provisions. However, complete elimination until the cleanup objectives are achieved is a better approach as most citizens are strongly inclined to oppose any importation of offsite waste. The very difficult and complex task of Hanford Cleanup is unnecessarily made even more so by including the possibility of importing, processing or storing offsite waste with a Public continuously opposed to the process due to that.

C. Offsite Waste Activities Will Dilute the Focus Upon the Cleanup Objective, Increasing the Risk of Failure to Achieve It

As stated clearly and well in Washington Ecology's Foreword on page 7 of the EIS, the track record so far in cleanup has been very mixed and adding Offsite Waste to the cleanup effort increases risks of failure. Ecology admonishes DOE to take a conservative approach and eliminate the disposal of off-site disposal at Hanford. REP is fully aligned with Washington Ecology in that respect. We challenge DOE to

189-6

189-6 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.

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.

Commentor No. 189 (cont'd): Robert W. Batty, Washington State Chapter, Republicans for Environmental Protection

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fully explain why a cooperating agency's opinions are being disregarded if the final version of the EIS still includes any off-site waste in-shipment, processing or storage before the cleanup objectives are achieved.

189-6 cont'd

VI. FAST FLUX TEST FACILITY DECOMMISSIONING

DOE prefers FFTF Decommissioning Alternate 2 (Entombment) with RH-SCs (remote handled special components) shipped to Idaho and the bulk sodium (Na) kept at Hanford for reuse. (See Table S-17 pg S-116) This is the most expensive variant of Alt 2. About 12% could be saved by doing the opposite, shipping the Na to Idaho and keeping the RH-SCs at Hanford or by sending both to Idaho. The expensive part is processing the Na at Hanford.

Alternate 3 calls for complete Removal of all above ground structures as well as contaminated below-grade structures equipment and materials. The Reactor Containment Building (RCB) would be demolished and removed to grade and all auxiliary facilities would be removed to 3 ft below grade. Essentially, everything that could be hot would be removed. If the RH-SCs were handled at Hanford and the Na shipped to Idaho, It would cost 8% less than DOE's preferred option. If both were kept at Hanford the additional cost over DOE's preference would be only 3%.

189-4 cont'd

The difference becomes clearer when the "groundwater influences" are compared. This is found in 24 pages in the main document on the CD. (pages 5-371- 5-395) Only two pages discuss Alternate 3's contamination. At first we thought DOE was ignoring it, but it turns out that this alternative leaves NO contamination to discuss. Alternates 1 (do nothing) and 2 (Entombment) cause significant contamination of the groundwater and at the Columbia River. Alternate 2 reduces the amount of short lived tritium but makes virtually no reduction in the Technetium-99 that has a 213,000-year half-life. Alternate 3 eliminates everything.

We appreciate the opportunity to provide this comments letter and hope it will help DOE and Washington Ecology to accomplish their respective roles in the Cleanup of Hanford.

By: Robert W. Batty
Robert W. Batty
Immediate Past President
Washington State Chapter
Republicans for Environmental Protection

cc: Washington State Department of Ecology

Response side of this page intentionally left blank.

Commentor No. 190: Mannfried Funk

3/10/2010

Dear Ms Burandt;

I am writing in concern about the intention of the US government to use the already contaminated Hanford Nuclear Reservation as the latest dumping ground of nuclear waste. The area needs to be cleaned up, not made worse. We in Washington do not want our water and wild life sacrificed further and we certainly do not want our population sacrificed at all! The intent is wrong in every way. It is a terribly misguided idea that must not be followed through.

Sincerely,

Mannfried Funk

190-1

190-1 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. 191: Sister Leslie L. Lund

March 12, 2010

Sister Leslie Lund
2892 SR 211 #3
Newport, WA 99156

Dear TC & WM EIS Folks:

I wish to comment on the clean up of the Hanford area, the transportation of dangerous materials through populated areas, and the issue of making Hanford a national radioactive waste dump. *191-1*

It is not enough to say that making Hanford the national radioactive waste dump is shortsighted in the extreme, it is truly suicidal and murderous of a populated region. I do not want dangerous waste transported through populated areas or stored near major watersheds that affect millions of people (or any people at all)! I want Hanford to be cleaned up as close to 100% as is technically possible. I do not want any nuclear reactor facilities anywhere near the Columbia River or any watershed of the United States. *191-2*

Some years ago the GAO already did a study for Congress on the placement of the national radioactive waste dump. I know this because my own sister worked on this research. Yucca Mt. in Nevada was the recommendation by the GAO because it is in the middle of no where, not near populated areas or near water sources and it has better geologic formations for storage. Why is this research being ignored? That Hanford would be left to deteriorate the water supplies of the northwest, and jeopardize the lives of millions of people with continued, mounting contamination defies all rational sense and understanding. *191-3*

I protest the US DOE's proposals to dump more radioactive wastes at Hanford. As a former philosophy major I know that ***ad hominum*** arguments attacking the character or intelligence of others is not a compelling argument, but honestly whoever the people are who are behind such an outlandish proposal need to have their heads examined for lack of logical thinking, and need to examine their consciences on moral grounds for considering seriously harming the lives of others. *191-1 cont'd*

Please do not let these immoral proposals of USDOE happen!

Sincerely,

Leslie L Lund

Sister Leslie L. Lund, ocdh

191-1 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.

191-2 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.

191-3 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. 192: Marjon Riekerk and Dr. Ir. A.G. Voorhoeve

TANK CLOSURE

U.S. DEPARTMENT OF ENERGY

Comment Form
Formulario para comentarios

Thank you for your input
Gracias por su participación

Date/Fecha: 03/09/10

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?)*

After attending the public hearing on the Hanford Draft Tank Closure and Waste Management EIS, March 8, 2010, the thought occurred to us that there is a far more efficient and possibly far cheaper solution to the problem of dispersing contamination that threatens the water quality of the Columbia River:

Isolate the contamination source by creating one huge frozen block of land, several miles wide and long, and 300 feet deep.

This may need a bit of explaining:
Efficiency: it would put an immediate stop to the groundwater flow that transports the contaminants down to the Columbia River, giving DOE the urgently needed time to clean up the existing contamination. As long as the frozen block of land is maintained the contamination can go nowhere. The energy needed could be generated by a massive wind park on site.
Cheaper solution: a technology is presently being developed, although currently only in it's conceptual phase, to extract energy from warm air, with electricity, water, and (freezing) cold air as products. This is a self-supporting system, because the generated electricity can be (partly) used to run the equipment. But no outside-generated electricity may be needed and the freezing air can be used to create the desired frozen land block. Once the whole block of earth is frozen it will take less energy to keep it frozen.

The technology to create frozen soil is available, especially in the drilling industry. It only needs to be expanded for such a large project. It needs huge amounts of energy, but that energy is right there, either as wind energy or in the warm air of the Columbia Basin.

An additional advantage to fully develop this technology is that it can be applied everywhere, thus solving the problem of long-distance transport of contaminated waste.

One more advantage is that the whole Hanford cleanup project is less earthquake sensitive. A frozen block of earth may crack and split, but it still will be frozen and will freeze together again. If the installed pipe system is damaged, it can be replaced.

I urgently request that you propose this possibility to USDOE for evaluation.

Sincerely yours,

Marjon Riekerk
36th District.

Dr. Ir. A.G. Voorhoeve

Address/Dirección: 10051 Dibble Ave NW Seattle WA 98177

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*.

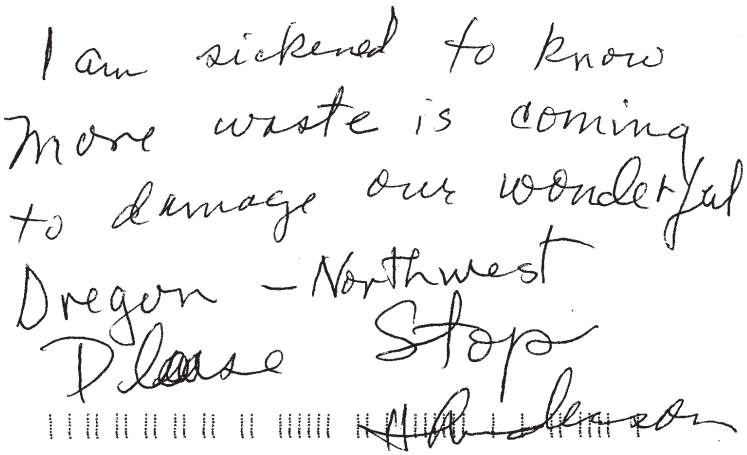
For more information contact: Mary Beth Burandt, Document Manager,
TC & WM EIS, P.O. Box 1178, Richland, WA 99352
Toll-free Telephone: 1-888-829-6347 • Toll-free Fax: 1-888-785-2865

CT STATEMENT

192-1

192-1 As discussed in Chapter 2, Section 2.6, Technologies and Options Considered But Not Evaluated in Detail, as well as Section 2.6.1, Tank Closure, this technology, called "in situ soil remediation," was one of many in situ soil remediation technologies initially considered by DOE. However, it was not evaluated in detail in this *TC & WM EIS* because of the difficulties and uncertainties associated with placement of treatment zones and verification of performance. In situ treatment generally requires long periods of time and provides questionable uniformity of treatment because of the variability in soil and aquifer characteristics. The overall efficacy of in situ processes is also relatively difficult to verify.

Commentor No. 193: H. Anderson



193-1

193-1 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. 194: J. McCredy

6 Mar 2010

to whom it concerns:

Would you please clean up the mess already made?

So, obviously this means "No" to the "preferred alternatives" nonsense site! So to repeat No to the Natrinal Waste Dump.

Sincerely, J. McCredy

194-1

194-1 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. 195: Nancy Lou Tracy

From: Nancy Tracy [nancyloutracy@gmail.com]
Sent: Tuesday, March 16, 2010 8:18 PM
To: tc&wmeis@saic.com

We rsidents of the Northwest have had enough of the DOE's delays, fabrications, false assurances - decades of them. Obviously We the People must now lead the way. We are not going to allow Hanford to be a Natl. Radioactive Waste Dump. Your 60 years of inaction, premeditated negligence have created shameful history . Now permanent radioactive contamination of the Columbia River and what that portends for agriculture, recreation, wildlife, drinking water and cancer threat for millions has your OK. You now face a public fed up with Wall Street, stupid wars and a virtual corporate control of decisions benefiting Big Money - not in any way connected to the a sustainable future for all of life. We the People are a growing force and it is going to start here. Clean up and shut up the nonesense talk. We are no longer good citizens responding in good faith. We are now well trained and seasoned watchdogs. The Coloumbia Riveer is a national treasure and we are not going to lose it because the nuclear industry and its stockholders want an easy way out. Sincerely, Nancy Lou Tracy 7310 S.W. Pine St. Portland, OR 97223

195-1

195-1 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 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.

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.

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 196 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 183.

Commentor No. 197: Sharon Evoy

From: Sharon [sharonevoy@eoni.com]
Sent: Tuesday, March 16, 2010 10:07 PM
To: tc&wmeis@saic.com
Subject: HANFORD

Dear TC & WMEIS,

I am a resident of La Grande, OR and attended the recent presentation at Eastern Oregon University. My stand from listening to the various agencies and commentary is:

1. CLEAN IT UP

2. NO MORE WASTE

This site is a hazard to our quality of life and is already a threat to the soil and rivers.

Thank you for coming to La Grande to raise our awareness of this situation.

Sincerely,

Sharon Evoy

197-1

197-1 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 198 is not included in this Comment-Response Document because it is a duplicate of a Commentor submitted in Campaign A.

Commentor No. 199: Lynn Sims, Hanford Watch

From: Lynn Sims [lsapplecrisp@gmail.com]
Sent: Wednesday, March 17, 2010 3:12 AM
To: tc&wmeis@saic.com
Subject: Hanford Tank Closure and Waste Management EIS Comment

March 17, 2010

Hanford Tank Closure and Waste Management EIS Comment

Thank you for the opportunity to comment.

This EIS is certainly one of the most important documents concerning Hanford management. After attending informational and public meetings and hearings for eighteen years, I have seen that although progress has been made regarding Hanford containment and clean up, many challenges are ahead. The Tank Closure and Waste Management issues top the list for public concern.

The activities at Hanford may have been well intentioned, but many were mismanaged and directed without a long term vision or solution. As the years passed, complications arose, contamination spread, dangers increased and accidents happened. Furthermore, no comprehensive program for the site was implemented, management companies changed, federal leadership changed, personnel changed, the tanks deteriorated, funding fluctuated and technology advanced, all of which influenced Hanford activities.

The irrefutable fact remains that Hanford is the most seriously contaminated site in the western hemisphere. The problems must be addressed with moral and technological emphasis upon protecting the Colombia River and the health and well being of future generations. ***199-1***

At least 99 percent of the tank waste should be treated now, and as technology develops, we should aim for 99.9 percent.

Construct and expand vitrification facilities. Store the high level waste in canisters on site until a different disposal site is available.

Soils should be characterized and contaminated soils and equipment should be removed and placed in a disposal facility.

The best attempts to immobilize/contain dangerous waste should be made and improved upon as technology develops.

No off-site wastes should be transported to Hanford at this time. ***199-2***

199-1 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*.

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. This *TC & WM EIS* addresses alternatives for on- and offsite disposal of treated tank waste, depending on the waste type. However, the scope of this EIS does not include making a decision on the ultimate disposition of HLW and any transportation related to such disposition. 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.

199-2 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. 199 (cont'd): Lynn Sims, Hanford Watch

All projects must be made to adhere to legal requirements.

Strong efforts must be made to clean up Hanford NOW to the best of our abilities and with a vision for the future. We must have funding for these projects...we seem to have enough for wars and weapons...and Hanford is a relentless attack on our homeland! If we wait, the problems and risks and expenses become greater.

We have been dealing with Hanford for less than 100 years, cleaning up for only decades and what we have on our hands impacts our environment for 10s and 100s of thousands of years to come! It is necessary to develop a spiritual and political will to confront this immense problem! If we don't approach this challenge with the mission to clean up and contain contaminants to the highest standards then despite all our advanced technologies, we are unleashing doom.

This project is a monumental task. Like cathedrals of ages ago, the finishing will stretch into the next generations. But we must begin with excellent decision making now that will direct the remedy for our terrible mistakes. Thank you to everyone who has worked long and hard on these issues and good luck forever.

Respectfully submitted,

Lynn Sims
Hanford Watch
3959 NE 42nd Ave.
Portland, OR 97213

199-3

199-3 Throughout this EIS, DOE identifies the legal requirements that it would need to comply with concerning the specific activities that are part of the proposed action and alternatives. For example, Chapter 1, Section 1.2.1, discusses Hanford regulatory compliance requirements and 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 the Tank Closure alternatives. 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 regarding tank closure. 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.

Commentor No. 200: Edwin "Ed" H. Shaul Sr.

From: Ed Shaul [eshaul@eoni.com]
Sent: Tuesday, March 16, 2010 3:22 PM
To: Mary Beth Burandt
Cc: CREDO Action LiAnna Davis; Office; Heart of America Northwest
Subject: Comments on Draft TC&WM EIS
Attachments: Hanford Appeal.docx

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

Dear Mary Beth:

I appreciate your team coming to Eastern Oregon University last Feb 22 to inform our community of the alternatives under consideration regarding the Hanford proposed cleanup and transportation issues. It is my understanding that comments will be accepted via email or in written form before the deadline of March 19, this coming Friday. Based information received at your meeting and from other sources, I submit my following comments:

I write in hopes of preventing the Hanford location in Washington State becoming the national dump site for all nuclear waste and associated hazardous materials. Also, I support the concept of leaving existing nuclear waste at current nuclear power plant sites and at weapon production facilities until such can be disposed of with maximum public safety. Highly radioactive wastes should not be transported over our interstate highways that would produce any harmful health hazards, no matter how insignificant. ***200-1***

I am against any additional radioactive wastes being added to the Hanford site. I applaud what has been done so far to close and demolish existing reactors at the site, and also support the dismantling of the FFTF reactor versus entombing it. It is my understanding that it is possible to remove 99.9 percent of radioactive waste in the more than 200 single wall and double wall underground tanks, many of which are leaking. And, all liquid, tanks and piping can be disposed of and/or treated via a glass-type processing method in a plant being built at the Hanford location. That processing facility needs to be built sooner than later since time is of the essence. The processing plant needs to be dedicated to waste on the Hanford site, exclusively. I support the so-called "Clean Closure" of all contaminated earth areas, not the "cap method" that would allow toxic and radioactive materials to ***200-2***

200-1 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 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.

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.

SNF and HLW are transported in DOT-certified containers that meet strenuous technical standards established by NRC.

200-2 Under DOE's Preferred Alternative for FFTF decommissioning (Alternative 2: Entombment), 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.

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).

As discussed in the *TC & WM EIS* Summary, Chapter 1, and Chapter 2, this EIS analyzes additional waste treatment capability that includes expanding

Commentor No. 200 (cont'd): Edwin "Ed" H. Shaul Sr.

continue to seep into the Columbia River at greater speed in the generations and decades to come. *200-2 cont'd*

While I realize that our nation is dealing with a number of issues, not to mention great financial challenges now and in the future, it is imperative that the States of Oregon, Washington and Idaho continue to encourage their Departments of Energy, Transportation and Environment to work in concert with the US Department of Energy to address the ultimate cleanup of Hanford to protect citizen's health now and of those to be born in the decades to come. The Columbia River is the source of drinking water, salmon migration, irrigation, recreation and must be protected. Those traveling on our highways need to be protected, as well. In short, we need to work as fast as possible to clean up the site and find ways to process radioactive materials nationwide. A safe, national repository for processed materials also needs to be found, but Hanford is clearly not that place. *200-3*

Thank you for taking my requests under consideration.

Edwin "Ed" H. Shaul Sr.

62179 Starr Lane, LaGrande, OR 97850 xxx-xxx-xxxx
P. O. Box 3167, LaGrande, OR 97850-7167 eshaul@eoni.com

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.

200-3 The *TC & WM EIS* alternatives were developed to help DOE compare the short- and long-term potential impacts of the proposed actions and analyze the tradeoff between the two. For example, the Waste Management alternatives were developed partly to compare the potential short-term impacts of expanding some existing facilities, constructing new facilities, and operating and deactivating those facilities used to store, treat, and dispose of waste. The Waste Management alternatives were also developed to compare the potential long-term water quality, human health, and ecological impacts resulting from these activities.

Short-term impacts analysis, as described in the Summary, Section S.5.3 and Chapter 2, Section 2.8, covers potential impacts associated with the active project phase during which construction, operations, deactivation, and closure activities would take place, as well as potential impacts that could occur during the applicable 100-year administrative control, institutional control, or postclosure care period. Short-term potential impacts are presented primarily in Chapter 4 of this EIS. Long-term impacts analysis is presented primarily in Chapter 5, which addresses the potential impacts for groundwater, human health, and ecological risk through the 10,000-year period of analysis. This time period starts in 1940, extends out to the year 11,940, and captures the impacts associated with past tank leaks, retrieval leaks, and past practices associated with contiguous cribs and trenches (ditches).

Commentor No. 201: Lisa Van Dyk, Heart of America Northwest

From: Lisa Van Dyk [lisa@hoanw.org]
Sent: Tuesday, March 16, 2010 4:46 PM
To: tc&wmeis@saic.com
Subject: Comments on the TC&WM EIS

These comments are in addition to the public testimony I gave at the Hood River, Portland & Seattle public hearings on the draft Tank Closure & Waste Management Environmental Impact Statement

Tank Wastes

The impacts of not cleaning up the tank leaks, cribs & trenches are tremendous – and entirely unprotective of groundwater & the Columbia River. The oldest High-Level Nuclear Waste tanks at Hanford have already leaked over one million gallons into the soil, where it threatens the Columbia River & public health. The Hanford Advisory Board & other stakeholder groups have repeatedly warned that the hard heel wastes in the bottom of the tanks are more likely than not to hold a disproportionate amount of radioactivity.

USDOE must retrieve 99.9% of the wastes from the tanks, or retrieve to the absolute limits of technology. Any other alternative is unacceptable.

The tanks must be fully removed from the ground. All the stakeholder groups are unanimous in advocating for clean closure of the tank farms, and USDOE must amend its preferred alternative to chose this, which is most protective of the environment and public health over thousands of years. Landfill closure is short-sighted and inappropriate, given the current contamination at Hanford. Leaving the tanks in the ground only contributes further to the contamination, as capping does not prevent the contamination from spreading. Abandoning the contamination from tank leaks and deliberated discharges is unacceptable. It is obvious, but must be stated: the TC & WM EIS should include an alternative that is fully protective of human health and the environment and that results in compliance with federal and state clean up standards! ***201-1***

In addition, it recently was brought to my attention that the estimates of the amount of tank waste in the soil included in the TC & WM EIS dramatically under-represent the amount of waste actually present. Thus, the maps of modeled groundwater contamination – as scary as they already are – are not even telling us the true story of contamination at Hanford. The TC & WM EIS should be revised, before the final draft is released, to include accurate inventories of the amounts and compositions of the wastes at Hanford. ***201-2***

201-1 The decision whether to leave 0.1 percent, 1 percent, or more of the waste in the SSTs is one of the decisions supported by the *TC & WM EIS* analyses (see Section S.1.3.1 of the *TC & WM EIS* 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, 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. 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 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.

201-2 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. 201 (cont'd): Lisa Van Dyk, Heart of America Northwest

Offsite Waste

Considering the environmental impacts analyzed in the TC & WM EIS, the Department of Energy must withdraw its February 2000 Record of Decision to use Hanford as a national waste dump for Low Level Waste & Mixed Wastes.

It is inappropriate that the draft TC & WM EIS does not include an alternative under which Hanford is not used as a national radioactive waste dump. Figure S-21 in the TC & WM EIS shows that importing waste for disposal at Hanford increases the cancer risk levels over the next thousand years by tenfold, which is unacceptable. It is also confusing that the Greater Than Class C wastes are not considered at all in the TC & WM EIS. What does the term cumulative impact mean if a huge amount of highly radioactive wastes are not considered? *201-3*

The promise to not bring waste to Hanford until 2022 is meaningless; it has nothing to do with protecting the environment, the Columbia River or public health. Withdrawing the Record of Decision to use Hanford as a national radioactive waste dump site would be the only action the Department of Energy can take to fully assure the public that it will not import waste to Hanford.

The public's said it over and over again over the past decade, but I'll add my voice to the chorus – do not bring any more waste to Hanford.

Vitrification

The supplemental treatment options mentioned in the TC & WM EIS should be discarded, not preferred. I'm relying on the expertise of the members of the Hanford Advisory Board, which was repeatedly recommended and advised that USDOE vitrify all of Hanford's wastes, as that is most protective of the environment. USDOE should instead, start up the Low Activity Waste portion of the Waste Treatment Plant as soon as possible, and add additional LAW melters. *201-4*

Fast Flux Test Facility

While I've thought of the FFTF portion of the TC & WM EIS as the most innocuous part of the EIS, we've learned from past experience that the FFTF can come back from the dead. Therefore, USDOE must take this opportunity to finally decommission the FFTF once and for all, remove the reactor core from the ground and treat the wastes at Hanford. *201-5*

201-3 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.

The impacts of the offsite waste in terms of radiological risk are presented in the Summary, Section S.5.5.3, Figure S–21, and Chapter 2, Section 2.10.3, Figure 2–132. These graphs illustrate 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.

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.

201-4 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. 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.

201-5 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. Removing the FFTF reactor core and treating the associated special components

Commentor No. 201 (cont'd): Lisa Van Dyk, Heart of America Northwest

Public Involvement

I appreciate the Department of Energy's willingness to hold eight hearings throughout the Northwest on the TC & WM EIS, as all of the Hanford stakeholders recognize that this is an extremely crucial document for the future of Hanford cleanup. I hope the Department of Energy was encouraged by the hundreds of members of the public who took time out of their weeknights to attend the hearings, and that the Department of Energy will take seriously and under equal consideration all of the comments submitted through the process.

The Department of Energy is required to give notice of the hearings to the public – an effective notice. I personally did not find the mailer that the Department of Energy sent out to be effective, or quite frankly, readable at all. The TC & WM EIS is of public concern because of the environmental and health impacts it outlines – not because of what was or was not included in the EIS. In addition, graphics and/or color make a huge difference in the aesthetics of a direct mail piece.

Again, I would like to encourage the Department of Energy to record the question and answer periods of the public hearings as part of the public record. This is important, as there were noted inconsistencies in how questions were answered at the various TC & WM EIS hearings. For example, the public in Hood River & Portland was left confounded when they were told that the moratorium on importing offsite waste to Hanford is legally enforceable. That's currently true, but the way it was phrased led them to believe that it would still be legally enforceable even after the Final TC & WM EIS is issued, which is not true. At that point, the public is relying on the Department of Energy's promise, not a legally binding document.

Finally, I think it is inappropriate that the email address to which the public is to submit comments is an SAIC email address. The Department of Energy should be transparent about who exactly is reviewing and responding to comments, in a document available to the public at the hearings and online. In addition, the Department of Energy should commit to a timeline for reviewing comments and notify the public of that timeline, so they know when to expect responses and when the process will move forward.

Thank you for the opportunity to comment on the Tank Closure & Waste Management Environmental Impact Statement.

Lisa Van Dyk
1314 NE 56th St, Suite 100
Seattle, WA 98105

201-6

and bulk sodium at Hanford are analyzed under FFTF Decommissioning Alternative 3 in this *TC & WM EIS*.

201-6 All comments made during the public comment period, whether given orally at hearings or sent via mail or email, were considered equally by DOE. All comments received on the *Draft TC & WM EIS* and their approved responses are included in this CRD, a volume of this final EIS. DOE has posted this *Final TC & WM 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*.

Commentor No. 202: Susan B. Edwards

From: Sue Edwards [suebedwards@comcast.net]
Sent: Tuesday, March 16, 2010 8:40 PM
To: tc&wmeis@saic.com
Subject: DOE proposal for Hanford

I am among the many in the Northwest who would like to voice my strenuous objection to the DOE dumping more nuclear waste at the Hanford Reservation, particularly if it is sent from other existing DOE sites as they propose. It is already the largest nuclear waste repository in the Western Hemisphere. Following are some of the reasons: *202-1*

-Existing waste from 170 old, single shell tanks has not yet been entirely cleaned up and it appears that about 67 of those are leaking. At the rate clean-up is going (for 30 years now) it will take about 100 years to clean up these alone. *202-2*

-According to the latest court decision, no more waste is supposed to be dumped at Hanford until the existing waste is adequately disposed of and stored safely. *202-3*

- Nothing has been done (nor are there provisions to do anything) to remove waste in an unlined trench. *202-4*

- There has already been nuclear waste contamination of the Columbia River and it allegedly contains 1500 times the allowable drinking water standard of Strontium 90... and that's not even withstanding a number of other detects of radioactive substances that have been found

- There has been evidence of statistically significant incidences of various cancers and chronic diseases that could be related to nuclear waste exposure and contamination, including 32 new cases of chronic beryllium disease. *202-5*

-There is increasing evidence that there is already groundwater, earth, and vegetation contamination...including some found in the milk local cows produce who have been eating grasses growing in this area.

-The threat of earthquake in this area is too high to risk continued dumping of any nuclear waste - the existing waste is dangerous enough. *202-6*

-More than 17,500 truck-loads of radioactive waste (about two a day for 20 years) would be carrying these extremely dangerous substances along some of our busiest state and interstate highways. What are the odds that something could happen to one of these trucks carrying radioactive substances that have half-lives in the hundreds of thousands and millions of years? *202-1 cont'd*

202-1 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.

202-2 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. 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. Currently, DOE is retrieving waste from the C Area tank farm; the TPA milestone to close this tank farm is 2019.

202-3 See response to comment 202-1 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 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.

202-4 In general, the scope of this *TC & WM EIS* does not include groundwater remediation activity as part of the proposed actions evaluated. DOE is engaged

Commentor No. 202 (cont'd): Susan B. Edwards

The continued dumping of nuclear waste at Hanford is absolutely NOT worth the risk to human and animal lives. The proof is already in the pudding with the problems incurred with the existing waste - both in terms of cost and longevity of clean-up and health and safety problems.

Susan B. Edwards

202-5 cont'd

in an extensive cleanup program at Hanford under the TPA, subject to active oversight and participation by EPA, the State of Washington, American Indian tribes, and other stakeholders. Disposal of LLW in unlined trenches within the Hanford LLBG 218-W-5 ceased in 2004, as described in Chapter 3, Section 3.2.12.1.4, of this EIS. Closure of these CERCLA past-practice units is outside the scope of this EIS. As described in the Summary, Section S.1.3.2, and Chapter 1, 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. They are CERCLA past-practice units and were evaluated in this EIS as part of a connected action because they would be influenced by barrier placement. Similarly, closure of these CERCLA past-practice units is not part of the proposed actions analyzed in this EIS. Closure of these units would be addressed at a later date. These six sets of cribs and trenches (ditches) are noted in Chapter 2 and described in detail in Appendix D, Section D.1.

202-5 The sources of information from which the commentor's comments derive are unclear. Regarding strontium contamination in the Columbia River, DOE publishes an annual Hanford Site environmental report (Poston, Duncan, and Dirkes 2011). In the report, Table C.4 shows that the average concentration of strontium-90 in river water samples collected in Richland, Washington, in 2010 was 0.020 picocuries per liter, and the average over the previous 5 years was 0.041 picocuries per liter. These results are more than 100 times lower than the water quality standard of 8 picocuries per liter (40 CFR 141).

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 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.

The *TC & WM EIS* 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").

202-6 Chapter 3, Section 3.2.5.1.1, of this *TC & WM EIS* presents the locations of geologic faults relative to Hanford and their potential for producing earthquakes. DOE has thoroughly and objectively analyzed the potential risks from, and environmental consequences of, an earthquake-induced accident at Hanford during waste storage, treatment, transfer, and handling. For the analysis of seismic impacts, see the geology and soils sections of Chapter 4 (Sections 4.1.5, 4.2.5, and 4.3.5) for each of the alternatives analyzed.

Commentor No. 203: Barbara Glancy

1620 NE Broadway St., #515
Portland, OR 97232
March 12, 2010

Ms Mary Beth Burandt
Document Manager
TC & WM EIS
PO Box 1178
Richland, WA 99352

Dear Ms. Burandt:

I have not read the Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington, but I have listened to news reports and read articles in The Oregonian.

I am concerned that they plan to deposit more nuclear waste there. I understand that tanks filled with such have been buried but are leaking into the soil below. I understand that this waste is slowly making its way to the Columbia River. That needs to be corrected before there is any idea of depositing more poisons at Hanford. *203-1*

I also hear that the surrounding population has a higher incidence of cancer. No wonder!. *203-2*

I am horrified that President Obama wants to build more nuclear reactors elsewhere in the nation while there is no agreement on where to dispose of all this contamination. I know you cannot do anything about that. However, adding to the nuclear mess at Hanford is just as foolish. *203-3*

Please devote yourselves to adequately cleaning up the mess already deposited there. *203-1 cont'd*

Sincerely,

Barbara Glancy

Barbara Glancy

203-1 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 the Columbia River. 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.

203-2 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 (for Hanford), of this *TC & WM 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.

203-3 This *TC & WM EIS* addresses proposed actions to retrieve, treat, and dispose of Hanford tank waste; decommission FFTF; and expand waste disposal capacity at Hanford to provide for disposal of on- and offsite DOE waste. The disposal of other wastes, including waste associated with commercial nuclear power generation, is beyond the scope of this EIS.

Commentor Number 204 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 174.

Commentor No. 205: Stephen Bomkamp

3/13/10

USDOE:

THIS IS MY RESPONSE TO THE DRAFT TC & WM EIS:

PLEASE FULFILL THE LEGAL AND MORAL RESPONSIBILITIES INCURRED BY THE FEDERAL GOVERNMENT TO CLEAN UP THE HAZARDOUS WASTE CREATED BY DECADES OF NUCLEAR ACTIVITIES. THESE RESPONSIBILITIES INCLUDE:

① REMOVAL OF 99.9% OF THE HIGH LEVEL TANK WASTE OR REMOVE TO THE LIMIT OF TECHNICAL CAPABILITIES. *205-1*

② REMOVE THE STORAGE TANKS AND REMEDIATE THE SOIL CONTAMINATION FROM TANK LEAKS. *205-1*

③ REMOVE THE FAST FLUX TEST FACILITY, RESTORE THE SITE AND TREAT THE WASTES AT HANFORD. *205-1*

④ START UTILIZING THE LOW ACTIVITY WASTE PORTION OF THE VITRIFICATION PLANT PRIOR TO 2019 AND START FUNDING A SECOND LAW FACILITY IN 2012 IN ORDER TO HAVE IT OPERATING BY 2022. *205-2*

⑤ DO NOT TRANSPORT ANY ADDITIONAL WASTE TO HANFORD. DIG UP PLUTONIUM AND OTHER TRANSURANIC WASTES IN UNLINED SOIL DISPOSAL DITCHES AND TANK LEAKS, TREAT THE WASTES AND DISPOSE OF THEM IN DEEP GEOLOGICAL 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 GROUND WATER OR NEXT TO A RIVER. *205-3*

THE USUAL ARGUMENT AGAINST RESPONSIBLE, THOROUGH CLEAN UP IS THAT IT COSTS TOO MUCH. HOWEVER, THAT ARGUMENT HAS BEEN DESTROYED BY RECENT ACTIONS BY THE FEDERAL GOVERNMENT WHICH WITHIN THE LAST COUPLE OF YEARS HAS SPENT SEVERAL TRILLION DOLLARS BAILING OUT THE FINANCIAL INDUSTRY. *205-4*

205-1 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. Tank Closure Alternatives 4, 6A, and 6B 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*.

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.

205-2 This EIS analyzed supplemental LAW treatment capability by building new treatment facilities that are either part of (expanded LAW capacity) or separate (bulk vitrification, steam reforming, or cast stone) from the WTP. As discussed in Chapter 2, Section 2.12, DOE does not have 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.

205-3 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.

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. 205 (cont'd): Stephen Bomkamp

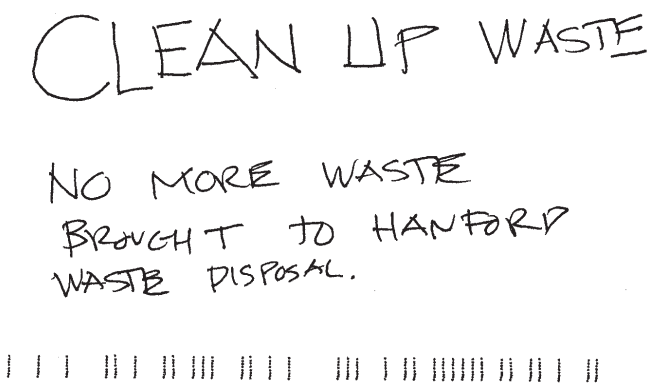
CAN ANYONE SERIOUSLY ARGUE THAT THE BAIL-OUTS WILL MAKE ANY DIFFERENCE TO ANYONE A THOUSAND YEARS FROM NOW? I DON'T THINK SO. BUT THE GOVERNMENT'S FAILURE TO CLEAN UP THE NUCLEAR WASTE IT HAS CREATED WILL BE SERIOUSLY IMPACTING THE LIVES AND HEALTH OF PEOPLE LIVING IN THE HANFORD AREA AND ALL DOWN THE COLUMBIA RIVER IN A THOUSAND YEARS AND LONG BEYOND THAT. TO CREATE SUCH HAZARDOUS WASTES AND THEN TO FAIL TO CLEAN THEM UP AND RESTORE THE AREA TO A HABITABLE CONDITION IS IRRESPONSIBLE AND IMMORAL. OBVIOUSLY THE MONEY TO DO THE JOB CORRECTLY IS AVAILABLE. IT IS JUST A MATTER OF PRIORITIES

205-4 cont'd

SINCERELY,
STEPHEN BOMKAMP
3944 SW 97TH ST
SEATTLE WA 98136

205-4 Both DOE and Congress are committed to the cleanup efforts at Hanford, and DOE continues to seek funding for these efforts.

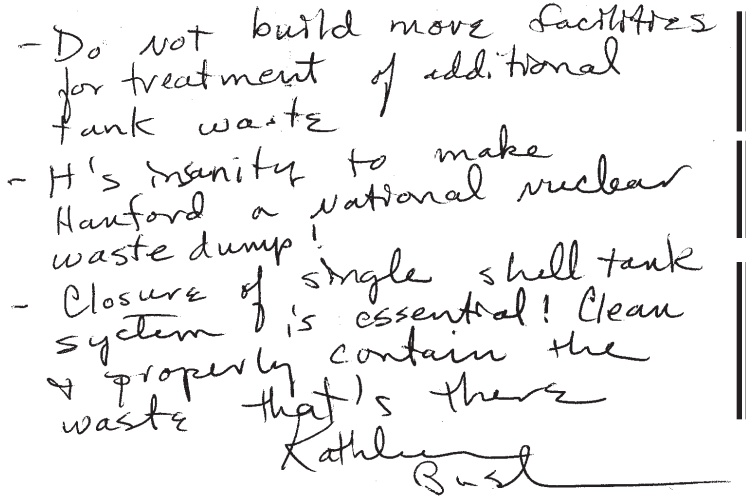
Commentor No. 206: Marshall Houston



206-1

206-1 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. 207: Kathleen Bushman



207-1

207-2

207-3

207-1 Construction of tank waste treatment facilities is beyond the scope of this *TC & WM EIS*.

207-2 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.

207-3 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 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. 208: Jean Poyer

TC&WM EIS Comment from 1-888-829-6347
10:49 a.m. 3/15/2010

"I hope it's alright to leave a comment on this line. My name is Jean Poyer. I'm calling from Cashmere, WA. And I – I support the Hanford Challenge folks. I – and just anything that the Department of Energy can do with this EIS statement we need our government to conduct a thorough, uh, effective, uh, clean-up at Hanford with environmental remediation actions just as soon as possible to protect our current and future generations. So again, this is just a comment, um, for Mary Beth Burandt on the Tank Closure and Waste Management at Hanford Nuclear Site. Thank you."

208-1

208-1 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. 209: Max Power, Chair, Oregon Hanford Cleanup Board

From: Carlson, Shelley [shelley.carlson@odoe.state.or.us]
Sent: Wednesday, March 17, 2010 1:17 PM
To: tc&wmeis@saic.com
Subject: Oregon Hanford Cleanup Board's comments on the TC&WM EIS.
Attachments: OHCB_TCWM-EIS_Comments_FINAL.pdf; Report_capping_final08.pdf

Please see the Oregon Hanford Cleanup Board's attached comments on the TC&WM EIS.

Sincerely,

Shelley Carlson
Hanford Cleanup/Emer. Planner
Oregon Department of Energy

625 Marion St SE
Salem, OR 97301

(xxx) xxx-xxxx direct
(xxx) xxx-xxxx cell
shelley.carlson@state.or.us
www.oregon.gov/ENERGY/

Response side of this page intentionally left blank.

Commentor No. 209 (cont'd): Max Power, Chair, Oregon Hanford Cleanup Board

OREGON HANFORD CLEANUP BOARD

March 17, 2010

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

Dear Ms. Burandt:

The Oregon Hanford Cleanup Board appreciates the opportunity to comment on the draft Tank Closure and Waste Management Environmental Impact Statement (TC&WM EIS).

This is a tremendously complex document that has important health and environmental implications for the future. We commend the U.S. Department of Energy (DOE) for providing a 140 day comment period to allow a thorough and considered review of this document. We also commend DOE for conducting four public hearings within the State of Oregon to take comment on this document. All four hearings had large turnouts, demonstrating the wide interest within Oregon in ensuring that the cleanup decisions DOE makes are protective both now and in the future.

The Cleanup Board endorses preliminary comments submitted by the Oregon Department of Energy on January 4, 2010, which proposed a new alternative be analyzed regarding Hanford's tank waste. We believe this is a reasonable new alternative and strongly encourage DOE to analyze this proposed alternative and publish a comparison of the results with its other alternatives. *209-1*

The Board takes note of DOE's own analysis in the draft TC&WM EIS showing that importation of offsite waste has seriously unacceptable impacts. The Cleanup Board therefore also endorses the request put forward by the Oregon Department of Energy that DOE amend its February 2000 Waste Management Record of Decision which designated Hanford as a disposal site for low-level and mixed low-level waste from throughout the DOE complex. *209-2*

Some alternatives within the draft TC&WM EIS include widespread capping of waste sites. We would like to call your attention to the Cleanup Board's "Position Paper on Capping Waste Sites located on *209-3*

phone 503.378.4040 800.221.8035 in Oregon fax 503.373.7806
625 Marion Street, N.E., Suite 1, Salem, Oregon 97301-3131
www.oregon.gov/ENERGY/NUCSAF/HCB/hwboard.shtml

209-1 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.

209-2 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.

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.

209-3 The scope of this *TC & WM EIS* includes decisions on storage, retrieval, treatment, and disposal of tank waste and closure of the SST system, including the tank system and the vadose zone impacted by the tank farms (i.e., past leaks). 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). DOE will consider all comments and recommendations carefully in reaching decisions about the proposed actions evaluated in this *TC & WM EIS*.

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,

Commentor No. 209 (cont'd): Max Power, Chair, Oregon Hanford Cleanup Board

the Hanford Nuclear Site," which we have included with this comment letter. This position paper clearly lays out the limited circumstances in which the Board believes capping is an acceptable remedy. We ask that DOE take these recommendations into consideration before it considers moving forward with actions that include capping of waste sites.

209-3 cont'd

We are deeply concerned by the potential future shown in the draft TC&WM EIS modeling analysis. That future is one of persistent and recurring contamination of the groundwater that was modeled at concentrations well above regulatory standards for thousands to tens of thousands of years. We believe this analysis demonstrates the need to address contaminants that are deposited in the vadose zone, and particularly those associated with tanks. We encourage DOE to dedicate additional funds towards developing new technologies to deal with wastes that have escaped from tank farms, including waste already in the deep vadose zone.

209-4

The EIS also clearly shows the need for technology development to permanently immobilize technetium. Technetium is one of the, if not the most, significant future risk drivers. The EIS indicates that current technologies to immobilize technetium have limited value and that the technetium will eventually leak from virtually all waste forms except glass or isolation in a deep, dry geologic repository.

209-5

We are disappointed that the draft TC&WM EIS does not provide a clearer picture of the cumulative risks at Hanford, or provide decision makers an ability to differentiate the incremental risk burden from various tank closure activities, waste sites, waste forms, and cleanup approaches. Without knowing these incremental impacts, decision makers are forced to prioritize cleanup actions without knowing whether the actions will have the most meaningful positive impact.

209-6

We support DOE's preferred alternative for the decommissioning of the Fast Flux Test Facility (FFTF). However, spending money at this time at FFTF is not a priority for the Board. We encourage you to move forward with a Record of Decision on FFTF, but then defer further decommissioning work for the indefinite future until other priorities have been dealt with.

209-7

Finally, this EIS is being conducted under the National Environmental Policy Act (NEPA). In 1969, Congress enacted NEPA in response to public concerns about the deteriorating quality of the environment and the inadequate consideration of environmental impacts from major federal projects. The intent of NEPA is to:

corrective action, and/or active remediation. For a more comprehensive discussion of remediation at Hanford, see Section 2.3 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.

209-4 As discussed in Appendix E, Section E.1.2.3.1.1, the Pretreatment Facility within the WTP was originally designed to remove technetium-99. Based on reviews of technetium-99 in ILAW glass, DOE and Ecology agreed to eliminate technetium-99 removal from the WTP permit. To date, the Pretreatment Facility is not being constructed to include a capability for removing technetium-99 from the LAW stream. This *TC & WM EIS*, however, assumes that technetium-99 removal could be completed in the existing Pretreatment Facility and analyzes it under Tank Closure Alternatives 2B and 3B. Design and construction modifications would be necessary to add the technetium-99 removal capability to the Pretreatment Facility, if required. As noted by the commentor, technetium-99 is a risk driver, which is one of the reasons for its removal from the ILAW; its immobilization in IHLW is analyzed under Tank Closure Alternatives 2B and 3C.

209-5 The incremental groundwater impacts and human health risks from the Tank Closure alternatives; FFTF Decommissioning alternatives; Waste Management alternatives; and other past, present, and reasonably foreseeable future actions are presented separately in Chapter 5 and Appendix U. Chapter 5 provides the impacts of each Tank Closure, FFTF Decommissioning, and Waste Management alternative; Section 5.4, the impacts of each of the three alternative combinations; and Appendix U, the impacts of the other past, present, and reasonably foreseeable future actions. Chapter 6 combines the impacts of the alternative combinations (Chapter 5, Section 5.4) with the impacts of other past, present, and reasonably foreseeable future actions (Appendix U) to derive cumulative impacts.

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. 209 (cont'd): Max Power, Chair, Oregon Hanford Cleanup Board

"...prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man...recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man ...without degradation, risk to health or safety, or other undesirable and unintended consequences.[1]"

209-7 cont'd

We strongly encourage DOE to keep these principles in mind as it moves forward with actions based on analysis within the TC&WM EIS.

Sincerely,

Max Power
Chair

[1] [1] NEPA Pub. L. 91-190 § 4321-4327, January 1, 1970 as amended.

As described 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. Because of the large number of sites evaluated, results were not presented separately for each of them. Additional sensitivity analyses in this EIS 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.

209-6 Comment noted.

209-7 DOE appreciates the commentor's recommendation and has made a good faith effort to follow NEPA and CEQ principles in its decisionmaking process. This is reflected by the scope of this EIS's analyses and DOE's efforts to obtain and consider the public's comments.

Commentor No. 210: David Waln

From: David Waln [dwaln@eoni.com]
Sent: Wednesday, March 17, 2010 3:19 PM
To: tc&wmeis@saic.com
Subject: Ethics of Nuclear Waste cleanup

Ethics is the weighing of the negative consequences our actions and our inactions. In the case of Nuclear Waste this is a calculation that could make the long term consequences of Slavery in America look like a brief interlude.

By not getting on top of all the waste streams of our Nuclear activities, past and present, we are irresponsibly gambling with the future.

Civilization has beneath its' veneer of human creations, the ultimate function of organizing a tribally adapted species into competitive - but unnaturally large-survival units. Because Empires and even Nation States do not come natural, they have also not proved very durable. During hard times they factionalize. *210-1*

We are at a pinnacle of sorts. The largest, most technologically advanced, most capable survival unit that good circumstances and fossil fuels could create out of a tribally adapted species.

We are also at a crossroads of sorts. Do we have the clarity of vision to see the magnitude of the responsibility we have to future generations to not leave a world with dangers that they may not have the political organization or resources to deal with.

Perspective and priorities are key to ethical decisions.

Sincerely,

David Waln
67322 Timberline Rd.
Summerville, OR 97876
xxx-xxx-xxxx

210-1 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. To that end, this *TC & WM EIS* analyzed the reasonably foreseeable direct, indirect, and cumulative impacts of the proposed actions, including potential short-term and long-term impacts.

Commentor No. 211: Carl Holder, Board Member, Eastern Washington Section of the American Nuclear Society

From: Carl Holder [holdercarl@hotmail.com]
Sent: Wednesday, March 17, 2010 7:02 PM
To: tc&wmeis@saic.com
Cc: thesecretary@hq.doe.gov; warren.miller@nuclear.energy.gov; mark.gilbertson@em.energy.gov; denise.freeman@hq.doe.gov; Doug Chapin
Subject: Merits of Deactivation - EWS American Nuclear Society
Attachments: 100317 Merits of Deactivation.pdf

TC&WM EIS Public Comment

Please find attached the Public Comment of the Board of Directors of the Eastern Washington Section of the American Nuclear Society.

Attached .pdf file.
100317 Merits of Deactivation

Best regards,

Carl Holder
Member of the Board of Directors

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Commentor No. 211 (cont'd): Carl Holder, Board Member, Eastern Washington Section of the American Nuclear Society

Public Comment: **Merits of NO ACTION** March 17, 2010

The Department of Energy proposes to decommission the deactivated Fast Flux Test Facility (FFTF) in Washington State.

Alternative #1 – **NO ACTION** would leave the facility in its current state of Deactivation - Cold-Standby.

As late as 2007, the Assistant Secretary for Nuclear Energy confirmed consideration of reactivation to support the Global Nuclear Energy Partnership (GNEP) and a study was completed to evaluate FFTF's physical and legal integrity. Subsequently, the nuclear infrastructure listed the FFTF as an available asset to support civilian nuclear R&D. GNEP was a Bush Administration initiative to recycle and burn spent nuclear fuel. $10s of millions were spent in competitive programs that defined processes and facility designs and reactor development.

Evaluation ceased when the GNEP initiative and the Environmental Impact Statement (GNEP EIS) were canceled. But the new Administration has picked up the ball.

Dr. John Holdren, Director of the Office of Science and Technology Policy, Executive Office of the President, wrote on March 5, 2010, *"The President directed the Secretary of Energy to establish a Blue Ribbon Commission on America's Nuclear Future. The Commission will conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle … The review will include an evaluation of advanced fuel-cycle technologies... The important work of the Commission is just getting underway."*

The FFTF is deactivated, but remains a fully licensed reactor with a 20-year full-power core-life remaining. Combined with the Fuels and Materials Examination Facility (FMEF), and the Maintenance and Storage Facility (MASF) a demonstration of the closed nuclear fuel cycle could not find a more perfect location.

The cost to continue Deactivation – NO ACTION – is only $1.2 million per year. This status has been supported by Washington Ecology and EPA having written, *"It is our view that FFTF work should proceeded only until it can be placed in a min-safe configuration...."* This is the current status – Deactivation, Surveillance and Maintenance.

The NO ACTION Alternative #1 continues the availability of the FFTF for the benefit of nuclear energy policymakers.

The Board of Directors of the Eastern Washington Section of the American Nuclear Society recommend – NO ACTION – Alternative #1 for FFTF Decommission (TC&WM EIS).

Public Comment: Open through Friday, March 19, 2010
TC&WMEIS@saic.com Fax 888-785-2865 – Voice mail 888-829-6347

Copy to:
The Secretary of Energy Steven Chu: thesecretary@hq.doe.gov
Assistant Secretary of Nuclear Energy: Warren.Miller@nuclear.energy.gov
Department of Environmental Management: Mark.Gilbertson@em.doe.gov
NEPA Hotline: denise.freeman@hq.doe.gov

EWS-ANS contact: Carl Holder holdercarl@hotmail.com

211-1

211-1 DOE has previously weighed FFTF's potential use in other applications but determined that no further uses should be pursued and shutdown of the facility is appropriate. 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. DOE has identified the need to determine an appropriate end state for FFTF; that is the scope of analysis regarding FFTF in this *TC & WM EIS*. Decisions regarding proposed future uses of FFTF, the Fuels and Materials Examination Facility, and the Maintenance and Storage Facility are beyond the scope of this EIS.

Commentor No. 212: Don Meyers

From: Bogeyandbobby@aol.com
Sent: Wednesday, March 17, 2010 10:50 PM
To: tc&wmeis@saic.com
Subject: D.Meyers' Comments on Draft TC&WM EIS

DOE, TC & WM EIS, My comments are being provided by Email and regular mail to make sure you receive them. I have commented on Hanford's Waste Cleanup effort over the years, mainly to optimize the effort applying lessons learned to revisiting the strict requirements of the Tri Party Agreement. The optimization might have already saved much money and time. It can surely be applied now as problems are encountered and as DOE supports preserving the Hanford history to tell its roll in the Plutonium production part of the Manhattan Project. Sorry the following is lengthy but hopefully some applicable to the waste cleanup and closure EIS.

Thank you, Don Meyers (also signed off at end)

March 17, 2010
TO: DOE, TC & WM EIS, Waste Cleanup and Closure
FROM: Don Meyers, Hanford Retiree
SUBJECT: **D. Meyers' Comments on Draft TC & WM EIS, Waste Cleanup and Closure**

DOE, TC & WM EIS,

I am providing my comments on the Cleanup and Closure of Hanford waste storage facilities, including: 1) underground storage tanks, single shell tanks; 2) the FFTF Reactor & auxiliary facilities; and 3) the ongoing and expanded management efforts to dispose of Hanford's waste and waste from offsite. Efforts to complete Hanford Cleanup should be optimized continually, and with preservation of Hanford's History relative to the Manhattan Project. My comments are in the form of excerpts from past suggestions to **optimize the Waste Cleanup effort**, which were transmitted to representatives of Hanford Contractors, State and Federal DOE, State Politics, and the Hanford Advisory Board (all stakeholders).

212-1

My 23 years experience at Hanford never directly involved production facilities, only FFTF (18 years fuel exam and handling), BWIP till stopped, Tank Waste Retrieval, and Solid Waste Nuclear Safety.

The optimization of Waste Cleanup would consider alternate approaches to utilize existing facilities and storage areas as in-place disposal sites, thereby generating more **"Cleanup Monuments" and saving much time and cost.** The DOE funding saved can fund the maintenance and operation of the Monuments. The Monuments will show and describe the history of Hanford's plutonium

212-1 The creation of national monuments, parks, or other tourist attractions for such purposes is not within the scope of this EIS. 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. DOE does not consider the use of onsite waste disposal areas and facilities as public attractions to be reasonable alternatives due to the radiological and unique chemical hazards associated with these facilities, the age of the buildings, and the lack of financial sponsors.

Commentor No. 212 (cont'd): Don Meyers

production effort to the very interested public and tourists -- already apparent with Hanford Site and B Reactor Museum tours.

My past comments suggested consideration of Alternate Approaches to achieve the following:

1) Use lessons learned about characteristics of waste removed from original storage/disposal locations;
2) Leave as much radioactive waste in original locations as safely possible;
3) Isolate safe waste monuments from the Public on clean Hanford roads and grounds;
4) Let tourists visit the safely fenced monuments to hear verbal descriptions of how each contributed to the plutonium production effort;
5) Support B Reactor Museum and other "saved facilities" as Monuments to preserve Hanford's history and possible establishment as a National Nuclear Park;
6) Save considerable time of high risk waste cleanup to assure the safety of groundwater, Columbia River, and the public in the Columbia River Corridor; and
7) Save millions of DOE dollars that can be used to maintain/operate the Hanford Site and Monuments for tourists to learn of its Manhattan Project History.

212-1 cont'd

These suggested Alternate Approach features and achievements **have been rejected by most recipients**, based on "must exactly meet" TPA requirements.

My more detailed comments on Waste Tank Closure are as follows:

This is one of several of my past Emails that covers my concerns.

Subj: Comments to Chris Smith's Request for Public Comments
Date: 3/3/03 10:30:37 PM Pacific Standard Time
From: Bogeyandbobby@aol.com
To: jodi.giles@co.benton.wa.us, jroberson@doehq.gov, JeffMarkey@mail.house.gov, senator_murray@murray.senate.gov, emailago@atg.wa.gov, Secretary@hq.doe.gov, Rost461@ecy.wa.gov, Jennifer_L_Sands@rl.gov, governor.locke@wa.gov, pmabie@enviroissues.cp, Hanford_Advisory_Board@rl.gov, Richard_A_Holten@RL.gov, GRogers522, Julie_A_Goeckner@rl.gov, DavidM4@atg.wa.gov, Bryan_L_Foley@rl.gov, gwen@crehst.org, hale_pa@leg.wa.gov, longterm_stewardship[@rl.gov, holdercarl@hotmail.com

CC: Bogeyandbobby

To Distribution,

My following comments to Chris Smith on "Changes to Cleanup Decisions on the Columbia River Corridor" are transmitted to you Representatives

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Commentor No. 212 (cont'd): Don Meyers

of the Hanford Cleanup Effort for your consideration and information. I strongly believe there are some very good overall ideas for Hanford Site restoration in my comments. They are based on my strong interest in this latest "Changes to Cleanup Decisions", and my past Email transmittals to you that suggested an Alternate Approach be considered. That Approach would expedite cleanup of River Corridor to minimize risk of contamination of the groundwater or the Columbia River.

Chris Smith,

Sorry for the overall lenghthy nate=ure of my comments, gur I have been very interested in the total Hanford Cleanup for the last 15 years or so!

In response to the DOE/ROO request for Public Comment on "Changes to Cleanup Decisions on the Columbia River Corridor", my enthusiasm for this approach is apparent from my comments as below. The Tri Party Agencies have taken a big step toward a more realistic cleanup approach (i.e. level of risk vs: extent of effort).

The proposed "significant change to the scope, schedule or cost of cleanup" appears to be a genuine effort to revisit applicable Regulatory Requirements now specified in the Tri Party Agreement. For now, this only applies to the extent of cleaning up the 100-N Area land, and with the added proposal that all future irrigation of that land be prohibited. It follows that any other reactor/ processing site cleanup efforts that pose an "extensive effort with no additional protection to the Groundwater or the Columbia River" (or Public or Environment) would also justify revisiting appropriate Regulatory Requirements. Any other extensive cleanup efforts with no additional protection to the Columbia River, Public or Environment would also justify the same consideration.

In the past, I have often proposed that DOE, Hanford Contractors, Wash. State Ecology, Tribes and Stakeholders revisit the Nuclear Regulatory Requirements for Environmental Cleanup as applicable to the Hanford Site. The purpose being to finalize cleanup of Hanford Land, not to "Original Condition"(for unlimited Public use) as stated in the Tri Party Agreement, but to perform the Cleanup to extent there is no realistic hazard to our water, the public and the environment. The remaining "No Risk Contamination" would be disposed of in-place and isolated from the Public as fenced-in sites. All Fenced Cleanup Sites would be included as Monuments in a proposed "Hanford Nuclear National Park", which would also include the Hanford Reach Monument, B Reactor Museum, CREHST, and FFTF (either operational or cleaned up). The remaining part of Hanford land would be available for Public uses either irrigated or not as determined by Tri Party Agencies. This approach would optimize the Vitrification Plant facility scope and processing effort to only that for readily retrievable, high risk waste. Overall, this would result in

212-1 cont'd

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Commentor No. 212 (cont'd): Don Meyers

very significant savings in Time, Risk and Cost to the United States Government! This savings would be realized many times based our large number of national cleanup sites.

It seems we will bankrupt our country in trying to cleanup Hanford, then repeat the process at all other national and commercial reactor cleanup sites in the same costly manner! All stakeholders should be most interested in spending otherwise wasted cleanup funds on important national issues regarding our citizens needs. As Cleanup progresses, it is obvious that removing all waste from tanks, basins, burial grounds and structures is no longer feasible. We must review the in-storage waste forms as they now exist, then be sure the Tri Party Agreement and Nuclear Regulatory Requirements still apply for safe storage and removal. Also:

1. How realistic are the risks to the environment, river corridor and the public in its present state?

2. How difficult is removal of all non-pumpable waste from each tank with the existing physical and radiological properties?

3. How feasible to leave waste in-situ in some existing storage/disposal sites?

4. What words of the TPA and/or Regulatory Reqmts need to be re-interpreted or changed to ensure low risk, timely and cost effective cleanup?

212-1 cont'd

My views on overall Hanford Site Preservation cover environmentally safe cleanup, historical preservation and future utilization of land and facilities. That proposed approach is to ensure cost effective efforts on FFTF, Hanford Cleanup and Hanford Museums/National Parks. My general comments above are based on the following information – hopefully to be read and taken into consideration for this current "Changes" effort. This proposed Hanford Nuclear National Park approach applies to the Overall Hanford Cleanup and "Long Term Stewardship Program"

D. MEYERS' COMMENTS ON LONG TERM STEWARDSHIP PROGRAM

Great title for effort to ensure Hanford's facilities are demolished, secured and further utilized while preserving the overall Atomic History of Hanford! This being accomplished without endangering our water, the public and the environment, while fully utilizing existing facilities to benefit the Tri City Area, Washington State, and our National Government. My comments on the 3 points of Approach for Long Term Stewardship are addressed as follows:

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Commentor No. 212 (cont'd): Don Meyers

1. Management of Leftover Contamination

A. Concentrate cleanup effort and funding completely on the River Protection Part of Hanford Cleanup. Do it RIGHT NOW! -- at considerably lower total cost, elapsed time, and risk to the Public and Environment. Could probably complete for only $5 to 10 BILLION and in 5 to 10 YEARS!! --- Let development of the Vitrification Plant be a parallel effort -- **Vit Plant problems must not delay the River Protection part of Hanford Cleanup!!**

B. Ensure all Radioactive Waste is DRIED UP

1. Forget about total clean out of tank waste -- remove liquid slurry and leave solids.

2. Stir tank liquid/sludge waste into slurry in a safe manner using proven, standard, existing equipment/procedures

3. Pump tank slurry to Evaporator and process, dry out remaining sludge/mud and leave in tank

4. Stir, transfer and process basin liquid/sludge, in proven manner similar to tank waste in (2) above

5. Dryout basin sludge/mud/trash items and leave in basin -- cover to confine contamination

6. Remove liquid waste from cribs/other holding areas in manner similar to tanks/ basins.

7. Dispose of Hanford Site contaminated structural and equipment items by placing in dried-out waste tanks, basins and old process buildings (canyons, reactors), while filling voids with contaminated soil, etc.

C. Remove High Level Radioactive PU/TRU waste (e.g. fissile and irradiated component) from old process buildings and basins, and transfer into surface fuel storage/disposal using safe, reliable and proven transfer/handling methods. For insignificant amounts of High Level PU/TRU, dry out and leave/dispose of in-place within secured/covered facilities.

D. Keep Low Level Radioactive PU/TRU in existing containers and storage in Hanford facilities until transfer to Permanent Nevada Disposal Facilities.

E. Leave Low Risk Radioactive/Hazardous waste in storage and disposal structures intact to maximum extent possible, and fill structures with other dry waste like contaminated soil, equipment and materials. Seal/cover the filled structures and facilities for permanent in-place disposal of these waste.

212-1 cont'd

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Commentor No. 212 (cont'd): Don Meyers

F. Permanently cover/enclose the filled tanks, basins and buildings so rainwater can't contact contamination and leach to the groundwater or the Columbia River.

2. Protection of the Hanford Site's Cultural, Biological and Natural Resources

A. Cleanup Monuments

1. Install security fences around permanent cleaned-up waste

Areas and building sites to isolate from Public.

2. Declare each fenced-in site a FEDERAL MONUMENT (like B-Reactor Museum).

3. Each fenced site would have Tourist actuated audio stations providing description and history of that particular site -- all sites combined would

help tell the Hanford Production Story!

4. The cleaned-up Hanford Site would contain clean public roads and mostly usable lands, with Cleanup Monuments fenced in.

5. The cleaned-up site Custodian would ensure that in future, if any existing radioactive contamination gets into the groundwater and Columbia River, that it proceeds only at diminishing and acceptable rates.

B. B Reactor Museum

This Museum has already proved itself invaluable for tourist understanding about the Hanford Production Reactor's operation. Historical remains are preserved to display various aspects of the reactor's operation and production of the Plutonium. Excellent verbal descriptions are provided on walk-thru tours.

C. Hanford Reach National Monument

This unique part of the Hanford Site has preserved the original condition of the Hanford town, Columbia River and surrounding areas. It is apparent there are little adverse affects on the vegetation and wildlife activity on this reservation-type area.

D. CREHST (Columbia River Exhibition of History, Science & Technology)

This special museum houses the overall history of the Hanford Atomic activities, with remnants, photos, stories and documented articles to show, display and tell the detailed history of personnel, facilities and way of life at Hanford and communities.

E. FFTF (Fast Flux Test Facility)

The FFTF Project was successful from the first proposals thru design, research & development, construction, plant acceptance testing and initial operation. This facility has been self sustaining as evidenced by its good operating record over

212-1 cont'd

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Commentor No. 212 (cont'd): Don Meyers

the past 20 years of operation. That was possible by performing its own remote maintenance on radioactive equipment utilizing the remote capability of the Interim Examination & Maintenance Cell.

The "fast reactor" (fast neutrons greatly shorten irradiation time) lets materials be irradiated faster to predict long term radiation affects for future materials and energy development. In the same fast reactor environment, FFTF can quickly produce radio-isotopes which are required for medical applications including early detection, treatment and cure of cancer patients. The FFTF has already provided materials research to expedite improvement of reactor plants around the world. The "new generation" of nuclear reactors being considered will require the advanced testing capability of the FFTF.

3. Reuse of the Hanford Site's Assets

It is apparent that combining the B Reactor Museum, CREHST, and Hanford Reach National Monument efforts, with the upcoming "Hanford Cleanup Monuments" into one overall Hanford Nuclear National Park could result in great savings. Presently our Hanford Site Projects continue to compete for DOE funding and priority which results in increased time, cost and risk.

The total Cleaned-Up Hanford Site would consist of the Cleanup Monuments, with clean roads and lands accessible to the Public. The Cleanup Monuments, B Reactor Museum, CREHST, the Hanford Reach and the FFTF could combine to make up the Hanford Nuclear National Park with all historical aspects preserved. That history would span from initial Hanford construction days to present energy and medical research capability provided by the FFTF Fast Breeder Research Facility. Tourists could visit all these Monuments and Museums to view and hear the overall Hanford Atomic History.

It was bad enough to lose our Hanford Nuclear Power Park when the successful Fast Breeder Reactor Program was terminated in the 1980's. That started with cancellation of the Clinch River Breeder Reactor Plant, then the planned Full Scale Demonstration plants in New England states and our four Fast Breeder Power Production Plants here at Hanford. We could have furnished electrical power to whole Pacific Northwest – possibly even the West Coast! For just bringing Enriched Uranium into the Nuclear Power Park, recycling the spent fast breeder fuel, and processing the radioactive waste (all within the Power Park site!) and sending clean electrical power out of the Park. A series of about 5 or 6 Nuclear Parks across the U.S. could have provided most of our national electrical energy needs – without depending on foreign supplies!

212-1 cont'd

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Commentor No. 212 (cont'd): Don Meyers

Let's not lose this chance for an Economical Hanford Cleanup and National Monument to preserve the atomic age history at Hanford for our Nation.

Nuclear Energy is good – we just need to deal realistically with processing the radioactive waste products. We can take pride in displaying such a successful and high quality facility as the FFTF, and still use it as an important medical, materials, and energy research tool!

Thank you for considering my comments on Cleanup and Closure of Hanford's waste storage facilities . I hope they may help in future discussions to evaluate the decision with long term stewardship and national recognition in mind. The B Reactor Museum may get national Historical National Park status in near future. If so, that can grow to take in the other Monuments to tell the whole story of the Hanford Site history! That could become a real asset to our communities and the whole Columbia Basin Region.

212-1 cont'd

In my interest for our Hanford Site History,

Don Meyers Ph. xxx-xxx-xxxx
1807 W.8th Place
Kennewick, WA 99336

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Commentor No. 213: Ken Dobbin

United States Department of Energy March 17, 2010

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

Subject: Comments on the Draft TC & WM EIS

To Whom It May Concern:

As the preferred alternative to the decommissioning the Fast Flux Test Facility (FFTF), please select the no action alternative in order to maintain the current deactivation status of the FFTF to assure future proper disposal of Hanford's tank waste. For the purposes of this EIS, it is important to leave this facility as it is until a record of decision is made on the nuclear reactor spent fuel recycle program which dramatically impacts the ultimate disposition of Hanford's tank waste, as explained below. To demolish this facility would remove one of the options for the future decision path, to the detriment of the environment. *213-1*

Tank waste disposal involves vitrification and disposal at a Yucca Mountain type repository. This glassified waste from Hanford competes with spent fuel from more than 100 nuclear reactors that have already created sufficient spent fuel to nearly fill a repository the size of the one planned for Yucca Mountain. These reactors are currently creating, and will continue to create more of this waste as Hanford's vitrification plant goes on line. There will simply be no place to ship the Hanford waste whether the United States Department of Energy (US DOE) completes the Yucca Mountain facility or another like it under the current policy of sending spent reactor fuel to a repository without processing. This EIS should not predetermine the environmental or economic viability of providing separate repositories for these waste streams. Future options should not be precluded. *213-2*

There would be sufficient room in a reasonably-sized repository to store both Hanford's glassified waste as well as spent fuel from nuclear power reactors if the spent fuel was recycled. The volume, toxicity, and required time for the waste to be isolated from the environment would all be reduced by recycling the fuel. In order to accomplish this task, facilities are required to create actinide fuel assemblies, test them in a reactor environment having the correct neutron flux, fluence, and temperatures, and then examine the irradiated assemblies. Hanford's FFTF and Fuels and Materials Examination Facility (FMEF) in the 400 Area are facilities designed to do that and must be maintained in their current status until a record of decision is made regarding spent fuel recycle and its ultimate disposal with respect to geologic storage requirements. *213-1 cont'd*

These 400 Area facilities are keys to implement nuclear fuel recycle. These facilities can provide the required testing of fast reactor actinide fuel recycle to provide for nuclear safety development and licensing purposes. Nuclear fuel recycle involves reuse of the actinide elements in fast reactor fuel and the transmutation of the long-lived fission products such as Tc and I in either fast or thermal reactors. Actinide fuel elements burn up well fast reactors, but not in light water reactors. Fast reactors have a neutron spectrum where the capture-to-fission ratios of actinide elements cause more actinides to fission than get captured, thus burning up the actinide elements. In a thermal reactor, on the other hand, more captures take place in the actinide

213-1 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. The scope of this *TC & WM EIS* is to address the final decommissioning of FFTF. As discussed in Chapter 1, Section 1.4.2, Decisions Not to Be Made, DOE is not considering restarting FFTF. Decisions regarding the status and disposition of the Fuels and Materials Examination Facility, which, although constructed to be a support building for FFTF, was never used in a nuclear capacity, are beyond the scope of this *TC & WM EIS*.

213-2 This *TC & WM EIS* analyzes storage of the IHLW canisters generated from treating the waste from the SSTs and DSTs at Hanford; however, the ultimate disposition of the IHLW canisters is outside the scope of this 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. 213 (cont'd): Ken Dobbin

elements creating more actinide elements. Actinide fuel use in fast reactors requires extensive testing to provide the US DOE and Nuclear Regulatory Commission (NRC) information vital to safety characteristics, important for licensing.

FFTF was built for the required testing. It accommodates a core large enough to obtain the right temperature/neutron flux/neutron fluences to simulate a large power plant's fuel characteristics. The FFTF has been placed into a safe minimum maintenance mode with its fuel and sodium coolant removed. Starting at its current state, it could be resurrected quicker, at less cost, and less impact to the environment than reconstructing the facilities somewhere else. Also located adjacent to the FFTF, the FMEF is a large hot cell facility that was constructed to fabricate fuel elements for the FFTF and examine irradiated fuel elements from that reactor. It is nearly a complete hot cell with only the windows and manipulators to install when construction was halted.

Future consideration for disposal of Hanford's vitrified tank waste shall involve a repository which would most expeditiously include waste from nuclear power plants. The characteristics of that repository will depend upon the radiological status of the waste. If a future record of decision finds beneficial use for spent fuel recycle, then it is important not to preclude environmentally sound options. The Fast Flux Test Facility and the Fuels and Materials Examination Facility (FMEF), located in the 400 Area on the Hanford Site near Richland Washington, need to be maintained without further degradation so as not to preclude one environmentally sound option.

213-1 cont'd

Sincerely,

Ken Dobbin

Ken Dobbin, nuclear engineer

5303 Blue Heron, West Richland, WA 99353

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Commentor No. 214: Stuart Buchan

From: stubuchan@comcast.net
Sent: Thursday, March 18, 2010 12:01 PM
To: tc&wmeis@saic.com
Subject: Hanford Tank Closure and Waste Management Environmental Impact Statement

To Whom it may concern,

I am a WA Bellevue resident and have lived here over 30 years. I have great concern for the future of the Hanford site and its nuclear waste impact on the Columbia river and detrimental affects to the local environment for generations to come. I have attended the USDOE public hearings and submit my comments in this email to your organization for consideration in the public comment period through March 19th, 2010 of the subject above.

The following points must be considered in the future plans of this site:

1. It is well known that the site is currently contaminated from the failures in the single shell tanks and the waste leakage has already reached the river and will continue to get worse. *214-1*

2. The attempts to clean up this site have been delayed far too long and substantial damage has already been done to the environment. The current plans for clean up are less than required to arrest the problem *214-2*

3. The USDOE waste treatment proposed project schedule has been deferred substantially decades more with attendant cost overruns and no future funding source guarantees for completion, so there is no expectation that the government can complete this project successfully *214-3*

4. The USDOE plans to make this site a national radioactive dumping ground, adding to the mess already in existence. Given the foregoing problems, it is unconscionable that the USDOE would plan to make this site a national dumping ground. *214-4*

5. The EIS has well underestimated the situation and it is flawed *214-2 cont'd*

Suggestions with urgent priority:

1. Drop all consideration of using the Hanford site as a National radioactive waste dump (this should be the top priority to not allow further damage) *214-4 cont'd*

2. Focus all efforts on conducting a "clean closure" program on what exists at the site today and arrest further spreading of the contamination, which entails finding alternate ways of moving the wastes to repositories that will not contaminate groundwater or the rivers. *214-5*

214-1 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 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.

214-2 Although some contamination has reached Hanford's groundwater, efforts are ongoing to prevent existing plumes from reaching the Columbia River. For example, groundwater pump-and-treat systems are currently in place or under construction, and temporary caps are being placed on the tank farms as part of RCRA corrective action. These and other short-term cleanup measures are being conducted while longer-term cleanup decisions are being addressed. The analyses presented in this *TC & WM EIS* will aid DOE in making these longer-term decisions regarding the treatment and disposal of tank waste and the closure of the SST farms (by landfill closure, selective clean closure, or clean closure). The EIS analyses are also intended to aid DOE in making decisions regarding cleanup of contamination from past leaks, including remediation of the contamination in the vadose zone. Because uncertainties are associated with implementing the proposed actions described in this EIS, the analyses presented therein were based on conservative assumptions that tend to overestimate potential environmental impacts. These uncertainties are summarized in Chapter 2, Section 2.7.4; more-detailed discussions are provided in Chapters 4 and 5 and associated appendices.

214-3 Hanford cleanup is governed by the 1989 TPA, a legal agreement signed by DOE, Ecology, and EPA (parties). According to the TPA, DOE was years behind schedule for pumping radioactive waste out of the storage tanks and for startup of the vitrification plant (the WTP). In late 2008, the State of Washington sued DOE to enforce deadlines for Hanford's cleanup. In October 2010, the parties reached a settlement, resulting in a Consent Decree (*State of Washington v. Chu*, Civil No. 2:08-cv-05085-FVS, October 25, 2010). The settlement imposed a new, enforceable, and achievable schedule for cleaning up waste from Hanford's underground tanks and notification requirements.

Commentor No. 214 (cont'd): Stuart Buchan

3. Dismantle the FFTF reactor entirely *214-6*

sincerely,

Stuart Buchan
16800 S E 29th St
Bellevue WA 98008 tel xxx-xxx-xxxx

214-4 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.

214-5 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 SSTs. Tank Closure Alternatives 6A and 6B assumed that the materials removed during clean closure activities would be managed as HLW, as appropriate, and stored on site pending disposition.

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 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.

214-6 Regarding the complete dismantlement of FFTF, 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.

Commentor No. 215: Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

From: Niles, Ken [ken.niles@odoe.state.or.us]
Sent: Thursday, March 18, 2010 12:42 PM
To: TC&WMEIS@saic.com
Cc: Burandt, Mary Beth
Subject: Oregon Comments on the Draft TC&WM EIS
Attachments: Oregon-TC&WM_EIS_Final_Comments.pdf

Attached are the State of Oregon's comments on the draft Tank Closure and Waste Management EIS. Please acknowledge receipt of our comments.

Ken Niles

Nuclear Safety Division Administrator
Oregon Department of Energy
625 Marion Street NE
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xxx-xxx-xxxx
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ken.niles@state.or.us

Response side of this page intentionally left blank.

Commentor No. 215 (cont'd): Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

Oregon
Theodore R. Kulongoski, Governor

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March 18, 2010

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

Dear Ms. Burandt:

Thank you for the opportunity to provide comments on the draft Hanford Tank Closure and Waste Management Environmental Impact Statement (TC&WM EIS). The Oregon Department of Energy previously submitted preliminary comments on January 4, 2010[1]. These comments should be considered as a supplement to those earlier comments.

Oregon appreciates the fact that the U.S. Department of Energy (DOE) provided a 140 day comment period for this document. It is an incredibly complex document and the additional review time was necessary in order to complete at least a somewhat thorough review of the draft EIS. DOE served the public well by not unnecessarily rushing the public's review of this document. Please note that a lack of a comment by Oregon regarding any portion of the EIS should not be read as concurrence; rather it reflects the lack of time and resources to fully consider every element in detail.

Oregon has extensive comments which follow. However, the fundamental conclusion from our review is that serious flaws within this document require that DOE issue a new draft for review and comment before it moves to a final EIS. Oregon expects to continue a dialogue with DOE as it responds to and incorporates the comments received. *215-1*

We recognize that the draft TC&WM EIS analyzes a series of potential actions, many of which are integral to the cleanup of the site and which are governed by state and federal agencies enforcing environmental laws. The full investigation, analysis and decisions on these actions will be made by the regulatory agencies, the Washington State Department of Ecology and the U.S. Environmental Protection Agency, and not by DOE as a result of this draft TC&WM EIS. This EIS should support, rather than supplant, their analyses and decisions. *215-2*

[1] Oregon Department of Energy letter to Mary Beth Burandt, Document Manager, DOE, January 4, 2010.

pg. 1

215-1 DOE has satisfied NEPA requirements by responding to public comments on the draft EIS in this CRD and by making changes to the draft EIS where appropriate and necessary. Subsequent to the issuance of the *Draft TC & WM EIS*, DOE prepared an SA to analyze 14 topics it identified where it is unclear whether updated, modified, or expanded information warrants preparation of a supplemental or new draft EIS. 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* is not required. See Chapter 1, Section 1.8.2, for more information. Early stakeholder participation in the *TC & WM EIS* planning and development process is important to DOE, which has provided numerous opportunities for such interaction. For example, the Oregon Hanford Cleanup Board and other key stakeholders have provided extensive input to the *TC & WM EIS* development process and analyses. Chapter 8 of this *TC & WM EIS* identifies the process for these interactions and includes a description of the outcomes of such stakeholder meetings.

215-2 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. 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. In Sections 8.1.7 and 8.3, DOE identifies the

Commentor No. 215 (cont'd): Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

❒ **Conformance with the National Environmental Policy Act (NEPA)**

This draft TC&WM EIS must show that future actions will conform to the policy and specific directions provided by NEPA. NEPA requirements are to:

> *"…prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man…recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man …without degradation, risk to health or safety, or other undesirable and unintended consequences; The Congress authorizes and directs that, to the fullest extent possible: (1) the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this Act, and (2) all agencies of the Federal Government shall….insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision-making along with economic and technical considerations.[2]"*

215-3

In its current form and with its current alternatives, actions proposed within the draft TC&WM EIS do not meet NEPA requirements. None of the proposed actions, if implemented, would prevent or eliminate damage to the environment. Instead these actions result in on-going injury to the environment for more than 30,000 years[3].

The proposed actions in the draft EIS do not restore the environment. The proposed actions in the draft EIS do not prevent degradation or risk to health and safety or other undesirable consequences. Instead the draft EIS looks at a narrow range of alternatives, all of which result in increased damage to the environment and risk to human health. Additionally, the draft EIS does not give appropriate consideration to environmental amenities and values alongside economic and technical considerations as required by NEPA.

Under both NEPA and the Council on Environmental Quality Regulations implementing NEPA, mitigation actions are required. The draft TC&WM EIS details a series of potential mitigation actions in section 7.1. The proposed actions are, for the most part, proposed ways to lessen the impacts of the proposed actions, and do not constitute actual mitigation of the impacts. Moreover, DOE does not commit to these actions.

215-4

❒ **Tank closure alternatives**

DOE analyzed 11 different alternatives related to the storage, retrieval, treatment and disposal of Hanford's tank wastes, along with closure of the tank farms.

215-5

The Oregon Department of Energy reviewed each of the 11 alternatives against the following criteria:

[2] NEPA Pub. L. 91-190 § 4321-4327, January 1, 1970 as amended.
[3] Figure U-2 and Tables U-2, U-5, U-6, U-7, U-9 and others.

pg. 2

215-3

consultations and coordination that DOE has undertaken with American Indian tribes and would need to continue for the purpose of implementing the proposed actions and alternatives. In addition, 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 Alternative for waste management in this *TC & WM EIS* may not be the most environmentally preferred alternative, 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 include additional opportunities for public comment.

This EIS addresses many environmental amenities and values, including American Indian cultural and religious values, aesthetics, visual resources, noise, land use, and ecological resources, among others.

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.

Commentor No. 215 (cont'd): Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

- Long-term protectiveness of the Columbia River, primarily associated with preventing additional migration of contaminants into Hanford's groundwater
- Compliance with the Tri-Party Agreement; meeting schedules for waste treatment and requirements for quality of the final waste form
- Permanence of the actions (for example, durability of the waste form so as to prevent future releases)
- Minimizing natural resource injury liability
- Protectiveness of human health and the environment

We believe these criteria meet the purpose and need of the draft TC&WM EIS, which as stated on page S-9 includes "…treat the waste and close the (single-shell tank) system in a manner that complies with Federal and applicable Washington State laws and DOE directives to protect human health and the environment. Long-term actions are required to permanently reduce the risk to human health and the environment posed by waste in the (Hanford tanks)."

We found that perhaps only one of the Tank Closure alternatives satisfied all of these criteria, while many failed to satisfy most or all of the criteria. The 11 alternatives lack the necessary actions to ensure that, to the maximum extent possible, soil and groundwater will not be further contaminated by the actions proposed; that the risk to the environment and human health will not increase in the future; and that existing contamination will be remediated to ensure protectiveness of human health and the environment. The biggest failing was that few of the alternatives took measures to retrieve existing waste from the soil, which the draft EIS clearly indicates causes some of the most significant long-term impacts[4].

215-5 cont'd

Oregon's Proposed Alternative 7 (Alternative 7) is a reasonable new alternative[5]. We believe it would better meet the purpose and need of the TC&WM EIS. It focuses on compliance with applicable state and federal laws, while proposing actions to reduce the risk to human health and the environment. It largely selects elements already analyzed (as shown in Table S-1 on Page S-27) within the draft TC&WM EIS, however Alternative 7 bundles these elements together in a new way that offers a reasonable alternative to the 11 alternatives which have already been analyzed.

Alternative 7 is environmentally preferable, especially with respect to the criteria listed above in that:

> Tank Waste Storage – Alternative 7 would include construction of New Waste Receiver Facility tanks to help ease retrieval operations and necessary waste transfers.

[4] As one example, Figure 2-83 on Page 2-217.
[5] "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate." Resources Ltd. v. Robertson, 35 F.3d 1300, 1307 (9th Cir.1993) (quoting Idaho Conservation League v. Mumma, 956 F.2d 1508, 1519 (9th Cir.1992)).

pg. 3

215-4 DOE disagrees that mitigation has been inadequately discussed in this *TC & WM EIS*. 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. The discussion presented in this EIS identified potential mitigation measures that could be applied; specific mitigation measures would be selected based on the course of action chosen by DOE as identified in the ROD. 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 (10 CFR 1021.331).

215-5 Regarding the adequacy of the Tank Closure alternatives analyzed in the *Draft TC & WM EIS* and the suggestion that the proposal put forth by the Oregon Department of Energy be evaluated as a distinct alternative in this EIS, DOE has determined that implementation of such an alternative would be technically infeasible as defined. Accordingly, the Oregon proposal cannot be considered a reasonable alternative and was not analyzed in detail in this *TC & WM EIS*. For a more comprehensive discussion of this issue, see Section 2.6 of this CRD.

Commentor No. 215 (cont'd): Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

This would result in less long-term reliance on the integrity of the aging single-shell tanks.

Tank Waste Retrieval – Alternative 7 would include removal of a *minimum* 99 percent of the waste from each of the tanks. Additional retrieval would be determined on a tank-by-tank basis, based upon the remaining radioactivity and composition of the waste, and whether the tank itself would need to be removed to access contaminated soil beneath the tank. The EIS analysis clearly indicates that as more waste is removed from the tanks, future impacts will be less severe[6].

Tank Waste Treatment – Alternative 7 includes constructing and operating Hanford's Waste Treatment Plant (WTP) as currently configured (two high-level waste melters and two low-activity waste [LAW] melters). We propose to supplement the existing WTP by expanding LAW vitrification capacity to the extent necessary with the goal of completing vitrification by 2040. We reject supplemental technologies such as bulk vitrification, cast stone or steam reforming, which the draft EIS demonstrates are poor choices as supplemental waste forms[7]. We also advocate studying additional pre-treatment options like fractional crystallization or the removal of sodium and technetium from the waste stream to reduce the volume of glass produced and make the process more efficient and effective in achieving permanent immobilization of waste.

Tank Farm Closure – Alternative 7 advocates retrieving high concentrations of contaminants that exist in the soil within and beneath Hanford's tank farms. The analysis already demonstrates that these past releases and leaks contribute significantly to the long-term impacts to the groundwater. Tanks which have not leaked and are not blocking access to contaminant retrieval would likely not need to be exhumed.

Tank Farm Cribs and Trenches Closure – As with past tank releases and leaks, Alternative 7 proposes a similar action for nearby cribs and trenches – retrieving high concentrations of contaminants that exist in the soil. This applies not just to the limited suite of cribs and trenches considered in the EIS, but to all similar locations posing a threat to groundwater, the environment or human health.

NEPA requires that environmental impact statements present all reasonable alternatives and disclose and consider the impacts of all related pending federal agency proposals for action, including cumulative impacts. We believe that Alternative 7 is a reasonable alternative, and therefore DOE should "rigorously explore and objectively evaluate" this alternative[8]. In addition to Oregon's proposed alternative, a new array of reasonable alternatives is needed. These alternatives should provide decision makers with an objective basis for comparison of the benefits and impacts of potential decisions, and should meet the full intent of NEPA.

215-5 cont'd

[6] Page S-88, Figure S-14.
[7] Page S-91, Figure S-15.
[8] 40 C.F.R. § 1502.14(a).

pg. 4

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Commentor No. 215 (cont'd): Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

None of the proposed supplemental waste forms (bulk vitrification, cast stone, or steam reforming) can meet environmental standards[9]. Each of these waste forms releases contamination into the soil and groundwater at unacceptable levels. If DOE retains these waste forms for further analysis, it must be predicated upon shipping the resulting waste forms to a repository at another site rather than disposal in the Hanford soil.

215-5 cont'd

❒ **Off-site waste**

The modeling analysis in the draft EIS clearly shows that no matter where at Hanford DOE proposes to dispose of off-site wastes, the impacts exceed standards and are unacceptable[10]. 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. All of the waste forms that were considered will release contaminants and exacerbate the contamination already present. As a result, no off-site wastes can be allowed[11].

A major deficiency in the draft EIS is that it did not analyze any alternative in which off-site waste was not brought to Hanford for disposal. Such an analysis should be included in the revised draft EIS.

DOE issued a Record of Decision (ROD) in February 2000[12] as part of its Final Waste Management Programmatic EIS that designated Hanford as one of two disposal sites for low-level waste (LLW) and mixed low-level waste (MLLW) from throughout the DOE complex. The Nevada Test Site was the other disposal location.

215-6

The "Basis for Decision" for the selection of Hanford, as generically explained in the February 2000 ROD, was "low impacts to human health, operational flexibility, and relative implementation cost." Yet the only "environmental safety benefit" that the ROD specifically mentioned was that as an arid site, "evaporation rates exceed rainfall by approximately 10 to 1 or more.[13]" In addition, Hanford LLW disposal facilities were pointed out to have expansion capability and could dispose of a wide range of radionuclides. Lastly, Hanford (and the Nevada Test Site) were the only two DOE sites which had MLLW disposal facilities already constructed.

The 2000 ROD provided no further environmental justification for the selection of Hanford, as the site-specific analyses of the impacts of this decision were to be assessed through a separate EIS. That has eventually evolved into this draft TC&WM EIS, which does show

[9] Chapter 2 and others comparing the impacts of DOE's proposed alternatives
[10] Figures 5-397, 5-399, 5-401 and others.
[11] Section 7.1, Table 7-1, Additional Consideration for Long-Term Mitigation, Water. The TC&WM EIS authors note as mitigation that several COPCs are predicted to exceed benchmark concentrations and they propose as mitigation that DOE "Restrict the receipt of offsite waste to waste that would have low impacts on groundwater over the long term at Hanford (e.g., limit or restrict receipt of off-site waste containing iodine-129 or technetium-99 at Hanford)."
[12] Federal Register, Volume 65, Number 38, February 25, 2000, DOE/EIS-0200-F.
[13] Federal Register, Volume 65, Number 38, February 25, 2000, DOE/EIS-0200-F, pages 10064 and 10065.

pg. 5

215-6 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. As can be seen in the sections above, the radiological risks increase by an approximate factor of six. 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. With regard to the February 2000 ROD, DOE explained in the *WM PEIS* (DOE 1997) that additional analyses would be prepared to implement DOE's programmatic decisions.

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. 215 (cont'd): Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

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.

Therefore, given that the February 2000 ROD was contingent upon the assumption that the site-specific analysis would demonstrate that the impacts would not be significant, and the draft TC&WM EIS assessments are to the contrary, the 2000 ROD should be immediately amended to withdraw Hanford as an acceptable disposal location for LLW and MLLW from throughout the DOE complex.

215-6 cont'd

In addition, Hanford should be withdrawn for consideration as a disposal site for Greater Than Class C waste[14], and Hanford should no longer be considered as a reasonable alternative for other, future waste[15] or disposal missions.

❒ **It is impossible to assess impacts of various options against each other**

Whatever alternatives DOE develops and analyzes in the revised draft EIS, these should be assembled in such a manner that decision makers can assess the impacts and merits of the various component parts of the decisions. The approach used in the existing draft EIS makes it impossible to judge which alternatives in each step of the remediation process (for example, tank closure, waste treatment, etc.) are more appropriate or more protective. There is no way to separate the impacts of alternative aspects in these evaluations in order to understand their individual impacts. There is no practical way, for example, to directly compare the impacts of clean closure to landfill closure.

215-7

The draft EIS should have analyzed elements of each remediation step in comparison to each other and then assembled the best elements to create the best alternative approaches for comparison in the draft EIS analyses.

❒ **There are no "reasonable" remediation alternatives in the draft EIS**

DOE created alternatives that individually contain aspects which make them unacceptable. The EIS incorporated technologies (cast stone, bulk vitrification, steam reforming) that are individually and as a group unacceptable because they fail to permanently immobilize highly mobile technetium and iodine. It was also not clear what criteria DOE used in assessing the viability of an alternative. DOE should have used compliance with criteria from environmental laws and with Tri-Party Agreement milestones as threshold standards in creating and evaluating the various alternatives.

215-8

The draft EIS does not appear to contain a "reasonable or protective" remediation alternative. DOE should have used water quality criteria (drinking water and aquatic life

[14] Environmental Impact Statement for the Disposal of Greater-Than-Class C Low-Level Radioactive Waste (GTCC EIS), DOE/EIS-0375 (72 FR 40135).
[15] E.g. Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury, DOE/EIS-0423 (74 FR 31723).

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215-7 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 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 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 the *Draft TC & WM EIS*, allowing an in-depth 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- and long-term impacts presented in Chapters 4 and 5, respectively. DOE believes that there are specific aspects of each alternative that illuminate key issues or concerns, including the potential impacts related to landfill closure or clean closure of the SST system. These comparative impacts are described in the key environmental findings sections of the Summary (Section S.5.5) and Chapter 2 (Section 2.10) of this EIS.

215-8 See response to comment 215-3 regarding NEPA alternative development.

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 it 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 on 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 Model Toxics Control Act (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.

One purpose 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

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standards) from environmental laws, together with risk-based criteria for human and ecological health, as minimum threshold standards in creating and evaluating alternatives. The modeling analysis of the impacts from the implementation of the EIS alternatives proposed shows that none of the alternatives appear to keep water quality below Federal CERCLA and Washington Model Toxic Control Act water quality thresholds for groundwater.[16] Any alternative that included importation of off-site waste demonstrated little chance of meeting the thresholds. A series of near-term, more comprehensive and aggressive remediation alternatives should be developed that address the potential to prevent future degradation of groundwater.

215-8 cont'd

Some of the remediation elements (for example, leaving contaminated vadose zone unremediated or capping cribs and trenches) will damage the future state of cleanup, negating current cleanup efforts. Remediation selection should focus on cumulative risk and should be directed toward developing alternatives that bring about risk reduction, both now and into the future, for the entire site.

❒ **The draft EIS fails to be all-inclusive**

The cumulative impacts and risks of all Hanford wastes and cleanup actions must be part of the EIS. The EIS fails to note that nearly all of the activities and wastes analyzed in the EIS are DOE wastes, and that the impacts from all of these are additive, not comparative. It is impermissible for DOE to use the impacts of wastes from parts of DOE (for example, the Richland Field Office (RL), the Office of River Protection (ORP), or other DOE sites) as a basis upon which to compare impacts. The EIS repeatedly does precisely this, assessing the significance of impacts in comparison to impacts from other DOE wastes[17]. All of these impacts are additive. DOE must meet environmental standards for all of them together. The risk of this EIS is not "small in comparison to the RL waste."

215-9

The EIS also fails to include wastes from US Ecology in a cumulative analysis. There are large inventories of uranium, other radioactive elements, and other hazardous substances at US Ecology, and these must be included in any credible assessment of cumulative effects.

❒ **The draft does not account for planned and on-going remediation work**

While the impacts of disposed contaminant inventories of waste sites, tank leaks, intentional releases, and unintentional releases were used in the construction of the draft EIS, none of the on-going or planned remedies for some of these contaminant masses were used in the modeling. The impacts of past, on-going and nearly implemented groundwater and vadose zone remediation projects were not part of the modeling input, which limited the ability of the model to simulate reality. For example, no groundwater or vadose zone remediation was included in the analyses and many CERCLA past-practice units were not included.

215-10

[16] Draft EIS, Appendix O, "Groundwater Transport Analysis".

[17] For example, Summary section 5.4.4.2 Long Term Cumulative Impacts on Groundwater Quality, on Human Health, and on Ecological Resources. Note that these risks are often not temporally correlated. The peak risks used for comparison are often decades in the past and not meaningful for analysis or comparison.

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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.

215-9 As described in Appendix R, and summarized in Chapter 6, Section 6.1, cumulative impacts were estimated by the addition of impact values for the alternative combinations (Chapters 4 and 5), the baseline (Chapter 3), and the reasonably foreseeable future actions (Appendices R, T, and U). For any given resource, cumulative impacts are the total impacts regardless of what agency or action produces the impact, although an important secondary consideration is what action is producing the bulk of the impact. Therefore, it is important to indicate whether the actions that are the subject of this EIS, and thus the decisions to be included in the ROD, produce the bulk of the impact or are only minor or negligible contributors to the cumulative impact. This helps the reader distinguish between activities responsible for the bulk of the impact/risk and activities outside the scope of this EIS. As described in Chapter 6; Appendix R, Table R–4; and Appendix S, Tables S–24, S–50a, and S–50b, the U.S. Ecology Commercial Low-Level Radioactive Waste Disposal Site (US Ecology) is included in the cumulative impacts analysis.

215-10 This EIS does not consider groundwater remediation; its scope is limited to non-groundwater remediation activities for tank closure and FFTF decommissioning, as well as waste management. Other 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. The other Hanford remediation activities are considered in the *TC & WM EIS* cumulative impacts analysis.

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 names and locations of the waste sites, the mass or volume of waste disposed of, the disposal dates, the inventories of contaminants present, and the current or future end state. Information on the current or future end state helps 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

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This skews the results of the modeling. Trying to predict the outcome of remediation efforts may be somewhat speculative. However, an attempt to include these impacts into the model analysis would have produced a much more comprehensive and realistic result.

215-10 cont'd

❒ **Currently contaminated groundwater, groundwater yet to be contaminated, and the vadose zone must not be declared "Irreversible and Irretrievable" lost resources**

The groundwater and vadose zone are State, not Federal resources, and are not subject to an irreversible and irretrievable claim under NEPA. The cleanup and protection of groundwater is the driver for most of the remediation work planned for the future at Hanford. It is not reasonable to declare the resource that is the focus of the cleanup as irretrievably lost. DOE management has always maintained and guaranteed that the groundwater at Hanford would be returned to drinking water standards by the end of cleanup.

Likewise, excluding large masses of contaminated vadose zone from remediation by declaring them as irretrievable is not reasonable. These vadose zone sources will continue to supply contaminants to the groundwater.

215-11

Perhaps more important, the long-term impacts on soil and groundwater are not "unavoidable" and are therefore not appropriate for consideration as irreversible and irretrievable lost resources. Although the draft EIS shows impacts to the vadose zone and groundwater under all of the alternatives considered, that outcome is an artificial construct resulting from the limited set of alternatives considered in the EIS, together with decisions limiting the level of cleanup for non-EIS wastes. Just as it is possible to develop alternatives that are protective of human health and the environment, it is possible to develop alternatives that do not lead to unacceptable contamination of the vadose zone and groundwater and that obviate the need to even consider making claims for irreversible and irretrievable loss of these resources.

❒ **The EIS makes it clear that minimizing the amount of waste left in place is probably the only approach that will analyze as a successful alternative**

The draft TC&WM EIS's cumulative impact analysis projects that the Hanford Site will persist in re-contaminating groundwater and the Columbia River over the next one hundred to tens of thousands of years. This flow of contamination will continue long after current allocated budgets and identified cleanup is done. There is no acknowledgement within the current draft EIS of the potential to drive down the cumulative impacts by initiating a policy of pursuing additional retrieval from burial grounds, tank leaks, tank bottoms and all other sources (RL and ORP) where there are significant amounts of waste discharges and buried waste.

215-12

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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 of 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 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.

215-11 DOE does not make a claim in Chapter 7, Section 7.3, that groundwater or vadose zone contamination is irreversible or irretrievable. However, permanent in-place closure of existing facilities analyzed in this EIS, including newly created disposal facilities, is considered an irreversible and irretrievable commitment of land resources. DOE acknowledges the commentor's assertion that long-term impacts on soil and groundwater are not "unavoidable," but disagrees that this is because the selection of alternatives analyzed in this EIS is limited and is not fully protective of human health and the environment. Section 7.2 provides a discussion on unavoidable, adverse impacts on water resources that would occur under any of the alternatives analyzed in this EIS. In reference to the suggestion to develop an alternative that "does not lead to unacceptable contamination of the

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It is clear from the analysis in the EIS that the wastes already released deep into the soil dominate the onsite risks, and that vastly more work and research is needed to find ways to retrieve this contamination or to stop it in place. As the dominant long-term risks are from mobile species (notably technetium 99 and iodine 129, and also uranium and carbon tetrachloride), it seems likely that in-place stabilization will at best slow the movement temporarily, providing time for other remediation actions to be taken. It is abundantly clear that tank closure decisions are highly dependent on first retrieving the leaked waste beneath the tank farms, and that no decision on tank closures can be made until that problem is solved.

215-12 cont'd

❒ **Favoring use of one Integrated Disposal Facility (IDF) over another is a false choice**

The draft EIS analyzes whether disposing of Hanford-generated waste in an IDF in the 200-East Area is better than disposing of waste in a pair of IDF's, one in each of the 200 areas. However, neither choice ultimately makes much difference to the eventual loading of contaminants into Hanford's groundwater. The perceived advantage comes simply from an increased velocity of groundwater, which temporarily dilutes the waste stream and changes the time in which waste migrates through groundwater and reaches the Columbia River. The amount of waste input to the cumulative waste loading of the site does not effectively change. The perceived "better option" is only a false choice that does not result in actual improvement. The EIS must examine other alternatives for disposal of this waste that do not negatively impact Hanford's groundwater.

215-13

❒ **Caps and barriers are shown not to be protective**

The EIS itself notes that caps and barriers do not effectively prevent movement of wastes in the soil and fail to provide protectiveness. The Draft EIS notes that caps "would delay, but not prevent down-gradient movement of contaminants…,"[18] and that barriers "… would degrade over time, allowing infiltration and contaminant migration, and the (Hanford tanks) would fail, resulting in release of their contents to the vadose zone and unconfined aquifer system."[19] Caps and barriers may have a place in the short term in slowing infiltration in the near surface. They may also have a place when coupled with other technologies as an additional layer in the defenses for the future. However, they should be accorded no credit as a solution on their own. Caps do not isolate waste from the environment for a long enough time period to be effective. Wastes must be exhumed, removed and isolated, not merely capped. This concept should also apply to non-TC&WM EIS cleanup decisions. Caps are neither effective nor durable enough for the long term, as acknowledged in the EIS.

This conclusion also means that vadose zone contamination, including intentional releases, tank leaks and unintentional releases, must be addressed to reduce cumulative impacts to lower groundwater impacts to a level below regulatory thresholds. Caps over vadose zone

215-14

[18] Page 2-146, Section 2.8.1.6.
[19] Page 4-69, Section 4.1.6.3.2.

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vadose zone and groundwater," any alternative that would involve onsite disposal facilities or that would fall short of remediating the site to a level completely "free" of contaminants would result in some measure of long-term unavoidable, adverse impacts on soil and groundwater, whether or not these adverse impacts would be considered unacceptable. Certain long-lived radionuclides such as technetium-99 do not disappear, but can be mitigated through changing the waste form to achieve better performance.

Chapter 7, Section 7.1, discusses mitigation measures that could be used to avoid or reduce adverse environmental impacts associated with implementation of the alternatives. 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, with a summary of these analyses in Section 7.5.

215-12 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.

215-13 DOE disagrees with the commentor's assertion that the choice of one IDF over another is a false choice because waste that would be generated from the WTP treatment process, FFTF decommissioning activities, and other waste management activities at Hanford will need to be disposed of at some location. This *TC & WM EIS* analyzed disposal of certain wastes in two different IDF locations, as described in Chapter 2, Section 2.5.1.3. The long-term groundwater analysis compares the anticipated impacts of disposal of this waste in IDF-East with those of disposal in IDF-West. As the commentor points out, there are some differences between these locations in terms of their geological and hydrological characteristics that could influence disposal considerations. In response to this and related comments, and following further analysis of the *Draft TC & WM EIS* results, DOE expanded the analysis of waste disposal in an IDF to address uncertainties in infiltration rates, waste-form performance, and components and inventories of offsite LLW and MLLW streams. This analysis specifically addresses the impacts of an IDF in the case of no offsite waste importation and disposal. The expanded analysis is presented in Chapter 7, Section 7.5, of this *Final TC & WM EIS*.

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contaminant masses were clearly shown in the EIS modeling as an ineffective method for the protection of groundwater from vadose zone contamination.

215-14 cont'd

❒ The EIS proposes secondary waste forms that are unacceptable

Waste forms that don't permanently immobilize waste are unacceptable and must be avoided. Mitigation for secondary waste, including that generated by the Waste Treatment Plant, must include the development of robust waste form(s) that will reduce the impacts to groundwater to the extent possible over the long term. The secondary wastes currently being produced must also be locked up in protective, durable waste forms.

All of the proposed secondary waste forms modeled in the draft EIS failed to immobilize contaminants for long enough time lengths necessary to be truly protective. Secondary waste forms proposed for wastes containing technetium 99, iodine 129, uranium, and other mobile nuclides have not been demonstrated to meet required standards. Development of additional waste forms that permanently immobilize waste and/or deep repository development work are urgently needed. In addition, the operation of the waste treatment plant must be performed such that the intent is to minimize generation of secondary waste. The maximum amount of hazardous and radiological constituents possible should be directed into the vitrification waste streams, leaving a minimum of these constituents for treatment as secondary waste streams.

215-15

The results of the EIS analysis argue heavily for the use of vitrification technology as the most durable waste form for secondary waste.

❒ The draft EIS should include full life-cycle costs in the alternative selection

Cost estimates in the EIS are incomplete and substantively misleading. The EIS does not consider any of the long-term stewardship costs that are required for cleanup decisions that leave waste in place and that do not permit unrestricted access and unrestricted use. These include activities such as monitoring and maintenance and CERCLA Five-Year reviews. The EIS also does not account for costs for environmental restoration (mitigation[20]) or for natural resource injury liabilities, including service losses that will continue to accrue until the site is restored to baseline condition.

215-16

The draft EIS further fails to consider the costs of active security that would be required to prevent access to large amounts of plutonium, or high curie radioactive sources left on site – costs that would require active security for so long as the wastes remain on site. When all of these costs are fully considered, a more comprehensive remediation effort initiated now could be more cost-effective and protective of human health and the

[20] Section 7.1 Mitigation – lists but does not commit to a series of "potential mitigation measures." The vast majority of these are not actual mitigations, but are measures to reduce impacts to varying degrees.

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215-14 The scope of this *TC & WM EIS* includes decisions on storage, retrieval, treatment, and disposal of tank waste and on 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* closure alternatives considered for the tank farms range from no action to landfill closure, selective clean closure, and clean closure, which would involve actions to remove the source of contamination.

215-15 As discussed in Chapter 7, Section 7.5.2.8, 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 results of these analyses will aid DOE in formulating appropriate performance targets for secondary-waste forms. As referenced in the discussion, DOE has drafted a roadmap that implements a strategy for development of better-performing secondary-waste forms.

215-16 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. Cost estimates for other environmental restoration activities or natural resource injury liabilities are considered beyond the scope of this EIS. For analysis purposes, these cost estimates were calculated using constant 2008 dollars and, where applicable, existing cost information. Where cost information was not directly applicable, relevant data were scaled to estimate costs, or, where appropriate, scoping-level cost estimates were developed.

However, because there is currently no specific path forward for final disposition of IHLW, an associated cost basis for disposal of this material is not available for inclusion in this EIS. Accordingly, the cost estimates are valid for the purpose of understanding the relative costs of the alternatives, but do not represent complete life-cycle costs.

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

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environment over the long-term, as opposed to leaving large amounts of waste in place that would need on-going care and monitoring.

No analysis of alternatives should even consider costs as a factor unless the estimates fully account for all life-cycle costs. An incomplete cost analysis is at best meaningless; at worst it is misleading and might lead to inappropriate cleanup decisions.

215-16 cont'd

❒ **The EIS should include life-cycle risk analyses in alternative selection**

Analogous to the concern noted above for cost estimates, risk analyses in the draft EIS are incomplete and misleading, because they consider risks only until the time of site closure. The EIS points to increased recordable worker occurrences as an argument against clean closure, but does not do any analysis of long-term risk of wastes left in place, either as a danger to exposure to someone on the Central Plateau or as exposure to groundwater or river water. This argument also ignores the fact that successful, clean closure and on-going remediation of waste sites has occurred all over the Hanford Site with little worker exposure. Long-term risks following closure are implicitly assumed to be zero.

As was noted for cost analysis, no analysis of alternatives should even consider risk as a factor unless the estimates fully account for all life-cycle risks.

215-17

❒ **Decommissioning of the Fast Flux Test Facility**

The EIS analysis is sufficient to select entombment for the Fast Flux Test Facility. However the priorities for site funding and work are such that DOE should make that decision, then defer the work until other priority work has been completed.

215-18

❒ **Characterization/source term**

The draft EIS inventory is missing waste volumes that may be indicative of a systemic under-estimation of the levels and amounts of vadose zone contamination. The estimates of tank waste in the EIS for the vadose zone consider only known leaks from tanks. These limited leak estimates appear to understate the real size of the tank waste releases. These estimates omit non-leak tank release events, such as tank overflows and discharges, as well as other intentional releases. Estimates of the quantity of waste in auxiliary equipment in tank farms which appears to be an extrapolation from another estimate may differ greatly from what they actually contain. Moreover, current analyses presume that all waste remaining in the tanks resides inside the steel liner. A significant quantity of waste may remain between the steel tank and the concrete walls for tanks that were overfilled or that leaked. The possibility exists that many tanks may have failed steel liners, but may not yet be accounted for as leakers as the waste has not yet escaped from the concrete external liner.

215-19

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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.

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*.

215-17 The statements that long-term risks following closure to intruders, including those of workers and from groundwater-mediated pathways, are assumed to be zero are incorrect. First, exposures to intruders after the loss of institutional control are considered under the Tank Closure, FFTF Decommissioning, and Waste Management alternatives intruder scenarios in this *TC & WM EIS* in Appendix Q, Section Q.3. In all scenarios, the impacts on intruders would be dominated by external exposure and inhalation, with the peak exposures occurring immediately after the loss of institutional control. The impacts through the groundwater pathways, including impacts on the Columbia River, are the subject of much of this EIS, detailed in Chapter 5 (alternatives impacts), Chapter 6 (cumulative impacts), and, in particular, Appendices L (groundwater flow field), M (release of contaminants to the vadose zone), N (vadose zone flow and transport), O (groundwater transport of contaminants), P (ecological risk), and Q (long-term human health dose and risk). This EIS estimated human-health impacts for a 10,000-year period following closure covering the entire life-cycle of the alternative.

215-18 Comment noted.

215-19 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.

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.

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There is a great deal of uncertainty in the composition of the waste in the single-shell tanks which could drastically affect the inventory estimates. The sampling of the tank contents has been limited and the EIS approach, which blends tank composition across the tank farms, does not appear to account for the complex chemistry of the liquid and solid makeup of waste that is found in individual tanks. This limited tank composition data does not engender high confidence in current DOE estimates of the tank waste compositions and severely limits our confidence in the risks reported in the draft EIS.

215-19 cont'd

The draft EIS modeled impacts from leaving waste in the tanks as if the contents of all of the tanks are homogenous. The final one percent left as a tank heel likely will have a chemistry that is something different than one percent of the bulk heavy metal radionuclides and chemical contaminants of concern.

The draft EIS should adequately report all chemical-radiological inventories from all disposal sites at Hanford (including non-Environmental Management disposal sites, such as US Ecology) to ensure a credible analysis of the actual and potential cumulative impact to groundwater.

Some older inventory documents (for example, PNNL-15289, 2006) indicate that a considerable amount of uranium has been disposed that was not accounted for in the draft EIS. The uranium in the solid waste burial grounds, in US Ecology and in the 618-11 burial ground, for example, has not been included in the modeling analysis. While the uranium disposed in these burial grounds was reported to be uranium salts or uranium metal, it is reasonable to assume that after a few thousand years, these shallowly buried toxic metals will be affected by weathering, will corrode, and will be converted to forms that are more mobile in the environment. The amount of uranium not reported is 6.42 million kilograms, or about 25 times the amount of uranium that was reported. These wastes become doubly important in that they would probably continue to corrode and leach into the vadose zone and groundwater well past the assumed 10,000-30,000 year analysis period, which was modeled assuming more mobile uranium forms already found in the vadose zone.

215-20

The characterization of contamination in the vadose zone beneath cribs, trenches and ponds was poor in the EIS modeling analysis. The EIS comments that "Uncontaminated aqueous waste, such as cooling water, was discharged to surface ponds." This statement is misleading. Surface ponds often received significant levels of contamination[21] [22] [23] [24].

The EIS also comments that high volume waste streams containing modest levels of contaminants were discharged to cribs and trenches. However, the waste stream disposed in the cribs and tile fields (for example on the west side of the T Tank Farm) often was tank

[21] PNNL-11800 Addendum 1, *Addendum to Composite Analysis for Low-Level Waste Disposal in the 200 Area Plateau of the Hanford Site*, M. P. Bergeron, E. J. Freeman, & S. K. Wurstner; Appendix A: C. T. Kincaid, M. M. Coony, D. L. Strenge, R. L. Aaberg, & P. S. Eslinger, September 2001; Table A-16.
[22] PNNL-15479, *Groundwater Monitoring Plan for the Hanford Site 216-B-3 Pond RCRA Facility*, D. B. Barnett, R. M. Smith, C. J. Chou, & J. P. McDonald, November 2005.
[23] PNL-2499, *Comparative Ecology of Nuclear Waste Ponds and Streams on the Hanford Site*, Richard M. Emery & M. Colleen McShane, October 1978.
[24] BNWL-1884, *Aquatic Studies of Gable Mountain Pond*, C. E. Cushing & D. G. Watson, December 1974.

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215-20

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.

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 inventories were identified and considered to be potential contributors to cumulative impacts on groundwater are included in the inventory listing provided in Appendix S and, therefore, were modeled. This includes non-DOE sites—in particular, US Ecology. The inventories for these sites were identified using the most recent information available.

As stated in Table S–5, the liquid release inventories were obtained from (1) SIM, Rev. 1 (Corbin et al. 2005); (2) the *Radionuclide Inventories of Liquid Waste Disposal Sites on the Hanford Site* (Diediker 1999); (3) the *Hanford Site Waste Management Units Report*, also known as the *Cramer Report* (DOE 1987); (4) technical baseline reports; (5) the latest version of the Waste Information Data System (the *Hanford Site Waste Management Units Report* [Shearer 2005], also referred to as the "WIDS database"); and (6) other sources. 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 the Waste Information Data System (Shearer 2005); and (5) other sources.

DOE has compared the inventory values reported in Appendix S to the report cited in the comment, and the numbers are identical. However, DOE notes the commentor's concern regarding the lack of uranium inventories (i.e., total uranium) in the cumulative impact analyses. DOE acknowledges that none of the reviewed documents included a total uranium inventory estimate for certain waste sites, particularly for the solid-waste disposal sites. However, DOE again reviewed the data and revised the inventories to include a calculated total uranium inventory for those that had not been reported in the referenced documents, as appropriate. This inventory was included in this *Final TC & WM EIS* and analyzed appropriately.

Chapter 5 of the *Draft* and this *Final TC & WM EIS* provides concentration versus time for COPCs under each alternative. These figures provide an

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supernate that flowed from the third tank in a three tank cascade. The trenches, cribs, and tile fields around the Tank Farms received considerable amounts of waste contamination which then flowed to the vadose zone and groundwater. Improvement of the characterization of the vadose zone beneath the cribs, trenches and ponds is needed to establish how much contamination is contained there.

215-20 cont'd

We urge DOE to revise the draft TC&WM EIS to include estimates of current and future maximum concentrations for all potential contaminants of concern. Information contained in the current draft EIS which shows past peak concentrations in groundwater for many contaminants is not useful to evaluate current or future risk.

❒ **The TC&WM EIS does not make allowance for the possibility of foreseeable natural events**

Natural disasters such as floods and seismic events need to be considered in the EIS analyses. Predictable events should be fully considered in all analyses. By definition, the site should expect approximately ten one-thousand year floods, and one ten-thousand year flood during the 10,000 year forecast period, and the EIS should consider the ramifications of those events. The EIS should analyze the likely water level along the Columbia River; groundwater levels; and the potential effects if there is catastrophic failure of one or more dams on the Columbia River. The EIS should also analyze the likelihood and potential impact if the channel of the Columbia River were to be catastrophically rerouted (for example, to the historic channel through Gable Gap and into the 200 Area).

Similarly, very large earthquakes (Cascadia Zone earthquakes) associated with the Juan de Fuca subduction zone appear to occur at 300-1,000 year intervals, based on geologic evidence, so one should expect and plan for 10-30 such events during the 10,000 year planning period. The EIS should analyze the likely effect of such major seismic events.

215-21

While less predictable, other environmental events are at least plausible and should be considered. The 1980 Mt. St. Helens eruption, and evidence of magma movements under the other Cascade volcanoes makes possible a range of volcanic events that could affect Hanford in a number of disastrous ways.

The EIS has also avoided inclusion of climatic effects, specifically the consideration of global warming effects that are recently being modeled throughout the world scientific community. The advance of climatic effects can be measured in decades, suggesting that thousands of years of climate change could present a very different Hanford environment to the one viewed today. The variation of climatic factors like temperature, wind strength and precipitation amount would have direct impact on infiltration rates, and on evaluation of alternative choices like the use of evapo-transpiration barriers and the life expectancy of landfill caps.

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indication of the trend and identify peaks that could occur during the 10,000-year analysis period (through calendar year 11,940). In addition, Appendix U provides the concentration versus time for the COPCs for the cumulative impacts analysis, which includes past, present, and reasonably foreseeable actions.

215-21 Chapter 3, Section 3.2.5.1.1, of this *TC & WM EIS* discusses and depicts the locations of geologic faults relative to Hanford and the faults' potential for producing earthquakes, as well as the location of floodplains at the site. DOE Order 420.1B and its implementing standards require that nuclear and nonnuclear facilities be designed, constructed, and operated to safeguard the facility, public, workers, and environment from natural phenomena hazards, including earthquakes and floods. Appendix V of this EIS also provides an analysis that depicts potential impacts at Hanford that could result from climatic changes, which may increase infiltration rates and the rise of the groundwater table.

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❒ **There are a number of issues with the Model used for the EIS analyses**

Prior to DOE issuing a revised draft TC&WM EIS, DOE should conduct a thorough analysis of the conceptual models used in fate and transport modeling and a critical re-examination of assumptions and presumptions upon which the EIS is based. The process then should proceed to develop and select reasonable alternatives in an open public process. Coupled with this, DOE should then develop and select a reasonable set of simulation codes capable of analyzing these alternatives. *215-22*

- The alternatives modeling analysis is based on only one deterministic modeling run. With limited model runs and a lack of documentation, the results cannot be considered reliable. Under these conditions, no sensitivity analysis or uncertainty analysis is possible, leaving decision makers and the public with little confidence in the repeatability of the results. In analysis of the draft EIS for the Hanford Advisory Board, K.D. Auclair and Associates[25] discussed at length the incomplete uncertainty analyses and poor quality assurance documentation of the EIS, shortcomings that limit the reliability of the EIS findings. We also note the instability of model forecasts for contaminant concentration and risk. In many model projections, these kinds of numbers vary erratically by as much as four orders of magnitude over short periods of time, reinforcing concerns about the stability of the models and likewise reinforcing skepticism of the reliability of any conclusions based on the models. *215-23*

- The model does not agree with present day conditions. While it is true that the model was fed known gross inventories of contaminants and then asked to predict where the waste would be transported, the model does not include on-going or past remediation that would have reduced the inventory and possibly impacted the flow direction of the waste streams. The model was not calibrated with present day conditions as part of model development and does not simulate known conditions. Some modern-known plumes (for example, the uranium plume under 200-East) are not well predicted by the model. This would appear to call the model's output into question.

- DOE's general inability to satisfactorily explain the sources of some groundwater contamination at Hanford (for example, the 200-East and 300-Area uranium plumes, or the chromium upwellings in the river at 100-BC) undermine the credibility of the input data and conceptual bases for the draft TC&WM EIS analysis. *215-24*

- The model was used inappropriately. The modelers ran subsections of the model using a variety of parameters, then selected the parameter set that gave the "best" observational fit[26] (based only on agreement of modeled particle tracks with an approximation of the tritium plume coming from the PUREX plant). The result is a shaped answer from a "pushed" model, not a reliable, natural simulation. The model *215-25*

[25] K.D. Auclair and Associates, 2010. Independent review of the Draft Tank Closure and Waste management Environmental Impact Statement, DOE Task Order DE-AT27-06RV14745.
[26] Section O.2.4

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215-22 There are currently no plans to issue a revised *Draft TC & WM EIS*. The alternatives analyzed in this *TC & WM EIS* were communicated to the public during the public scoping period, and public comments from this process were considered during development of this *Final TC & WM EIS*. There are no plans to conduct another public comment period.

The modeling codes used to perform the vadose zone and groundwater analysis were selected in the *Technical Guidance Document* (DOE 2005). There are no plans to revise that document and, therefore, no plans to revise the codes used in the vadose zone and groundwater analysis.

215-23 DOE disagrees with the commentor's assertion that the alternatives modeling analysis is based only on one deterministic modeling run. As described in this *TC & WM EIS*, the factors most strongly influencing the model results are the following: (1) Material properties of the vadose zone. Over 18 million parameter sets were investigated (see Appendix N, Section N.1.2, of the draft EIS). The suitable sets were used to construct predictions of contaminant distributions for the BC and BY Cribs and the 216-T-26 Crib, and the predictions were compared with groundwater measurements. Those most in agreement were used to construct predictions of the Plutonium-Uranium Extraction (PUREX) and REDOX tritium plumes, which were in turn compared with field observations (see Appendix N, Section N.3.6.1, of this final EIS). (2) Hydraulic conductivities in the unconfined aquifer. Over 6,000 parameter sets were investigated for the Base Case, and over 5,000 parameter sets were investigated for an Alternate Case (see Appendix L, Section L.9, of the draft EIS). The resulting predictions of water table elevations were compared with field observations from the late 1940s through 2006 (see Appendix L of the draft EIS), and those most in agreement were used to construct predictions of the PUREX and REDOX tritium plumes, which were in turn compared with field observations (see Appendix N, Section N.3.6.1, of this final EIS). (3) Transport parameters. Over 600 runs were made to investigate various transport parameter sets (see Appendix O, Section O.2.6, of this final EIS). The predictions were compared against measurements of the PUREX and REDOX plumes. (4) Infiltration rates, anthropogenic recharge, presence/absence of interbeds and other heterogeneities, distribution coefficients, and waste-form performance parameters. A variety of analyses were performed to demonstrate the effects of changes in these parameters on the flux of contaminants in the vadose zone (see Appendix N, Section N.5, of this final EIS).

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was not allowed to converge to a solution and the model output with the least amount of error before converging was chosen as the best. This is not industry standard practice.

215-25 cont'd

▪ The groundwater model chosen was inappropriate. The particle track function of MODFLOW is a crude modeling approach, which does not account well for reactive transport and is too simple an application to adequately simulate the hydrologic conditions found at Hanford. A reactive transport model would have been a better choice and would probably have used much smaller computer resources to run. The model should also have included some attempt at simulating the heterogeneity in sediment distribution and groundwater flux along preferential pathways that has been documented in the Hanford literature for a couple of decades.

215-26

▪ Inappropriate modeling assumptions were used. The model assumed there is no movement of water in or out of the basement basalts and there was no recognition of sedimentary architecture and features like the erosional windows into basalt layers in the 200-East Area, where the uppermost confined aquifer is connected with the unconfined groundwater aquifer above it[27] [28] [29] [30]. Contrary to modeling logic, the MODFLOW model for this area models this as an impermeable boundary. A number of similar areas of known inter-aquifer communication across the site through the fractured basalt basement are also modeled as having no flow. The southeast boundary of the model domain was made into a no-flow boundary where there actually is important groundwater flux that would affect the performance of the model.

215-27

▪ The model used an inappropriate application of parameters. For example, the model uniformly applies a distribution coefficient (for uranium, Kd = 0.6) and hydraulic conductivity (K = 156 m/d) across Hanford, which appears to be quite low as an average value for sediments that have hydraulic conductivities into the thousands of meters per day. Such model uniformity is only of value for uniform soils with no heterogeneity and under-represents the mobility of contaminants and the flux of groundwater. The model fails to account for heterogeneity of sediments, lateral transport, paleochannels, clastic dikes[31], preferential pathways and zones of flux retardation.

[27] M J Graham, G V Last, and K R Fecht, 1984, *An Assessment of Aquifer Intercommunication in the B Pond - Gable Mountain Pond Area of the Hanford Site*, RHO-RE-ST-12 P.
[28] M. J. Graham, M. D. Hall, S. R. Strait and W. R. Brown, 1981, *Hydrology of the Separations Areas*, RHO-ST-42.
[29] PNL- 7468, *2101-M Pond Hydrogeologic Characterization Report*, M. A. Chamness, S. P. Luttrell, D. J. Bates, W. J. Martin, September 1990.
[30] PNNL-13623, *Transient Inverse Calibration of Site-Wide Groundwater Model to Hanford Operational Impacts from 1943 to 1996—Alternative Conceptual Model Considering Interaction with Uppermost Basalt Confined Aquifer*, V. R. Vermeul, C. R. Cole, M. P. Bergeron, P. D. Thorne, S. K. Wurstner, August 2001.
[31] Fecht KR, KA Linsey, BN Bjornstad, DG Horton, and SP Reidel. 1999. *Clastic Injection Dikes of the Pasco Basin and Vicinity.* BHI-01103, Bechtel Hanford Inc., Richland, Washington.

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DOE also disagrees with the commentor's assertion that uncertainty and sensitivity are not adequately addressed in the *Draft TC & WM EIS*. DOE's view is that NEPA requires a comparison of the impacts of the various alternatives in the context of the cumulative impacts; that the comparison be technically sound and traceable to reliable sources of data; and that important sources of uncertainties in the analyses be identified and their potential implications for decisions and alternatives impacts discussed. Although DOE believes that uncertainty and sensitivity were adequately addressed in the draft EIS, in light of technical review and other comments, DOE has expanded and clarified the discussion of the nature and role of uncertainty in the groundwater modeling in this *Final TC & WM EIS*.

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.

In addition, DOE disagrees with the commentor's assertion that the model was not calibrated with present-day conditions. The vadose zone flow and transport model and the groundwater flow field and groundwater transport model were calibrated to conditions from 1980 to 2006, and this *Final TC & WM EIS* contains additional data through 2009. The areas of agreement and disagreement between modeled and measured conditions are discussed in Appendix U. In response to this comment and similar comments, this *Final TC & WM EIS* contains an expanded discussion of these comparisons.

215-24 DOE notes that Appendix U presents the results of a comparison of model predictions versus measured conditions in groundwater, as well as maps and discussions of these results. Uranium-238, total uranium, and chromium are specifically addressed, and the sources and inventories associated with these plumes are presented in Appendix S. DOE has received a number of comments suggesting that there is "missing contamination" in the groundwater model results based on interpretations of graphs and maps presented in Chapter 5 of the *Draft TC & WM EIS*. Such comments appear to result from a lack of understanding that the graphs and maps in Chapter 5 are for specific groups of sources that

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- The EIS briefly considered then excluded consideration of the observed interruption of lateral flow by the broadly emplaced network of clastic dikes. These dikes appear to redirect water and waste vertically to the groundwater. The STOMP model framework is incapable of adequately modeling these structures. *215-28*

- The EIS only crudely models the known preferential flow along the massive buried river channels of previous floods through the use of certain selectively chosen particle paths. Rather than including these important features directly in the model parameters, the model relies on assigned soil properties to model their effects. *215-29*

- The EIS modeling entirely omits the known and observed daily and seasonal oscillation of the Columbia River stage. These oscillations result in washing of soils near the river and of water table changes far inland. Additionally, these oscillations spatially rearrange and alter the chemistry in the soil. The impact of this inflow is important when considering that redox and pH changes have such huge consequences in the sorption chemistry of most of the contaminants. These impacts become especially important when it is noted that the effects on local water well levels in response to these river stage changes can be detected through the Gable Gap and nearly to the 200-East Area. *215-30*

- The EIS ignores the known and observed chemistry for uranium, plutonium, and neptunium which invalidate the use of simple adsorption (Kd) models. The understanding of the chemistry and fate and transport of these elements has changed dramatically in the last fifteen years. These changes include understanding the dominance of soluble carbonate complexes in the Hanford soils; the formation of soluble charged colloidal complexes; the formation of non-charged organic complexes; and the formation of nanometer scale traditional colloids. For example, the draft EIS models the movement of half a kilogram of plutonium and portrays highly unacceptable water quality results along the Columbia River thousands of years from now. Simultaneously, the draft EIS excludes from analysis the movement of nearly a ton of plutonium inventory in burial grounds and tank wastes on the presumption that it is immobile. The draft EIS makes similar assumptions for uranium. There is also a presumption that very large inventories of uranium in metal form buried in the solid waste burial grounds and other sites is also immobile, and will remain so, and therefore was excluded from the modeling analysis. *215-31*

- The amount of vadose zone characterization performed to date is insufficient to adequately model contaminant flux. The characterization of vadose zone contamination below the tanks is very limited. These data gaps impose serious limits on how well the TC&WM EIS model can simulate and estimate waste impacts to groundwater. Oregon is concerned that the EIS analysis may seriously understate the degree of contamination in the vadose zone. *215-32*

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make up particular alternatives, are presented for the purposes of comparing the impacts of those alternatives, and represent only the limited group of sources appropriate to that alternative. This *Final TC & WM EIS* includes, as an introduction to Chapter 5, a more detailed guide on the purposes and limitations of the data presented in that chapter.

215-25 DOE is not in agreement with the commentor's assertion. Each of the individual trial runs was allowed to converge naturally (or allowed to fail to converge) to a precise numerical solution consistent with the trial parameters. The model calibration process involved selection of the best results (i.e., those most in agreement with field conditions) from the entire suite of the trial results. Both the *Draft* and *Final TC & WM EIS* regional-scale groundwater models were calibrated using this industry standard practice.

215-26 DOE disagrees with the assertion that the groundwater model is inappropriate for use in this EIS. Two primary drivers contributed to the selection of particle tracking as the groundwater transport modeling tool: (1) Ecology requires that groundwater contaminant concentrations be measured and reported to within 100 meters of the fence lines of waste management areas/facilities, which is a requirement that the particle tracking model can meet; and (2) the March 25, 2005, *Technical Guidance Document*, which documents agreements between DOE and Ecology related to the *TC & WM EIS* groundwater pathway analyses, directs the use of particle tracking as the groundwater transport modeling tool.

DOE also notes that the MODFLOW [modular three-dimensional finite-difference groundwater flow model] model is the most frequently used commercial model for calculating flow fields; reactive solute transport models require more computational resources than the particle tracking model; and adequate site characterization data are not available to parameterize such models. Given the points noted above and the level of complexity that is needed for this type of model, DOE does not believe the reactive solute transport model is necessary.

DOE agrees with the comment that the groundwater model must simulate the heterogeneity in sediment distribution and groundwater flux along preferential pathways. The *TC & WM EIS* groundwater modeling process achieves this objective by encoding into the model the various subsurface material types observed across Hanford based on available well-boring data, and simulating flux along preferential flow pathways as appropriate, consistent with the encoded material types and their respective hydraulic properties.

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❒ **The justification for favoring landfill closure over clean closure[32] is misleading and contradicted by information in the EIS**

The draft EIS cites several reasons on page 2-292 for favoring landfill closure over clean closure. Some of these reasons are contradicted by other information in the EIS and seriously mislead readers:

- "Total recordable worker occurrences would increase by sixfold." This assertion is contradicted by data in Table 4-98 which shows that total worker recordable cases would increase less than 50% (from 3,940 under Alternative 2B to 5,760 for alternative 6B). Large increases in worker occurrences are projected for Option 6A, but those result from extensive construction and prolonged operation of the waste treatment plant, not from clean closure. *215-33*

- "Average radiation worker dose from normal operations would increase by over twofold." This may be true, but as the EIS notes on p 4-131, "radiation doses to individual workers would be managed and mitigated to minimize impacts. Such measures were not taken into account in this analysis."

- "Sagebrush habitat affected would increase by over two orders of magnitude." It is ironic for the EIS to cite habitat destruction as justification for an action. During the Supplemental Analysis for the Hanford Comprehensive Land-Use Plan (CLUP) in 2008, DOE refused to consider, or even acknowledge, the desirability of rezoning to protect sagebrush habitat. Moreover, as is noted on page 4-385, DOE is not even committed to mitigating this habitat loss, were it to occur. Perhaps most important, the projected loss of sagebrush habitat results solely from DOE decisions on where to place new facilities (a new IDF and the River Protection Project Disposal Facility). The tentative decision by DOE to place these disposal facilities on some of the best sagebrush habitat on the Hanford Site is an arbitrary decision that could be changed if DOE so decided, in order to preserve irreplaceable habitat. The implied need to choose between clean closure and habitat loss is an artificial, false choice. *215-34*

- "Electricity use would increase by one order of magnitude." According to Table 4-2, this is not true. Total electricity use under Alternative 6B would be increased by 33% from Alternative 2B (23.8 Million Megawatt hrs compared to 17.9 for Alternative 2B). The huge difference attributed to "clean closure" is in reality attributable almost entirely to building and operating 84 new double-shell tanks and operating two additional waste treatment plants for more than a century (Alternative 6A), not to clean closure. Increases in other utility infrastructure costs for clean closure similarly increase modestly (7% for water, 36% for gasoline, and 10% for diesel fuel) for clean closure compared to landfill closure. *215-35*

- On page 2-294, the EIS claims that "As a result of the above conclusions (discussed in preceding bullets) and excessive cost, DOE believes that clean closure may not be a viable alternative." "Excessive cost" is a subjective determination, and *215-36*

[32] Pages 2-292 and 2-294.

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215-27 A simplifying assumption was made that there is no hydraulic connectivity between the unconfined aquifer and any existing confined aquifers. It is likely that some interaction between unconfined and confined aquifers exists. However, the availability of data that describe the locations, sizes, and water flux amounts between the aquifers is not sufficient to encode these features into the model. This simplifying assumption should not bias the EIS analysis and is, therefore, believed to be reasonable in light of the uncertainty related to this feature.

Distribution coefficients are defined by the *Technical Guidance Document* (DOE 2005) and applied consistently to contaminants no matter where a contaminant comes from or where it is located during the model simulation. Hydraulic conductivity values were derived through model calibration. To account for the higher-conductivity regions in the model that result in some preferential flow due to paleochannels from historical cataclysmic flooding in the region, a separate conductivity zone named the highly conductive Hanford formation is encoded in the model. This zone of material has a hydraulic conductivity of almost 4,000 meters per day.

215-28 DOE acknowledges that clastic dikes exist at Hanford and that they are an example of complex geology that could affect the movement of water and solutes through the vadose zone. The STOMP [Subsurface Transport Over Multiple Phases] model is entirely capable of simulating clastic dikes when adequate characterization data are available to encode them in the model. However, the availability of data on the locations and sizes of clastic dikes at Hanford is limited. Such dikes were included in the STOMP model to the extent that they were represented in the boring logs and other information used to develop the geology. A sensitivity analysis of the effect of a clastic dike was included in Appendix N, Section N.5.5, to allow the reader to assess the impact of any such feature on the outcomes of the analysis.

215-29 DOE disagrees with the commentor's assertion that preferential pathways were accounted for through the use of selectively chosen particle paths. The particle paths are an outcome of the analysis, not an input chosen by the modeling team. The observed head data provide reasonably strong constraints on the presence and character of a zone of high hydraulic conductivity. This zone, in turn, influences the calculated particle pathways and, ultimately, the evolution of the contaminant plumes.

215-30 The regional nature of the flow model required an encoding resolution no finer than one value per year to account for river stage at any given location, and thus

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many would disagree with this characterization, even if the cost estimates were credible. Total cost of clean closure (Table 2-50) is $66.6 billion for Alternative 6B (with Option) compared to $40.1 billion for Alternative 2B. As discussed earlier however, these figures are misleading because they do not include all life-cycle costs. If those were factored in, the difference in cost for clean closure would be much smaller. It might turn out to be the cheaper alternative. Cost-based arguments are meaningless and should not be made unless all life-cycle costs are included in the comparison.

215-36 cont'd

In sum, the arguments against clean closure are erroneous and misleading, based on data in the EIS. The argument against clean closure is not supported and should be deleted from the EIS.

❒ **There is very little "environmental impact" analysis in this draft EIS**

This draft EIS is, in reality, predominantly a human health risk assessment, rather than an environmental impact assessment. The focus throughout most of the document is on human health, with some discussion of short-term environmental impacts and (especially in the summary document) little or no discussion of long-term environmental impacts. Human health risk information is critical for assessing and comparing alternatives presented in the EIS, but there needs to be a similar set of analyses, with a comparable level of detail, describing the environmental impacts of the proposed alternatives.

There is no meaningful analysis in the report of long-term contamination of abiotic resources in the environment. There is not for instance, any analysis of impacts on soil and groundwater, analyzing the extent, duration, and area of these resources that would be contaminated under the different alternatives, whether from EIS-related actions (for example, tanks, associated cribs and trenches) and from existing RL wastes as described in Appendix U.

215-37

In the case of long-term effects of biota, only a few summary data (for example, maximum hazard quotients in Appendix P) are provided. No information is presented, for instance, on the length of the shoreline or area of the Columbia River bottom in which biota may be exposed to high contaminant concentrations, or the duration of projected high concentrations. Projected high contaminant concentrations are trivialized by discussion in the text ("The chromium hazard quotients above 1.0 did not necessarily indicate high risk…" page P-50) and by modeling based on assumptions that are unsupported or contradicted by data, such as the presumption that groundwater will be diluted because upwellings into the river occur over a large area (page P-51). Recent data do not suggest any dilution of chromium in the hyporheic zone at the 100-B/C Area. Moreover, the upwelling data suggest contamination is more widespread than expected, such that a larger area of the river bottom and associated fauna (benthic invertebrates, salmon eggs and fry) are exposed to high contaminant concentrations.

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a corresponding limitation in the wellhead observation data set. It is known that river stage elevations vary during the course of a day at times, and even more over a week or a month, and that river stage boundary conditions strongly affect nearby wellheads. Given the limitation in river stage encoding, therefore, it was determined that it would not be helpful for the head observation data set to include the typically more detailed fluctuations. Specifically, it was decided to remove from the head calibration data set those head observation wells within 600 meters of the river, as these are the wells most likely affected by river stage fluctuations.

215-31 DOE disagrees with the commentor's assertion that the *Draft TC & WM EIS* did not include a projected concentration of uranium in groundwater. Uranium concentrations in groundwater for all of the alternatives are presented in Chapter 5, and concentrations for the vast majority of those alternatives are shown to be 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 comparison of the alternatives was presented in Appendix O, Section O.6, of the draft EIS. In addition, Appendix M, Section M.5 (constituents addressed in the source release model results), and Appendix N, Section N.4 (constituents addressed in the vadose zone transport model results), have been revised to reflect the same constituents.

As shown in Appendix M, Section M.4, both neptunium-237 and plutonium-239 are released from the waste form, but, as shown in Appendix N, Section N.4, are not released to the aquifer. The distribution factors for both of these radionuclides are listed in Table M–11 of this final EIS; both were obtained from the *Technical Guidance Document* (DOE 2005), which was signed by DOE and Ecology.

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 a total uranium inventory estimate for these disposal sites. However, DOE again reviewed the data and revised the inventories to include a calculated total uranium inventory. This inventory, appropriately analyzed, has been included in this *Final TC & WM EIS*. For further information, see Section 2.2 of this CRD.

215-32 Regarding the commentor's concern for increased detail in site characterization to support modeling and assessment, this issue of characterization has been brought up previously by the Oregon Department of Energy. Both DOE and Ecology

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There is no substantive recognition of DOE's potential liabilities under the natural resource damage provisions of CERCLA, and correspondingly, no attempt to analyze the occurrence or magnitude of likely natural resource injuries and service losses under the different proposed alternatives.

215-37 cont'd

❒ **Estimates of risk cited in the text underestimate actual long-term risk to the public**

The draft EIS fails to report and adequately discuss results for plausible exposure scenarios developed and presented in the appendices. The result is that the draft EIS shows only the lowest-risk exposure scenario in the primary part of the document.

The main portion of the EIS reports risk almost exclusively for only one exposure scenario – the drinking water well user. In Appendix Q, results are reported for two additional exposure scenarios – a "resident farmer" and an "American Indian resident farmer." Risks for those alternate scenarios are, on average, about 3 times and 7 times higher, respectively, than the risks reported for a drinking-water well user. By choosing to report results in the primary portion of the documents only for the lowest-risk scenario, the EIS under-reports plausible risk.

215-38

Moreover, the "resident farmer" scenario used here is different from the "resident farmer" scenario used in EPA risk analyses and results in a lower estimate of risk.

Also, the American Indian scenario used here is inconsistent with exposure scenarios developed by at least one of the tribes at the Hanford Site, and likely underestimates risk relative to their exposure scenario.

The revised EIS should more fully report risk under all reasonable scenarios, and needs to structure risk scenarios to conform to those already developed and used by Hanford regulators and stakeholders.

❒ **Public involvement/information related to the EIS**

215-39

We believe DOE's efforts to inform and engage the public in review of this draft EIS were uneven. As mentioned, DOE was responsive in providing an extended review period. A 140 day comment period was an acceptable review period.

We also appreciate the fact that DOE added additional public hearings and eventually conducted four public hearings within the State of Oregon, at which an estimated 330 citizens attended. The Oregon Department of Energy worked hard to engage new citizens into this process and believe our efforts helped increase attendance at the Oregon public meetings.

DOE was also quite responsive in conducting an informational workshop in December 2009 and in engaging the Oregon Hanford Cleanup Board at its February 2010 meeting.

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believe there is sufficient characterization to support this *TC & WM EIS*. The goal of NEPA is completion of an impacts analysis for a proposed Federal action (or state action under a SEPA) early enough in the agency's decisionmaking process to be useful. Accordingly, balanced judgment must guide an agency's decision to initiate the NEPA process; that agency must act as soon as sufficient information is available to inform its decisions, and yet it must recognize that all useful information may not be available. The CEQ regulations have long recognized this tension and provided appropriate ways to proceed with an EIS (40 CFR 1502.22).

DOE's view is that this EIS provides a comparative analysis of strategies for retrieving, treating, and disposing of wastes, and closing waste facilities associated with the SST system. DOE also believes that site characterization data that support differentiation among alternatives are a key feature of a comparative analysis. Available site characterization data do support comparison of key features in the alternatives, e.g., differences in the geologic settings of IDF-East and IDF-West, differences in spread of contaminant plumes in the 200-East and 200-West Areas, and the locations of contaminant plumes versus key lines of analysis (the Core Zone Boundary and the Columbia River). As part of the closure and permitting processes, additional subregional-scale site characterization data will be developed to support smaller-scale, more-detailed modeling assessments. As this EIS has progressed, information has been incorporated as appropriate between the draft EIS and this final EIS.

215-33 The point of the comparison regarding doses to radiation workers is that clean closure, which would involve removing the tanks and exhuming contaminated soil beneath the tanks, would have a larger radiological impact. As noted, individual worker doses would be managed to ensure that they are maintained ALARA and below regulatory requirements. To avoid potential misunderstanding by readers, the comparison was changed to be presented in terms of collective worker dose. The statement regarding recordable worker occurrences was also revised to directly compare the impacts of clean closure and landfill closure. The number of recordable worker occurrences would be directly proportional to the number of labor hours worked. For clean closure, the number of labor hours would be a factor of 8 to 18 greater than for landfill closure, depending on whether the cribs and trenches (ditches) are included.

215-34 The acreage of sagebrush habitat potentially disturbed by the various Tank Closure alternatives is presented in Chapter 4, Sections 4.1.7.2 through 4.1.7.11. As noted in these sections, the area of sagebrush habitat potentially disturbed

Commentor No. 215 (cont'd): Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

However, we did have concerns with the following:

- The Executive Summary did not provide sufficient information on the severity of the long-terms risks posed by the decisions that DOE proposes to make from this EIS. The document instead focused too heavily on short-term risks. Decision makers and the public who relied on the Summary alone for their view of the EIS were given a slanted view of the importance of short-term related impacts versus the more important long-term impacts to human health and the environment.

- The Executive Summary was difficult for a lay reader to understand. The repeated use of "unitless" radiological risk numbers in many of the graphs, without a thorough and clear explanation of the use of this term, was confusing.

- DOE was late to consult with the State of Oregon and stakeholders on dates and locations of public meetings.

- Despite considerable input provided to DOE, DOE did not make significant changes to its second public mailing. The mailing did not sufficiently highlight the importance or significance of the issues and failed to highlight in any way the preliminary findings from the EIS analyses.

- DOE "overstaffed" the public hearings – unnecessarily increasing the cost of the hearings.

If you need clarification on any of our comments, please don't hesitate to contact me.

Sincerely,

Ken Niles
Nuclear Safety Division Administrator

c.c. Jane Hedges, Washington Department of Ecology
Dennis Faulk, U.S. Environmental Protection Agency
Dave Brockman, U.S. Department of Energy, Richland Field Office
Shirley Olinger, U.S. Department of Energy, Office of River Protection
Stuart Harris, Confederated Tribes of the Umatilla Indian Reservation
Russell Jim, Yakama Indian Nation
Gabriel Bohnee, Nez Perce Tribe
Susan Leckband, Hanford Advisory Board Chair
Max Power, Oregon Hanford Cleanup Board Chair

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215-39 cont'd

ranges from 1.2 to 46.1 hectares (3 to 114 acres) under the landfill alternatives and from 98.3 to 182 hectares (243 to 450 acres) under the clean closure alternatives. The statement made in Chapter 2 of the *Draft TC & WM EIS* merely reflects the disparity in the amount of sagebrush habitat potentially disturbed by the clean closure alternatives versus the landfill alternatives. However, this statement has been modified to indicate that the amount of sagebrush habitat affected would increase by up to two orders of magnitude.

DOE recognizes the importance of late successional sagebrush habitat and categorizes it as a Level III resource at Hanford under the *Hanford Site Biological Resources Management Plan* (DOE 2001). As pointed out in this plan and reflected in the discussion in this EIS, sagebrush loss may be mitigable at different replacement levels or, in some cases, not at all. Chapter 7, Section 7.1.7, discusses potential mitigation measures for sagebrush habitat. The locations of facilities associated with the Tank Closure, FFTF Decommissioning, and Waste Management alternatives were not chosen at random, but rather were selected based on the need for certain facilities to be in proximity to each other and the availability of space. It should also be noted that the 200 Areas are within the Industrial-Exclusive land use zone designated in the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (*Hanford Comprehensive Land-Use Plan EIS*) (DOE 1999). This area is deemed suitable for the treatment, storage, and disposal of hazardous, dangerous, radioactive, and nonradioactive wastes.

Finally, the difference in sagebrush habitat potentially disturbed between the landfill and clean closure alternatives is only one of several potential adverse short-term impacts listed in Chapter 2, Section 2.10. This list does not imply that these impacts are of equal importance or that long-term impacts were not considered in determining DOE's preference for the landfill alternative over clean closure. For instance, an important consideration was the tradeoff between short-term worker risk, which would be higher under clean closure, and long-term groundwater risk, which would be higher under landfill closure.

215-35 As shown in Chapter 4, electricity (and other resources, such as diesel, gasoline, and water) is consumed in much larger quantities under Tank Closure Alternative 6A than under any of the other alternatives. However, the large increase in utility use under this alternative is attributable to the requirement to treat all tank waste as HLW and, thus, is not attributable to the construction and operation of replacement DSTs or the long operational period of WTP facilities. The reason for this is that substantially more utilities are needed to operate the

Commentor No. 215 (cont'd): Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

HLW melters for treating all of the tank waste. The text comparing clean closure to landfill closure of the SSTs in Chapter 2, Section 2.10, has been revised to clarify that the substantial increase in utility use is attributable to the clean closure option (e.g., Tank Closure Alternative 6A) of treating all tank waste as HLW in HLW melters and is not applicable to all clean closure options.

215-36 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. For analysis purposes, these cost estimates were calculated using constant 2008 dollars and, where applicable, existing cost information. Where cost information was not directly applicable, relevant data were scaled to estimate costs, or, where appropriate, scoping-level cost estimates were developed.

However, because there is currently no specific path forward for final disposition of IHLW, an associated cost basis for disposal of this material is not available for inclusion in this EIS. Accordingly, the cost estimates are valid for the purpose of understanding the relative costs of the alternatives, but do not represent complete life-cycle costs. Nonetheless, DOE anticipates the costs associated with disposal of HLW may be excessive under any of the clean closure alternatives. Cost was one of many factors used to determine the Preferred Alternatives identified in the *Draft TC & WM EIS*. Clean closure of the tank farms would require construction and use of containment structures during the removal of 149 SSTs, ancillary equipment, and deep soil. There is substantial uncertainty as to the costs associated with these clean closure activities.

The Tank Closure alternatives were developed to compare the potential long-term impacts on groundwater of closing the SST system. Proposed closure options range from clean closure or selective clean closure/landfill closure to landfill closure with or without any contaminated soil removal. The EIS analyses indicate that total short-term and peak short-term environmental impacts of SST farm closure activities would exceed total facility construction impacts under most alternatives, and would substantially add to short-term environmental impacts overall, especially in terms of emissions, worker doses, and resource demands.

In terms of land resources, clean closure would allow future use of the tank farm areas, but, unlike all other Tank Closure alternatives, would require significant

Commentor No. 215 (cont'd): Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

new, permanent land disturbance for new facilities to treat, store, and dispose of tank waste. In addition, geologic resource demands under the clean closure alternatives would be higher than those under the landfill closure alternatives. A significant uncertainty of clean closure in terms of technical feasibility and risk is the depth of excavation and soil exhumation that would be required. For some SST sites, excavation to depths of up to 78 meters (255 feet) below the land surface may be required to remediate contaminant plumes from past-practice discharges that have migrated through the vadose zone soils and sediments and possibly to the water table.

Because an effort of this scale in a radioactive environment has never been undertaken in the United States, it is unclear whether this operation could be conducted with adequate considerations for worker safety. The peak workforce for clean closure would be twice that for the landfill closure alternatives. Also, worker population radiation dose would increase by up to a factor of 10 in association with clean closure activities. Moreover, as indicated in the *TC & WM EIS* analyses, human health impacts (radiological risk to the drinking-water well user) at the Core Zone Boundary would depend on the closure actions.

The releases from the six sets of cribs and trenches (ditches) and the past leaks from the SSTs also show that clean closure of the SST farms would provide some beneficial long-term impacts on the groundwater after calendar year 6000. However, because of the early releases from past leaks and cribs and trenches (ditches) contiguous to the SST farms, clean closure would provide little, if any, reduction in long-term impacts on the groundwater before calendar year 6000. The EIS analyses further show that clean closure of the SST farms and contaminated soil would not reduce the concentrations of iodine-129 and technetium-99 below their respective benchmark concentrations for at least the first 2,000 years. Thus, groundwater impacts would persist under the clean closure alternatives due to the early releases from past leaks and from the intentional discharges to the soil column through the cribs and trenches (ditches) that occurred from the 1940s through the 1970s.

As a result of the conclusions discussed above, DOE believes that clean closure may not be a viable alternative. Therefore, DOE prefers landfill closure.

215-37 Ecological risk information analogous to the human health risk information is presented for the purpose of assessing and comparing the alternatives analyzed in this EIS. This information includes risk estimates for every chemical and radionuclide analyzed using the models of releases to air and groundwater

Commentor No. 215 (cont'd): Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

and subsequent discharge to the Columbia River at the point of maximum concentration at discharge. This EIS does not state or assume that biota in any portion of the Hanford Reach of the Columbia River are not potentially exposed to contaminants released to air or groundwater. Chapter 2, Section 2.9.1.1, Water Quality, discusses the long-term environmental impacts on groundwater quality from tank closure sources (i.e., tank farm past leaks, discharges to cribs and trenches [ditches] closely associated with the tank farms, tank farm residuals, retrieval losses, and ancillary equipment). Long-term impacts on groundwater quality from FFTF decommissioning and waste management sources are discussed in Sections 2.9.2.1 and 2.9.3.1, respectively.

Groundwater impacts are described in terms of the concentrations of COPC drivers such as hydrogen-3 (tritium), iodine-129, technetium-99, uranium-238, chromium, nitrate, and total uranium. These are all considered conservative tracers and, therefore, representative of potential long-term contamination. The magnitude of the impacts, including their extent, area, and duration, has been represented in terms of the total amounts of the COPC drivers released to the vadose zone from all sources related to a particular alternative.

As stated in Appendix P, Section P.2.1, comparing alternatives is the primary purpose of the ecological risk analysis in this *TC & WM EIS*. The most important pathways from sources to receptors (air emission and the subsequent deposition on soil, releases to groundwater) that are evaluated in this EIS are common to all of the alternatives, but vary in magnitude under different alternatives. The amounts released via these pathways and the resulting concentrations in the different media to which receptors are directly or indirectly exposed also vary under the different alternatives, but the extent to which receptors are exposed to the different media does not vary. Therefore, the risk to receptors under the different alternatives does not change if common parameters such as the magnitude of dilution in the nearshore environment are over- or underestimated as long as the risk estimates for all alternatives are calculated in the same way for the same set of exposures and receptors.

Given the parameters and assumptions used in the risk analysis, the magnitudes of exposures over the important pathways were judged to be conservative estimates and these were compared with the benchmark exposures associated with no impact, resulting in conservative Hazard Quotients. Statements addressing Hazard Quotients greater than 1 acknowledge the deliberate conservatism of some of the parameters used in the risk analysis and the

Commentor No. 215 (cont'd): Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

uncertainty associated with interpreting Hazard Quotients greater than 1, which are indicative of likely adverse impacts.

This EIS does not unequivocally state that there are no risks to ecological receptors under the various alternatives. As stated in Appendix P, a more precise evaluation would be required to resolve the uncertainties in the long-term risk characterization.

215-38 The rationale for presenting the results of the drinking-water well user only in the key environmental findings is discussed in the Summary, Section S.5.5, and Chapter 2, Section 2.10. In this context, the use of a generic EPA agricultural scenario is not the best choice. The scenario should be site specific to the extent practicable, reflecting factors such as location and lifestyle. The resident farmer scenario analyzed in this EIS is intended to be representative of an agricultural scenario in the Hanford region and, as such, will differ from a generic EPA scenario as might be used in preliminary human health analyses at a site. The intent of the American Indian scenarios was to collectively reflect American Indian lifestyles for the purpose of comparison. DOE acknowledges that other scenarios may be postulated, but it was never the intent to analyze all possible scenarios.

215-39 In response to comments that not enough summary information on long-term impacts was provided in the *Draft TC & WM EIS*, DOE added a more extensive discussion of long-term impacts analysis to the Summary, Section S.5.4, and Chapter 2, Section 2.9, of this *Final TC & WM EIS*. The Summary is intended to provide a brief overview of the information contained in the *TC & WM EIS* and cannot, by nature, include all topics of interest to individual parties. 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.

To address the confusion over the use of "unitless" in the presentation of radiological risk in this *Final TC & WM EIS*, DOE revised the depictions in the graphics located in the Summary and Chapter 5, as well as other locations

Commentor No. 215 (cont'd): Ken Niles, Nuclear Safety Division Administrator, Oregon Department of Energy

within the document to remove the term "unitless." In addition, a text box that addressed "radiological risk" was edited and placed earlier in the Summary. This term is also defined in the Glossary for this EIS. Radiological risk, as used in the long-term impacts analysis, is the incidence of cancer and the risk is expressed in these graphs as the probability over a lifetime of developing cancer. Therefore, no unit is necessary for this measurement. In response to requests for more-extensive collaboration in the *TC & WM EIS* public hearing planning 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.

The purpose of the mailers is to notify interested parties of scheduled hearings (date, time, location). DOE's public hearing format included holding 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 each open house.

Commentor No. 216: Doug Heiken, Oregon Wild

From: dh.oregonwild@gmail.com on behalf of Doug Heiken [dh@oregonwild.org]
Sent: Thursday, March 18, 2010 12:49 PM
To: tc&wmeis@saic.com
Subject: Comments on the Hanford Tank Closure & Waste Management DEIS

OREGON WILD
PO Box 11648 | Eugene OR 97440 | xxx-xxx-xxxx | fax xxx-xxx-xxxx
dh@oregonwild.org | http://www.oregonwild.org/

18 March 2010

TO: TC&WMEIS@saic.com

Subject: comments on the Hanford Tank Closure & Waste Management DEIS

Dear DOE:

Please accept the following comments from Oregon Wild concerning the Hanford Tank Closure & Waste Management DEIS. Oregon Wild represents about 7,000 members and supporters who share our mission to protect and restore Oregon's wildlands, wildlife, and water as an enduring legacy.

1. All cleanup activities should be planned so as to meet the standard of long term protection of the Columbia River, other surface and ground water, soil health, terrestrial ecosystems, air quality, farmland, and the health of the people in nearby communities and the entire Pacific northwest.
2. The waste contamination problem at Hanford has been lingering too long. Please start clean-up promptly and accelerate the pace of clean-up. Do not adopt a process that results in further delay. Two top priorities include: removing waste from single-shelled tanks, and cleaning up waste that has already leaked from it's containment. Plans should be made to store waste more securely while it awaits vitrification. ***216-1***
3. The clean-up should be high effective and efficient. More than 99% of the waste should be retrieved and properly treated. Do not settle for incomplete clean-up. All clean-up plans, contracts, agreements, must have stringent mechanisms for accountability so that the public is assured that promises will be kept. ***216-2***
4. Hanford is already one of the most pollute places on earth. Please do not increase the waste burden at Hanford by shipping waste from other locations to Hanford. Those who generate dangerous waste materials must be responsible for their own waste production. They should not be able to shift their waste problems to Hanford. Transporting highly toxic and/or radioactive waste across highways will endanger public heath and the environment. ***216-3***

216-1 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.

216-2 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*. DOE would monitor all work related to tank closure as it takes place. Also, postclosure monitoring would continue for at least 100 years (see Chapter 2, Section 2.2.2.4.1).

216-3 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. 216 (cont'd): Doug Heiken, Oregon Wild

5. Waste that is disposed of on site must be monitored until the wastes are no longer harmful to humans and the ecosystems. *216-4*
6. Tank farm wastes in cribs and trenches should be treated via "remove-treat-dispose" methods, rather than by using short lived "caps" to cover the material and divert run-off. There is an important aquifer under Hanford that feeds the Columbia River. Capping wastes does little to protect the aquifer and the Columbia River. *216-5*
7. EIS should include an alternative which does not rely on Hanford as a national radioactive and mixed radioactive hazardous waste dump.

Sincerely,
/s/

Doug Heiken, Oregon Wild
PO Box 11648, Eugene OR 97440
dh@oregonwild.org, xxx.xxx.xxxx

216-4 This *TC & WM EIS* assumes several different types of end-state management, as described in Chapter 2, the Glossary, and the Summary. These include administrative controls, institutional controls, and postclosure care, as appropriate. Each of these end-state management options would take place at the completion of an action and is assumed to occur for 100 years following the end of the action. For disposal facilities licensed by NRC for the disposal of Class A and Class B low-level waste 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.

216-5 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 would be addressed at a later date.

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. 217: Ted Hunter

From: Ted Hunter [huntertp@aol.com]
Sent: Thursday, March 18, 2010 1:01 PM
To: tc&wmeis@saic.com
Subject: Comment on Hanford Waste Site

Please include me as an interested party when considering shipping additional radioactive waste to Hanford. I was involved as Counsel to the Washington Legislature in the review of the suitability of Hanford as a High Level waste site during the 1980s, when the nuclear industry was actively seeking a permanent disposal site under the Nuclear Waste Policy Act. We determined it was not a suitable site, and thought the process for seeking to put additional waste at Hanford would then end. The site is not suitable because of the groundwater flows toward the Columbia River and the small 'earthquake swarms' that create fissures for flow of groundwater. We also noted that vitrification requires storage of materials prior to processing and that any storage of materials would threaten the Columbia River. *217-1*

Please do not allow an increase of radioactive material to Hanford.

Please keep me informed of what you are doing:

Ted Hunter
4500 Ninth Avenue NE, Suite 300
Seattle, WA 98105
=

217-1 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.

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.

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.

Public input is important to DOE and DOE appreciates the public's participation in the preparation of this EIS. All comments made during the public comment period, whether given orally at hearings or sent via mail or email, were considered equally by DOE. All comments received on the *Draft TC & WM EIS* and their approved responses are included in this CRD, a volume of this final EIS. DOE has posted this *Final TC & WM EIS*, including this CRD, on the Hanford website (http://www.hanford.gov) and on the DOE NEPA website (http://energy.gov/nepa), and a Notice of Availability will be published in the *Federal Register*.

Commentor No. 218: Susan Leckband, Chair, Hanford Advisory Board

HANFORD ADVISORY BOARD

A Site Specific Advisory Board, Chartered under the Federal Advisory Committee Act

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March 4, 2010

Inés Triay, Assistant Secretary for Environmental Management
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Jane Hedges, Program Manager
Washington State Department of Ecology
3100 Port of Benton Blvd.
Richland, WA 99354

Re: Tank Closure and Waste Management Environmental Impact Statement

Dear Ms. Triay, Olinger, Messrs. Brockman, Faulk and Ms. Hedges,

Introduction

The Hanford Advisory Board (Board) recognizes the importance of the draft Tank Closure and Waste Management Environmental Impact Statement (TC&WM EIS) in supporting cleanup decisions at Hanford. This draft TC&WM EIS will provide the basis for cleanup decisions with impacts far into the future. The Board has a long standing interest in this

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Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

draft since before 2002, when we provided advice regarding the Draft Hanford Solid Waste Environmental Impact Statement (SWEIS), the predecessor of the current draft TC&WM EIS. We thank the U.S. Department of Energy (DOE) for engaging the Board during the development of the current draft TC&WM EIS and for heeding our recommendation to provide the public opportunities to comment on the document in multiple locations in Washington, Oregon and Idaho.

This draft TC&WM EIS is incredibly complicated and the Board does not support in total the package of options contained in any of the alternatives that were presented in the draft document. Instead we will provide you with values-based advice on both the positive and negative elements in the draft document. We have also provided comments and divided the comments and advice into categories that seem appropriate for clarity. Please do not interpret our silence on any given element of the draft TC&WM EIS as an expression of concurrence with that element. The Board expects to continue to engage in an active dialogue with DOE as they respond to and incorporate comments received.

OVERARCHING COMMENTS

Background

The Board has used its independent contractor's analysis of the draft TC&WM EIS to formulate many of the following comments and advice.[1]

The draft TC&WM EIS analyzes a series of potential actions. Many of the actions discussed are integral to the cleanup of the site and are governed by state and federal environmental laws. The full investigation, analysis and decisions on these actions will be made by the regulatory agencies [Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA)] and not by DOE as a result of this draft TC&WM EIS. This draft will and should support their analyses and decisions.

It is incumbent on both the DOE Richland Field Office (DOE-RL) and the DOE Office of River Protection (DOE-ORP) in proposing various actions in this draft TC&WM EIS, to show that their proposals will conform to the policy and specific directions provided by the National Environmental Policy Act (NEPA) to:
"...prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man"; "...recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man";

1 K.D. Auclair & Associates, LLC, (March 4, 2010). *Hanford Tank Closure & Waste Management Environmental Impact Statement External Independent Review Team Preliminary Assessment Report.*

218-1

218-2

218-1 During the development of this *TC & WM EIS*, HAB submitted the following pieces of advice specific to this EIS: Advice #144 *"Tank Waste Retrieval and Closure Environmental Impact Statement (EIS) Scoping,"* Advice #184 *"Tank Closure & Waste Management Environmental Impact Statement Scoping Process,"* and Advice #185 *"Tank Closure &Waste Management (TC&WM) Environmental Impact Statement (EIS)."* Embedded in the three letters were 53 pieces of advice. DOE accepted 49 pieces of advice, partially accepted 1 piece of advice, and did not accept the 3 remaining pieces of advice. In all cases, DOE provided HAB with an explanation of how DOE addressed the advice.

218-2 Ecology has been a cooperating agency on this EIS for the purpose of fulfilling the SEPA requirements as identified by its MOU (see Chapter 1, Section 1.2.7). In addition, information can be found in this EIS on how the data in this EIS will support decisions and permitting. Ecology also has a foreword in both the draft and this final EIS that expresses how it will use this EIS to support its processes.

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

"...without degradation, risk to health or safety, or other undesirable and unintended consequences"; "The Congress authorizes and directs that, to the fullest extent possible: (1) the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this Act, and (2) all agencies of the Federal Government shall –"; "...insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision-making along with economic and technical considerations;"
(40 CFR 1508.7) "Cumulative impacts...the impact on the environment which results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions..."
Most tank closures and the waste management alternatives appear to lack necessary actions to ensure that the soil and groundwater are not further contaminated, that risk to the environment and human health does not increase in the future, and that the soil and groundwater are restored.

Per Board Advice #197 *Groundwater Values*, and Board Advice # 173 *Central Plateau Flowchart*, the preferred alternative should not harm groundwater, should return groundwater throughout the entire plume to best use in the near future, and capping waste sites should be considered as a last resort and then only if retrieving, treating and disposing waste is not technically feasible. Treatment waste forms should ensure protection of these values and should minimize contamination of groundwater. The Board has a long-standing belief that DOE should not claim that any shallow soil, vadose zone or groundwater is irretrievably and irreversibly committed to a restricted use category. ***218-3***

Advice

- Considering the breadth and depth of comments to the current draft TC&WM EIS and the potential impact on cleanup decisions based on the TC&WM EIS, the Board advises DOE to issue a revised draft TC&WM EIS for public review before finalizing the TC&WM EIS. ***218-4***

Decisions on cribs, trenches and tile fields should continue to follow Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) processes. Cumulative and composite impact analysis of the 200 Area vadose zone should be done to inform future RCRA and CERCLA decisions. Points of compliance should be established at the boundaries of the waste management unit. ***218-5***

218-3 Although this *TC & WM EIS* does not make decisions specific to groundwater remediation, as it is covered by CERCLA, regarding groundwater remediation in Advice #197, DOE has provided information in Appendix U on the activities done to date and information on future activities related to CERCLA operable units on the Central Plateau. Regarding Advice #173, which provides a detailed flowchart illustrating how remediation decisions could be made on site, these types of questions could be similar to the more detailed closure process that will be followed for the tank farm waste management areas. This regulatory process is described in Chapter 7, Section 7.1. Irreversible and irretrievable commitments of resources are discussed in Section 7.3.

218-4 DOE has satisfied NEPA requirements by responding to public comments on the draft EIS in this CRD and by making changes to the draft EIS where appropriate and necessary. Subsequent to the issuance of the *Draft TC & WM EIS*, DOE prepared an SA to analyze 14 topics it identified where it is unclear whether updated, modified, or expanded information warrants preparation of a supplemental or new draft EIS. 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* is not required. See Chapter 1, Section 1.8.2, for more information.

Early stakeholder participation in the EIS planning and development process is important to DOE, which has provided many opportunities for such interaction. For example, DOE has met with HAB on numerous occasions where the board provided extensive input to the *TC & WM EIS* development process and analyses. Chapter 8 of this *TC & WM EIS* identifies the process for these interactions and includes a description of the outcomes of the stakeholder meetings.

218-5 The commentor brings up the issue of integration and cleanup of CERCLA and RCRA units, which could influence each other. 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 (which include cribs, trenches [ditches], and tile fields), as well as sources of plutonium, is being addressed under CERCLA, which will also satisfy substantive RCRA and Washington State Hazardous

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

- Transparency of quality assurance and quality control is either lacking or not presented. The Board recommends that during the revision and incorporation of comments to the draft TC&WM EIS, DOE use more recent available data to enhance the accuracy of the draft. ***218-6***
- The Board recommends the draft TC&WM EIS should discuss Washington State's environmental exposure standards for both toxic chemicals and radiation dose in a manner that is understandable by the public. ***218-7***
- The draft TC&WM EIS should discuss Washington State's regulatory philosophy for limiting the overall lifetime cancer risk for the most highly exposed member of the public that is likely to accrue from all components of exposure (chemical and radiation). ***218-8***
- The Board recommends that DOE focus its future decisions on detailed considerations of the maximum likely drinking water contamination and individual radiation dose for each cleanup alternative as a means of ranking each alternative in terms of potential health risk. ***218-9***
- The Board recommends that DOE-RL and DOE-ORP use consistent exposure scenarios in all of their environmental impact statements. ***218-10***
- The draft TC&WM EIS should present estimates for full life cycle cost analysis using both current year and present value dollars (including estimated costs for natural resource restoration) and risk analyses in all of the alternatives. ***218-11***
- In addition to and preceding the executive summary, the Board recommends DOE include a two or three page high-level summary, in language the public can understand, describing the short and long term impacts of each alternative and why DOE selected its preferred alternatives. ***218-12***
- DOE should include an alternative that meets established standards that are protective of human health and the environment. ***218-13***
- Each alternative presented in the draft TC&WM EIS should be amended to identify mitigation to protect the soil, groundwater, environment and uncounted future generations. ***218-14***
- DOE should document how Quality Assurance/Quality Control (QA/QC) procedures and protocols were used in the performance of the draft TC&WM EIS analysis. ***218-15***

Waste Management Act corrective action requirements. Contamination in the vadose zone resulting from tank farm past leaks will be addressed during the SST closure process. The cumulative impacts analysis for this *TC & WM EIS* (see Appendix U and Chapter 6) includes the vadose zone of the 200 Areas in addition to other areas of Hanford. The alternatives analyses and the cumulative impacts analysis use points of analysis to allow comparison of alternatives in a similar fashion, as required by NEPA. These points of analysis include, as appropriate, the tank farm barriers, FFTF barrier, IDF-East barrier, IDF-West barrier, RPPDF barrier, Core Zone Boundary, and Columbia River. The points of analysis were identified in the *Technical Guidance Document* (DOE 2005), signed in March 2005 by DOE and Ecology.

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.

218-6 DOE applies quality management systems to its NEPA document preparation process and is committed to developing NEPA documents of the highest quality and technical accuracy. This *TC & WM EIS* was prepared in compliance with the requirements of DOE Order 414.1D, *Quality Assurance*, as well as project-specific quality management plans and procedures that govern data management, calculations and analyses, and analytical software development and use. As a result of 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, ending litigation concerning the *HSW EIS* (DOE 2004a), Ecology conducted its own quality assurance reviews of the *Draft* and this *Final TC & WM EIS* to ensure that quality assurance processes were in place and being followed. Ecology's foreword to the *Draft* and this *Final TC & WM EIS* states Ecology's belief that the document benefited from the quality reviews and quality assurance procedures followed during its preparation.

Quality assurance was identified wherever relevant and appropriate throughout the *Draft* and this *Final TC & WM EIS*. For example, Chapter 1, Section 1.2.7, and Chapter 8, Section 8.1.1, plainly identify and discuss DOE's quality assurance review that was initiated for the *HSW EIS* and resulted in a revised scope for the then-pending "Environmental Impact Statement for Retrieval,

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

- DOE should revise the draft TC&WM EIS to evaluate cumulative risk in a rigorous way, examining a broader and more representative range of the ninety-eight potential combinations of alternatives evaluated for cumulative risk. This revision will ensure sufficient precision to make decisions among the various combinations of alternatives. *218-16*
- As part of the cumulative risk analysis, DOE should present alternatives that are based on the present and reasonably foreseeable remediation actions for the vadose zone and groundwater conducted under CERCLA and RCRA (such as pump and treat and vapor extraction). *218-17*
- As noted by the Board's independent contractor's analysis, there appears to be a number of unit conversion or data errors. These errors raise serious doubts about the quality of the analysis. DOE should thoroughly review the draft TC&WM EIS and the revised draft TC&WM EIS to ensure that such errors are found and corrected. *218-18*

TANKS

Background

Waste has leaked from the tanks, pipelines and related facilities, along with hundreds of millions of gallons that have been discharged from the tanks system. Much of this contamination has moved deeply into the soil. This contamination, combined with more recent contamination, and with residual wastes which may remain in tanks, pipelines, and related facilities, constitute the source term for the tank waste portion of the draft TC&WM EIS analysis. The characterization of the vadose zone contamination is limited which imposes limits on how well the TC&WM EIS team can estimate the waste impacts. The Board is concerned that the analysis may understate the degree of contamination in the vadose zone and give false assurance to decision makers and the public about how much is known about the location, amount and movement of these wastes.

This contamination, particularly in the deep vadose zone, is moving. This leads the Board to conclude that there is great urgency to understand where it all is, how it is moving, and what can be done to remedy that, as well as how to protect the groundwater directly beneath the tank farms and waste sites as well as everywhere on site. The Board believes DOE will likely have to treat the soil to remove various contaminants either in place (through soil washing or other means) or after exhumation.

Treatment, and Disposal of Tank Waste and Closure of Single-Shell Tanks at the Hanford Site, Richland, Washington." Appendix S, Section S.3.2, describes the quality assurance process followed for each step of the cumulative impacts inventory development process.

Whenever available and appropriate, the latest data and information were included in this *Final TC & WM EIS*. For a more comprehensive discussion of this topic, see Section 2.2 of this CRD.

218-7 In this *Final TC & WM EIS*, DOE revised the draft EIS graphs of radiological risk in the Summary, Chapter 5, and other locations to clarify the term "unitless," which seemed to confuse readers and commentors. In addition, the Washington State statutes and regulations, including requirements and standards, that are potentially applicable to the proposed actions are discussed in Chapter 8 of this EIS.

218-8 Ecology's foreword, located in the front section of the *Draft TC & WM EIS*, provides information on Ecology's role as a cooperating agency and also includes Ecology's insights on the development of the draft EIS. The foreword presented in this final EIS provides additional insights from Ecology as a result of DOE's responses to Ecology's comments on the draft EIS and on DOE's decisions to be made. Federal and state laws and regulations are described in Chapter 8 of this EIS.

218-9 Under NEPA, agencies must conduct and present the results of a comparative analysis of the alternatives; consider the cumulative impacts of the alternatives when added to other ongoing actions; and identify potential mitigations that could be used to offset the impacts identified by the NEPA analysis. The goal is to consider the best-available information at the time of the agency's decisionmaking process. However, NEPA does not require that an agency ultimately select the environmentally preferred alternative based on a "ranking" process. Therefore, DOE disagrees that each alternative needs to be ranked based on a specific methodology or certain potential health risks. DOE does believe that there are specific aspects of each alternative that illuminate key issues or concerns; these are described in the key environmental findings sections of the Summary (Section S.5.5) and Chapter 2 (Section 2.10) of this EIS. DOE used these key findings to assist in identifying the Preferred Alternatives.

218-10 The same exposure scenarios were consistently used for all alternatives analyzed in this *TC & WM EIS*.

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

Because the single shell tanks (SSTs) and related facilities are already at twice their original design life and as there is inherent uncertainty in how much longer they may be relied on to contain the wastes, it is urgent that the wastes currently in SSTs be removed as expeditiously as possible. The current plan relies on the Waste Treatment Plant (WTP) to process tank wastes starting in 2019, thereby providing space in the double-shell tanks (DSTs) to retrieve the remaining SSTs. *218-19*

Historical precedent in the agency for such complex facilities suggests that DOE should not depend entirely upon the immediately successful operation of WTP on the planned schedule.

Comments

As stated in the draft TC&WM EIS, there is "considerable" uncertainty in the composition of the waste in SSTs. The sampling of the tanks was limited and complicated by the liquid and solid makeup of the tank waste. These limited data do not allow for the high confidence in the estimates of the tank waste compositions used in the draft TC&WM EIS.
The draft TC&WM EIS modeled impacts from leaving waste in the tanks as if the contents are homogenous, but they are not. The impacts modeled for DOE's preferred alternative to allow one percent of the volume to remain as a heel are based on the contaminant inventory when the tanks were full of liquid and solid waste. The final one percent may contain far more than one percent of heavy metal radionuclides of concern. Conversely, a smaller fraction of the soluble contaminants may be present in the tank residuals. *218-20*

The estimates of tank waste in the vadose zone consider only known leaks from tanks, pipelines and surface releases. These estimates probably understate the real size of the releases.[2345] The estimates appear to omit significant non-leak tank release events, such as tank overflows, other miscellaneous releases, and the quantity of waste in auxiliary equipment appears to be an extrapolation of an estimate which may differ greatly from the actual contents. *218-21*

2 TC&WM EIS D.1.4 "Historical Leaks and Other Releases." Estimates of tank waste in the vadose zone consider only known leaks from tanks. The estimate does not include or estimate non-leak tank events, such as overflows (e.g. Tank T-101).
3 Presentation to Hanford Advisory Board on Behalf of the Nez Perce Tribe, Feb. 16, 2010, "TC&WM EIS Chemical Cumulative Impact Does Not Take Into Account 96% of the Uranium on Site" – Comparison of PNNL 15829 - 3610.43 Ci to TC&WM EIS for non-EIS (cumulative impact Appendix S) sites cited - 3,220 Ci.
4 Bernhard, et al for the Nez Perce calculates total uranium from PNNL 15289 = 6.69 x 10^6 kg. TC&WM EIS reports total uranium as 2.73 10^5 kg.
5 TC&WM EIS Appendix S reports 1,820 curies of uranium disposed in US Ecology. PNNL 11800 (1998) reports greater than 10,800 curies disposed – a difference of an entire magnitude.

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218-11 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. Cost estimates for other environmental restoration activities or risk analyses are considered beyond the scope of this EIS. For analysis purposes, these cost estimates were calculated using constant 2008 dollars and, where applicable, existing cost information. Where cost information was not directly applicable, relevant data were scaled to estimate costs, or, where appropriate, scoping-level cost estimates were developed.

However, because there is currently no specific path forward for final disposition of IHLW, an associated cost basis for disposal of this material is not available for inclusion in this *TC & WM EIS*. Accordingly, the cost estimates are valid for the purpose of understanding the relative costs of the alternatives, but do not represent complete life-cycle costs.

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*.

218-12 Given the large number of alternatives and options analyzed in this *TC & WM EIS*, a two- to three-page summary of both the short- and long-term impacts would be at such a high level that it would not provide the reader with any useful information. DOE believes it has provided a useful summary of impacts in the EIS Summary in Section S.5.3, Summary of Short-Term Environmental Impacts; Section S.5.4, Summary of Long-Term Impacts; and Section S.5.5, Key Environmental Findings. DOE has also issued a Reader's Guide to this EIS that is intended to assist the public in navigating through information of interest to individuals. 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 this EIS to assist the reader in reviewing the technical analyses presented.

218-13 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

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

The draft TC&WM EIS reports that only relatively clean cooling water was disposed to ponds. Yet, surface contamination in the ponds and ditches was severe. Characterization of the vadose zone beneath the trenches and ponds is needed to establish the severity of the problem. Significant amounts of vadose zone contamination beneath the ponds and ditches do not appear to be included in the draft TC&WM EIS.

218-21 cont'd

The draft TC&WM EIS indicates that high volume streams containing modest levels of contaminants were discharged to cribs and trenches.[6] However, the waste stream disposed in the cribs and tile fields on the west side of the T Tank Farm was tank supernate that flowed from the third tank in a three tank cascade. It is unlikely that 150 million gallons of tank supernate contributed less than a curie of technetium to the vadose zone (Table D-28). The trenches, cribs, and tile fields around the TX and TY Tank Farms received considerable amounts of waste. 216-T-25 received 3 million gallons of evaporator concentrates containing more than 200 curies of technetium. Table D-28 reports total technetium 99 disposed in the TX Trenches as 1.62 curies. The T-19 crib and tile field at the south end of TX-TY received an estimated 120 million gallons of evaporator condensate containing high concentrations of tritium and iodine. These substantial waste volumes appear to have been omitted from the draft TC&WM EIS.

218-22

The Board is concerned that these problems may be indicative of a larger and more systemic underestimation of the levels and amounts of vadose zone contamination.

Advice

In its revised draft TC&WM EIS, the Board recommends DOE should:

- Evaluate the actual composition (radionuclides and hazardous constituents), mass and volume that are likely to exist in each tank heel, and between the inner steel tank and the concrete shell of each tank on a tank by tank basis. Analyze the impacts from DOE's preferred alternative to leave one percent of the tank waste volume as a heel in the tanks based on a more conservative assumption than the waste is homogenous. The analysis in the current draft likely misinterprets the impacts by assuming that the concentration of contaminants in the heel is in the same proportion in the overall waste volume.

218-20 cont'd

- Consider a reasonable alternative for providing additional tank capacity and/or other new facilities to allow for continued retrieval of SSTs prior to the WTP beginning full operation, and after operation when current projections are that retrieval will have to halt.

218-19 cont'd

6 RPP-23405, Revision 0, "Tank Farm Vadose Zone Contamination: Volume Estimates For Risk Assessments," J. G. Field, T. E. Jones, December 2004.

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.

218-14 Chapter 7, Sections 7.1 and 7.5, discuss 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.

218-15 DOE applies quality management systems to its NEPA document preparation process and is committed to developing NEPA documents of the highest quality and technical accuracy. See response to comment 218-6 for a discussion of quality assurance in development of this EIS.

218-16 As described in Chapter 5, Section 5.4, several hundred impact scenarios could result from the potential combinations of the 11 Tank Closure, 3 FFTF Decommissioning, and 3 Waste Management alternatives when factored with their associated option cases and waste disposal groups. For analysis purposes, three combinations of alternatives were chosen to represent key points along the range of actions and associated overall impacts that could result from full implementation of the three sets of proposed actions. DOE believes that these three combinations adequately represent the range of impacts presented by the hundreds of possible impact scenarios.

218-17 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 non-tank-farm contamination sites are considered in the *TC & WM EIS* cumulative impacts analysis. As described

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

- Do more characterization of the fate and extent of contamination from wastes leaked or released from tank farms and related pipelines, transfer boxes and cribs or other structures that may have discharged tank wastes to the soil. ***218-21 cont'd***
- Should also have estimates of non-leak tank release events, such as tank overflows, other miscellaneous releases, and undated leak events in the draft TC&WM EIS. The draft should include the uncertainty in that estimation. These estimates should be found in the broad scale uncertainty estimates in the modeling.
- Evaluate an alternative for tank waste management that results in compliance with all applicable standards. ***218-23***
- Reassess the discharge estimates for the cribs and tile fields associated with T, TX and TY tank farms to ensure that the best available information was used and that uncertainties in those estimates are fully addressed. If significant data were missed for these facilities, the draft TC&WM EIS should reassess the discharge estimates for such facilities associated with all tank farms. ***218-22 cont'd***
- Include an estimate of the contamination beneath ponds, ditches and other release sites contaminating the vadose zone and the uncertainties in the risk estimates as part of the cumulative analysis. ***218-24***

WASTE MANAGEMENT

Background ***(Waste Management)***

NEPA requires that environmental impact statements present a reasonable range of alternatives and disclose and consider the impacts of all related pending federal agency proposals for action, including cumulative impacts.
The Board opposes further consideration or implementation of the importation and disposal of off-site low-level waste (LLW) and mixed waste (MW) at Hanford due to the high impacts to groundwater and risk from existing wastes, and the documented increase in impacts projected from offsite waste. ***218-25***

Advice ***(Waste Management)***

- The draft TC&WM EIS should present an alternative which does not use Hanford as a national radioactive waste disposal site for LLW or MW.

in Section S.3.5 of Appendix S, 403 waste sites are included as part of the other past, present, and reasonably foreseeable future actions considered in the cumulative impacts analysis. Appendix S 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 of contaminants would be removed to the extent possible, treated (if needed), and disposed of in the ERDF or an IDF. The groundwater modeling incorporates the disposition locations for the contaminant inventories from each waste site; therefore, the long-term cumulative impact analyses reflect the current or future end states to the extent possible.

Even after the consideration of future end states, 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. These include: (1) the inventories of contaminants released to the ground at many of the sites; (2) for liquid release sites, the portion of the contaminants originally disposed of that remains 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: (1) cleanup/containment of waste and contaminated soil at liquid release sites, and (2) cleanup/containment of current or future groundwater contamination.

In recognition of concerns about the effects of remedial actions, DOE added a sensitivity analysis of the impacts that may occur if certain remediation activities are 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.

218-18 In response to this comment, DOE did a thorough review of the draft EIS and identified some errors where data were incorrectly input into the text of the document. These errors have been corrected in this *Final TC & WM EIS*.

218-19 All 29 SSTs have now been interim stabilized, and all work required to be performed under the Interim Stabilization Consent Decree (No. CT-99-5076-EFS,

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

- The draft TC&WM EIS should present an alternative which will exhume and dispose off-site significant quantities of Hanford's long-lived radioactive waste (e.g. pre-1970 buried transuranic waste). ***218-26***
- DOE should withdraw its February 2000 Record of Decision (ROD) which designated Hanford as a national waste disposal site for LLW and MW. ***218-27***

Comments ***(Groundwater)***

The draft TC&WM EIS identifies unacceptably high impacts to human health and the environment from contamination which will reach the groundwater from on-site disposal of existing waste and wastes which are projected to be created during Hanford cleanup. These impacts are compounded by existing high levels of contaminated groundwater and future groundwater contamination from the vadose zone, as projected from the draft TC&WM EIS alternatives presented. Secondary waste disposal from the WTP and tank farm closure activities are also expected to cause significant groundwater impacts. Technetium and iodine are drivers for elevated impacts. Adding off-site waste greatly increases these impacts. The Board has a long held value for DOE to return groundwater quality to its highest beneficial use. ***218-28***

Advice ***(Groundwater)***

- Choose a preferred alternative that will restore all groundwater to beneficial use throughout the plumes.
- For the combined groundwater analysis, DOE should consider an alternative which would remove and treat long-lived, extremely radioactive or mixed chemical hazardous wastes for disposal in deep geologic repositories or regulated off-site landfills which are not projected to cause contamination in excess of relevant standards [e.g. remove and dispose in a deep geologic repository radioactive or mixed wastes 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 (GTCC) – like waste in a geologic repository]. The combined groundwater analyses should also be presented with and without the contribution from a "closed" U.S. Ecology landfill. ***218-29***
- The draft TC&WM EIS should examine additional treatment processes for immobilization for technetium storage and/or disposal options to minimize release to the groundwater. ***218-30***

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September 30, 1999, as amended) has been completed and confirmed. As a result, the court granted the joint motion to terminate the Consent Decree on March 8, 2011. DOE does not believe that the construction of additional DSTs prior to WTP operation would be warranted. The 28 existing DSTs at Hanford are active components needed to complete waste treatment. The construction of additional DSTs was only considered under alternatives where the existing DST capacity was insufficient to support the proposed treatment schedule (Tank Closure Alternative 5) or required replacement because the design life of these facilities would be exceeded (Tank Closure Alternatives 2A and 6A).

218-20 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. For a more comprehensive discussion of this topic, see Section 2.2 of this CRD.

218-21 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 (e.g., overflows) needed to be revised. This inventory is relatively minor, but the inventory estimates in Appendix D and the groundwater human health dose and risk analysis in Appendix Q were updated in this *Final TC & WM EIS*. However, as noted by the commentor and discussed in Appendix D of the draft EIS, due to lack of supporting data, there is uncertainty regarding the volume of tank waste leaked. To provide additional insight, 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. 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

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

- The draft TC&WM EIS should adequately report all chemical inventories from all disposal sites at Hanford (including non-DOE Environmental Management (EM) disposal sites, e.g. U.S. Ecology) to ensure a credible analysis of the actual and potential cumulative impact to groundwater. ***218-31***
- Points of compliance should be established at the boundaries of the waste management unit. ***218-32***
- Points of analysis should be established at unit boundaries, geographic area boundaries, along the Columbia River, and other points of concern.
- To inform decision-makers and the public of the impacts from potential actions, the Board advises that the revised draft TC&WM EIS provide current concentrations and estimate future maximum concentrations for all potential contaminants, not just concentrations in groundwater which occurred in the past. ***218-33***
- In the revised draft TC&WM EIS, DOE should analyze and disclose cumulative impacts for exposure to all sources at the point of highest contamination, where it is foreseeable that there will be future wells, buildings or intrusions. ***218-34***
- DOE should:
- Revise the draft TC&WM EIS to address groundwater remediation in accord with Board Advice #197. ***218-35***
- Revise the draft TC&WM EIS to evaluate how remediation of waste sites may alter groundwater flow patterns and movement of groundwater contamination. ***218-36***
- Emphasize the potential impacts on human health and the environment from the largest predicted sources of impacts: B/C cribs, past-practice discharges to cribs, trenches, ditches, ponds, and past leaks and releases from SSTs, pipelines and transfer boxes. ***218-37***
- Not portray lesser impacts that fail to meet regulatory standards as insignificant. All of these impacts should be remedied. ***218-38***
- Address and include anticipated new technology development and use for addressing groundwater and vadose zone contamination. ***218-39***

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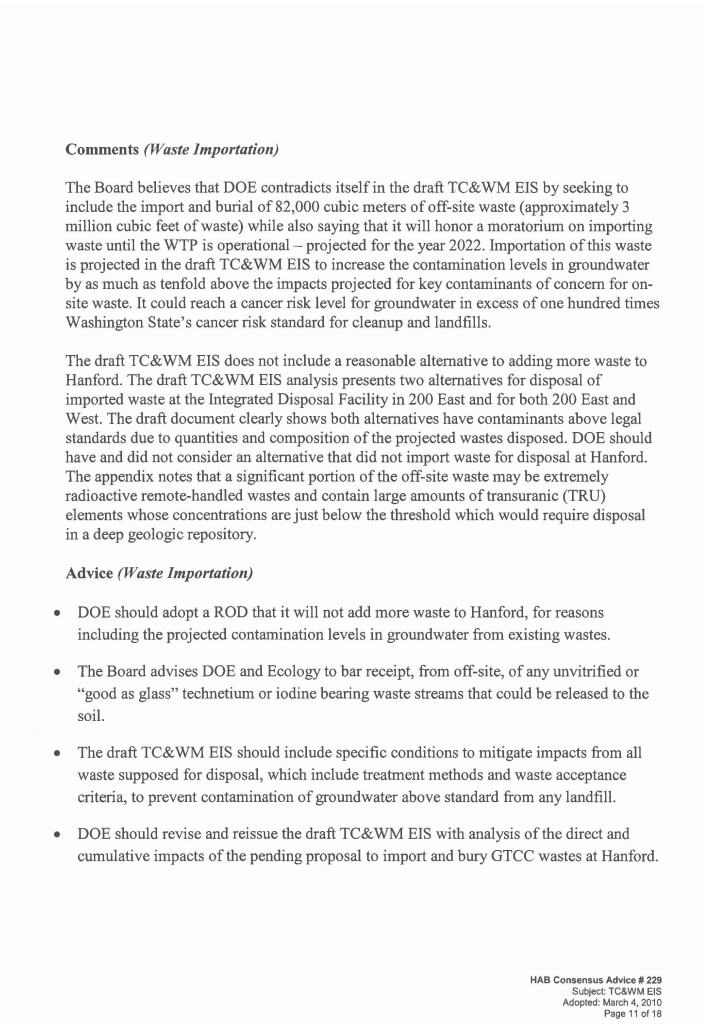
still remains. For a more comprehensive discussion of this topic, see Section 2.2 of this CRD.

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.

In addition, the regulatory process for closing tanks is extensive and involves a number of checks and balances. For example, once the waste in the tanks within a waste management area is retrieved, the actual residuals will be evaluated as part of the closure process for that waste management area. Activities 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 to make specific decisions on what levels of residual tank waste are acceptable in terms of short- and long-term risks.

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.

218-22 DOE used the latest, most credible and referenceable inventory data available in preparing this EIS. For the referenced cribs and trenches (ditches), the primary source of inventory information was the Hanford Soil Inventory Model, Revision 1 (Corbin et al. 2005), commonly referred to as "SIM." SIM generates inventory and uncertainty estimates for 46 radionuclides and 29 chemicals using 196 waste streams applied to 377 liquid waste disposal sites, unplanned releases, and tank leaks over their operating lifetimes in intervals of 1 year, from 1944 to 2001. SIM acknowledges that limited data are available to estimate waste site inventories from many waste sites. Consequently, for waste sites with no basis for waste composition, SIM often uses data that have been applied to nearby sites. SIM data differ from the commentor's estimates. For example, for trench 216-T-25, SIM estimates the volume of liquid received in 1954 was approximately 2,990,475 liters (790,000 gallons), which contained approximately 0.64 curies of technetium-99. For the 216-T-19 Crib, SIM estimates the volume of liquid to be approximately 454 million liters (120 million gallons); however,



Comments *(Waste Importation)*

The Board believes that DOE contradicts itself in the draft TC&WM EIS by seeking to include the import and burial of 82,000 cubic meters of off-site waste (approximately 3 million cubic feet of waste) while also saying that it will honor a moratorium on importing waste until the WTP is operational – projected for the year 2022. Importation of this waste is projected in the draft TC&WM EIS 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 cancer risk standard for cleanup and landfills.

The draft TC&WM EIS does not include a reasonable alternative to adding more waste to Hanford. The draft TC&WM EIS analysis presents two alternatives for disposal of imported waste at the Integrated Disposal Facility in 200 East and for both 200 East and West. The draft document clearly shows both alternatives 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. The appendix notes that a significant portion of the off-site waste may be extremely radioactive remote-handled wastes and contain large amounts of transuranic (TRU) elements whose concentrations are just below the threshold which would require disposal in a deep geologic repository.

Advice *(Waste Importation)*

- DOE should adopt a ROD that it will not add more waste to Hanford, for reasons including the projected contamination levels in groundwater from existing wastes.
- The Board advises DOE and Ecology to bar receipt, from off-site, of any unvitrified or "good as glass" technetium or iodine bearing waste streams that could be released to the soil.
- The draft TC&WM EIS should include specific conditions to mitigate impacts from all waste supposed for disposal, which include treatment methods and waste acceptance criteria, to prevent contamination of groundwater above standard from any landfill.
- DOE should revise and reissue the draft TC&WM EIS with analysis of the direct and cumulative impacts of the pending proposal to import and bury GTCC wastes at Hanford.

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218-40

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it reports no iodine-129 inventory and only a small inventory of technetium-99 (7.9×10^{-3} curies). Without a referenceable document, DOE cannot evaluate the commentor's estimates further.

218-23 See response to comment 218-13 for information regarding the alternatives' compliance with applicable standards.

218-24 As described 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 such key characteristics as the inventories of radioactive and chemical contaminants and the mass or volume of waste disposed of. Because the groundwater modeling requires stipulation of the contaminant inventories from each waste site, the long-term cumulative impact analyses reflect these inventories.

Appendix N, Section N.5, analyzes how travel times through the vadose zone change when infiltration rates are changed. Infiltration rates of 0.9, 3.5, 50, and 100 millimeters per year were included in this analysis. Additional sensitivity analyses have been included in Section N.5 to characterize the following model uncertainties:

- The dependence of solute flux at the water table on the magnitude of aqueous discharge at the source
- The dependence of solute flux at the water table on the thickness of silt layers
- The role of the tilting of layers in directing flow
- The role of dikes in directing or focusing flow
- The dependence of estimates of impacts on the recharge rate for sitewide and IDF conditions
- The dependence of impacts on the magnitude of the distribution coefficient of iodine in the vadose zone
- The role of the efficiency of capture of iodine in ILAW glass

Appendices L, M, and N describe the sensitivity of the results to uncertainties in key parameters. The analyses include sensitivity to the Base and Alternate Case flow fields, and contaminant inventory and release.

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

- DOE should revise the draft TC&WM EIS to update the 2004 SWEIS analysis and to present route specific transportation impacts and enable the public along all potential truck routes to have notice of potential shipments. ***218-44***
- The draft TC&WM EIS should include the transportation impacts of all pending proposed shipments (e.g. including GTCC wastes and sodium contaminated wastes) along with route specific potential, accident or terrorist caused impacts. ***218-45***

Comments ***(Retrieval/Capping)***

The draft TC&WM EIS's cumulative impact analysis projects that the Hanford Site will persist in re-contaminating groundwater and the Columbia River over thousands of years. Persistent contamination will continue long after current allocated budgets and identified cleanup are done. There is no acknowledgement within the current draft of the potential to drive down cumulative impacts by initiating additional retrieval from burial grounds, tank leaks, tank bottoms and other sources where there are significant amounts of waste discharges and buried waste. Lack of characterization data pose a problem for a defense of leaving the waste in place. ***218-46***

The Board has clearly advised that the agencies utilize remedies which remove, treat and dispose of waste (Advice #197). The impacts from relying on caps without prior remediation are shown to exceed relevant standards in the draft TC&WM EIS modeling. Within the draft document, DOE does not discuss Washington State requirements to remove contamination to the degree practicable before capping. ***218-35 cont'd***

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 after being generated during vitrification and other processes exceeds Model Toxicity Controls Act (MTCA) standards. Mitigation actions 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. ***218-47***

Advice ***(Retrieval/Capping)***

- The draft TC&WM EIS should evaluate the potential to reduce the cumulative impacts by exploratory exhumation of buried waste sites, to the degree practical, before capping. ***218-46 cont'd***
- The draft TC&WM EIS should contain an evaluation of the need for further characterization of wastes proposed to remain buried under caps. ***218-48***

218-25 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.

218-26 The scope of this *TC & WM EIS* does not include the remediation of the burial grounds as part of the proposed action 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. 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.

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.

218-27 See response to comment 218-25 for a discussion on the transport and disposal of offsite waste.

218-28 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*. 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. Contamination in the vadose zone resulting

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

- The draft TC&WM EIS should 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 off-site landfills. ***218-49***
- The draft TC&WM EIS should consider and disclose to the public for comment mitigation actions that could be applied to landfills and other waste management units to achieve compliance. ***218-50***

Comments (*Chemical Inventory)*

The chemical inventory appears to be incomplete as reported in the draft TC&WM EIS. Certain chemicals are missing or under-reported from the non-tank inventories (e.g. numerous volatile organic chemicals in burial grounds, metals and uranium volumes)[7]. Certain chemical analyses seem 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[8][9][10]. It is also missing from the chemical toxicity inventory for proposed imported wastes along with volatile organic chemicals.

Advice (*Chemical Inventory)* ***218-51***

- The draft TC&WM EIS should include documentation of all hazardous chemical constituents (e.g. chemicals known to be disposed in or releasing from landfills; total uranium).
- The draft TC& WM EIS should adequately report all chemical inventories from all disposal sites at Hanford (including non-EM disposal sites, e.g. U.S. Ecology) to ensure a credible analysis of the actual and potential cumulative impact to groundwater.

7 While hard data on the quantities disposed is impossible to determine without characterization, the draft TC&WM EIS ignores all the VOCs with the exception of Carbon Tetrachloride – comparing WA MTCA investigation of US Ecology to chemical inventory data in Appendix S; comparison of Appendix S Burial Ground data for Uranium in Curies to reported kilograms Ur for chemical inventory (e.g., US Ecology, W-3, W-4A, W-5 burial grounds) – by Richard Heggen for Heart of America Northwest.

8 Ibid - TC&WM EIS D.1.4 "Historical Leaks and Other Releases." Estimates of tank waste in the vadose zone consider only known leaks from tanks. The estimate does not include or estimate non-leak tank events, such as overflows (e.g. Tank T-101). Comparing RPP-7494, Rev. 0, (2001) to TCWMEIS for intentional releases to cribs, trenches, etc... from A, AX and C Farms.; and, Floyd Hodges, Ph.D. memo to HAB regarding estimates of tank waste in the vadose zone (D.14) failing to report non-leak events such as T-101 overflow.

9 Ibid - Presentation to Hanford Advisory Board on Behalf of the Nez Perce Tribe, Feb. 16, 2010, "TC&WM EIS Chemical Cumulative Impact Does Not Take Into Account 96% of the Uranium on Site" – Comparison of PNNL 15829 (3610.43 Ci) to TC&WM EIS (3,220 Ci) for non-EIS (cumulative impact Appendix S) sites cited.

10 Ibid - Bernhard, et al for the Nez Perce calculates total uranium from PNNL 15829 = 6.69 x 10^6 kg. TC&WM EIS reports total uranium as 2.73 10^5 kg.

from tank farm past leaks will be addressed in the SST closure process. The cumulative impacts analysis for this *TC & WM EIS* (see Appendix U and Chapter 6) includes the vadose zone of the 200 Areas in addition to the other areas of Hanford.

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 also 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, particularly 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.

218-29 The scope of this *TC & WM EIS* does not include the remediation of the burial grounds or soil discharge sites as part of the proposed action 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. However, Appendix S includes DOE's inventory estimates for the burial grounds, soil discharge site, and US Ecology. Appendix U provides supporting information on the long-term cumulative impact analyses that includes the burial ground, soil discharge site, and US Ecology inventories.

See response to comment 218-26 for a discussion of remediation at Hanford and associated model sensitivity analysis.

Regarding the removal of the tank farm equipment and piping and management of the removed materials as GTCC waste, Tank Closure Alternatives 6A and 6B assumed that the materials removed during clean closure activities would be managed as HLW as appropriate and stored on site pending disposition.

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

Comments ***(Modeling)***

The alternatives analysis is based on one deterministic model, with limited model runs and lack of documentation. The draft TC&WM EIS applies the model site-wide, although it does not appear to be comprehensive in quantifying all needed criteria for analysis. ***218-52***

Additionally, there is no concerted or documented attempt to address the propagation of uncertainties between the various parts of the draft TC&WM EIS important to analyzing long-term consequences within the draft TC&WM EIS subject areas of Environmental Consequences
and Cumulative Impacts. ***218-53***

New sample modeling data show contamination levels higher than projected in the draft TC&WM EIS's model (e.g. chromium upwelling into the Columbia River and contamination spreading from tank leaks and discharges). The Board believes the draft TC&WM EIS model is not conservative. ***218-54***

Advice ***(Modeling)***

- The draft TC&WM EIS should be transparent so a reader can follow the modeling development and documentation of input/output process controls and modeling uncertainties. ***218-55***
- The draft TC&WM EIS should document propagation of uncertainties between the various parts of the draft TC&WM EIS and attempt to quantify their consequences. ***218-53 cont'd***
- The draft TC&WM EIS should incorporate more recent sampling data and inventories which have been identified as incomplete or missing to reduce model uncertainty. ***218-56***
- The draft TC&WM EIS should recognize and report on the uncertainty in the tank waste compositions. ***218-57***
- DOE should revise the draft TC&WM EIS to base it on the International Standard Features, Events and Processes. DOE has already identified this basis as a standard approach to identify the conceptual issues needing to be evaluated and modeled to include all important factors that may influence how contaminants may move in the environment and how people may be impacted. ***218-58***

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218-30 As noted by the commentor, technetium-99 is a risk driver, which is one of the reasons for its removal from the ILAW; its immobilization in IHLW is analyzed under Tank Closure Alternatives 2B and 3C. One mitigation measure, recycling technetium-bearing secondary-waste streams into the primary-waste-stream feeds within the WTP to increase technetium-99 capture in ILAW and bulk vitrification, is discussed in Chapter 7, Section 7.5, of this EIS. In addition, Section 7.5.2.8 and Appendix E include discussions on the secondary-waste workshop held at Hanford to identify the risks and uncertainties associated with treatment and disposal of secondary waste generated during HLW and LAW treatment and disposal and to develop a roadmap for addressing the associated risks and uncertainties.

See response to comment 218-26 for a discussion of remediation at Hanford and associated model sensitivity analysis.

218-31 As discussed in Appendix Q ("Long-Term Human Health Dose and Risk Analysis"), Section Q.2, DOE estimated drinking water impacts for each chemical constituent and chose those chemical constituents that contributed more than 99 percent of the impacts for detailed analysis. This resulted in reduction of the original set of chemical constituents to a final set of 26 chemical constituents, which were used in both the alternatives and the cumulative impacts analysis, which includes non-DOE sites (like US Ecology). The list of chemicals and radionuclides used in the EIS analysis is presented in Appendix Q, Table Q–1.

218-32 The alternatives analysis and the cumulative impacts analysis both use points of analysis so that the alternatives can be compared with each other in a similar fashion, as required by NEPA. These points of analysis include, as appropriate, the tank farm barriers, FFTF barrier, IDF-East barrier, IDF-West barrier, RPPDF barrier, Core Zone Boundary, and Columbia River. The points of analysis were identified in the *Technical Guidance Document* (DOE 2005), signed in March 2005 by DOE and Ecology.

218-33 Chapter 6, Table 6–11, of this *TC & WM EIS* provides information in tabular form on the peak cumulative concentrations of the COPCs. The table footnotes state that, for some constituents, this peak occurred in the past. However, the relationship of past-to-future cumulative constituent concentrations is presented in the time-versus-concentration plots, also provided in this chapter.

218-34 Chapter 6, Section 6.4.2, of this *TC & WM EIS* provides the results of the long-term cumulative impact analyses for human health. Four measures of human health impacts were considered in this analysis: lifetime risks of

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

- Analyses of impacts to groundwater should be considered by the potential effects of increased water infiltration due to climate change or actions such as construction of Black Rock Dam. ***218-59***

Comments ***(Applicable Law)***

The draft TC&WM EIS does not discuss and consider the relevant state cleanup standards from MTCA in comparing projected contamination levels to what are referred to in the draft TC&WM EIS as "benchmark standards." MTCA standards are ten times more protective of human health for cancer risk than the levels shown in the draft TC&WM EIS. Additionally, Washington State's State Environmental Policy Act (SEPA) requires that an agency disclose for comment specific conditions that will mitigate projected impacts to bring a facility into compliance, and requires enforceable commitments as part of SEPA. NEPA requires that DOE disclose and consider a range of reasonable alternatives. In the Board's opinion, the draft TC&WM EIS does not present a range of reasonable alternatives to: a) using Hanford as a national waste disposal site or, b) retrieving, treating and removing wastes from Hanford for disposal in geologic repositories and landfills which are not projected to cause impacts to groundwater and would meet compliance standards. ***218-60*** ***218-61*** ***218-25 cont'd*** ***218-26 cont'd***

Advice ***(Applicable Law)***

- Revise the draft TC&WM EIS to conform to the new draft guidance from the Council of Environmental Quality requiring all NEPA analyses to consider long-term impacts of climate change. ***218-62***
- The Board recommends revision and reissuance of the draft TC&WM EIS for public comment with identification of specific mitigation efforts that could bring proposed landfills and other waste management units into compliance with relevant state and federal standards. ***218-61 cont'd***
- The Board advises Ecology that it: a) should not accept the draft TC&WM EIS for use in RCRA/Hazardous Waste Management Act permit decisions under SEPA if it is not revised for additional opportunities for public comment to identify mitigation conditions which would prevent landfills and units from exceeding state and federal standards; b) should not accept the draft TC&WM EIS for SEPA purposes if it is not revised and reissued for comment to consider state health based cleanup standards under MTCA in ***218-63***

developing cancer from radioactive constituents, lifetime risks of developing cancer from chemical constituents, doses from radioactive constituents, and Hazard Indices from chemical constituents. These measures were calculated for each year over a span of 10,000 years for applicable receptors at four locations. The onsite locations of analysis were the Core Zone Boundary, the Columbia River nearshore, and the Columbia River. Offsite locations of analysis included population centers downstream from Hanford. Because this resulted in a large amount of data, the presentation method chosen was to present the dose for the year of maximum dose, the risk for the year of maximum risk, and the Hazard Index for the year of maximum Hazard Index. This choice was based on regulation of radiological impacts as dose and the observation that peak risk and peak noncarcinogenic impacts expressed as a Hazard Index may occur at times other than that of peak dose.

218-35 As stated in DOE's September 20, 2007, response to HAB Advice #197, DOE appreciates HAB's time and thoughtful discussion concerning development of the groundwater values flowchart. Protection of groundwater remains a priority for DOE, and DOE remains committed to prioritizing increased funding for groundwater activities. The Hanford groundwater strategy is reflected in the *Integrated Groundwater and Vadose Zone Management Plan*. DOE's strategy is currently focused on preventing key contaminants from reaching the Columbia River. DOE is in the process of implementing systems to contain the plumes as part of ongoing CERCLA processes to remediate groundwater contamination. DOE believes this strategy is consistent with HAB's groundwater values advice. Chapter 8 of this *TC & WM EIS* discusses potentially applicable laws, regulations, and other requirements. In Section 8.1, a discussion is provided regarding the need to meet applicable Washington State and RCRA requirements for closing hazardous waste tank systems. In addition, Tank Closure Alternatives 2B, 3A, 3B, 3C, 4, and 6C address the removal of 4.6 meters (15 feet) of soil from the tank farms and replacing it with clean soil prior to placement of a landfill barrier.

218-36 DOE agrees with the supposition that techniques for remediating waste sites or mitigating their impacts may influence groundwater flow and, consequently, movement of contamination. For example, groundwater pump-and-treat methods both remove contaminant mass from the unconfined aquifer and alter flow patterns during the lifetime of the pump-and-treat operations. The effects on the flow field from this sort of remediation are expected to occur over a relatively short timeframe starting in the mid-1990s and extending approximately 100 years

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comparison to projected contamination levels; and, c) discuss potential benefits from meeting state regulations requiring removal of contamination to the extent practicable prior to use of caps and a landfill closure remedy.

218-63 cont'd

- The draft TC&WM EIS should show the public and decision-makers how the proposed actions and alternatives will impact groundwater when evaluated against MTCA which should be applied for landfill permits or cleanup decisions.

218-60 cont'd

PUBLIC INVOLVEMENT

Background

The draft TC&WM EIS is a very significant opportunity for the public to understand the range of actions for major Hanford cleanup decisions relating to high-level nuclear waste tanks and waste management and disposal, and the impacts of those potential alternative decisions. The process began in 2009 with great hope when DOE joined the Board in recognizing this significant potential and Assistant Secretary Triay committed to an extended public comment period. This extended public comment period has enabled DOE to hold eight public hearings around the Northwest, which the Board applauds and hopes will set a precedent to enable the public across the region to discuss and comment on major Hanford cleanup decisions in the future.

However, the Board notes that DOE did not prepare and provide meaningful notice and it did not significantly change the notice despite input from Board members and citizen groups. The notice prepared by DOE was difficult to read, and failed to provide impacts from proposed actions. The burden of providing notice to encourage turnout fell upon citizen groups and the State of Oregon. Hundreds of people attended public hearings, yet Heart of America Northwest's evaluation forms showed that many were not aware of DOE's notices.

218-64

Comments

Since the draft TC&WM EIS was, in relation to the waste management scope, a re-do of the SWEIS, DOE was asked repeatedly to provide summaries of the draft TC&WM EIS and notice of hearings to the thousands of people who asked to be on the notice list, commented on, and/or attended hearings on the SWEIS. We believe that most people did not receive notice from DOE, which undermines the public participation goals for the TC&WM EIS.

into the future. Alternatives dealing with storage, retrieval, and disposal of waste from and closure of the SST system have long-term impacts that begin approximately 100 years in the future and extend up to 10,000 years into the future. DOE's view is that the best way to inform the decision concerning these long-term impacts is to exclude the short-term effects from the analysis. The results provided in the *Draft TC & WM EIS* were prepared accordingly. In response to this and other, related comments, DOE decided to revise the draft EIS to include an explicit demonstration of the relationship between the short-term influences on the groundwater flow field and the long-term consequences of waste storage, retrieval, and disposal and tank closure options. This analysis is presented in Appendix L and Chapter 7, Section 7.5, of this *Final TC & WM EIS*.

218-37 Chapter 6, Section 6.4.2, of this *TC & WM EIS* provides the results of the long-term cumulative impact analyses for human health, including the impacts of past, present, and reasonably foreseeable future actions due to releases from non–*TC & WM EIS* sources, such as the BC Cribs, as well as past-practice discharges to cribs, trenches (ditches), and ponds. A listing of these sites is provided in Appendix S of this *TC & WM EIS*. The long-term alternatives analyses for human health presented in Chapter 5, Section 5.1.2, discuss results from three types of releases. The first is from past-practice activities, which include releases from the six sets of contiguous cribs and trenches included in the alternatives analyses. The second is past leaks from damaged tanks. The third involves future activities, including leaks during retrieval of waste from the tanks and long-term leaching of waste material from tanks and ancillary equipment.

218-38 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. NEPA's purpose and its focus are to ensure agencies take a "hard look" at the potential environmental impacts associated with a proposal and the reasonable alternatives to that proposal. Agencies must conduct and present the results of a comparative analysis of the alternatives; consider the cumulative impacts of the alternatives when added to other ongoing actions; and identify potential mitigations that could be used to offset the impacts identified by the NEPA analysis. This *TC & WM EIS* provides information on the results of DOE's analyses and compares those results to existing standards. For example, regarding the

The summary document in the draft TC&WM EIS did not present the long-term impacts of the preferred alternatives and other reasonable alternatives for those wanting to review and comment on the draft document without reading 6,000 pages. The document had a significant bias by presenting short-term impacts from retrieving wastes and contamination without a section discussing the long-term health and environmental impacts from not retrieving wastes. 218-65

The draft TC&WM EIS also does not present in an easy to understand comparison the potential impacts of each element of an alternative. The alternatives instead overlap making it difficult to discern incremental impacts from each action.
Each alternative combination within the draft TC&WM EIS, which included cleanup actions recommended by the Board such as remediating to the extent practical for tank leaks and discharges, contain unacceptable proposed actions on other decisions. The summary and DOE presentations also discouraged public comment by insisting that DOE would not consider alternative combinations of remedial actions. 218-66

Advice

- The draft TC&WM EIS should be revised and reissued for public comment with a clear description of the long term impacts and benefits from preferred alternatives presented in the summary and in notices, including comparisons of state standards to projected impacts and, full disclosure and consideration of related pending proposals with cumulative impacts. 218-67
- DOE should take comment on a revised draft TC&WM EIS which allows the public to easily comment on each individual proposed action separately. 218-68
- DOE should work closely with the Board and stakeholder groups in designing effective public notices and hearing locations for a revised draft TC&WM EIS. The Board recommends this collaboration should be part of all Tri-Party Agreement (TPA) and DOE notice processes, and a 45-day notice should be provided to stakeholders prior to hearings so they can prepare and mail notices and conduct other public turnout and education activities. 218-69
- DOE should add everyone who signed in at the TC&WM EIS hearings to the TPA Hanford Clean-Up mailing and email lists, unless they opt out. 218-70

long-term impacts analysis for groundwater, the risk driver's contaminant concentration results from the groundwater modeling run are compared with the benchmark value, which in most cases is the MCL (the standard for drinking water).

218-39 It is DOE's intent to treat and manage the Hanford wastes as effectively as current technology supports. If new technologies become available for remediation, they will be evaluated as part of the Vadose Zone Remediation program for potential implementation. DOE expects this *TC & WM EIS* to assist DOE decisionmakers in determining solutions for these and other issues at Hanford. Specifically, this EIS analyzes 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. DOE continually monitors and supports the development of new groundwater and vadose zone contamination remediation technologies and applies such technologies as they mature, if applicable. However, this EIS could evaluate only remediation technologies that are currently known to be effective for particular waste streams and conditions at Hanford.

218-40 DOE recognizes the potential negative impacts on Hanford groundwater that the offsite waste poses. See response to comment 218-25 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 discuss the radiological risk differences between including and not including offsite waste disposal at IDF-East. As can be seen in the sections above, the radiological risks increase by an approximate factor of six.

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.

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- DOE should record both the presentation and question and answer periods at the hearings, to ensure consistency and accuracy in the information relied upon by the public to comment. *218-71*
- DOE and the TPA agencies should continue to provide for alternative viewpoint presentations and availability of tables and presentation space for pre-hearing workshops, which significantly aid the public in commenting.
- DOE should prepare summaries (fact sheets) of each proposed action and the long-term impacts for alternatives under each action for use by the public before DOE issues the final TC&WM EIS. Summary documents showing potential impacts and mitigation measures should be developed for each element of the pending RCRA permit. DOE and Ecology should work with the Board's Public Involvement Committee and stakeholder groups to design these and plan for dissemination. *218-72*

Sincerely,

Susan Leckband

Susan Leckband, Chair
Hanford Advisory Board

This advice represents Board consensus for this specific topic. It should not be taken out of context to extrapolate Board agreement on other subject matters.

cc: Steve Pfaff, Co-Deputy Designated Official, U.S. Department of Energy, Office of River Protection
Doug Shoop, Co-Deputy Designated Official, U.S. Department of Energy, Richland Operations Office
Mary Beth Burandt, U.S. Department of Energy, Office of River Protection
Dennis Faulk, U. S. Environmental Protection Agency
Jane Hedges, Washington State Department of Ecology
Catherine Brennan, U.S. Department of Energy, Headquarters
The Oregon and Washington Delegations

218-41 See response to comment 218-25 for a discussion on the transport and disposal of offsite waste.

218-42 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. 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.

218-43 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.

218-44 The *TC & WM EIS* Summary, Section S.7.3, and Chapter 2, Section 2.12.3, Waste Management, states that the Preferred Alternative for waste management includes limitations on, and exemptions for, offsite waste importation at Hanford, at least until the WTP is operational. These limitations and exemptions are defined 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. This *TC & WM EIS* contains analysis of the transportation impacts that would be associated with transporting radioactive waste to and from Hanford that is independent from the analysis performed for the *HSW EIS* (DOE 2004a). Appendix H of this *TC & WM EIS* also contains an updated analysis of the transportation routes from specific origination sites to specific destinations that would most likely be used. 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. DOE complies with all Federal and state requirements regarding notification of state and tribal governments of radioactive material and waste shipments. For security reasons, DOE only provides advance notification to state governors and law enforcement officials who are responsible for regions and communities along the transportation routes. At a national level, DOE uses its National Transportation Stakeholders Forum (NTSF) to communicate with states and tribes concerning shipments of radioactive waste and materials, as well as occasional high-visibility, nonradioactive shipments. The purpose of NTSF is to bring transparency, openness, and accountability to DOE's offsite transportation activities through collaboration with state and tribal governments. DOE provides

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information about ongoing or planned high-visibility shipment campaigns at annual NTSF meetings and semiannual briefings and through reports to NTSF.

218-45 This *TC & WM EIS* presents the results of analysis of the impacts of transporting waste expected to be shipped to or from Hanford due to the activities proposed under the Tank Closure, FFTF Decommissioning, and Waste Management alternatives. Specific origination and destination sites and corresponding routes analyzed in this EIS are shown in Appendix H. The risks of transporting waste between Hanford and other DOE sites are summarized in the Summary, Section S.5.3, and Chapter 2, Section 2.8.3.10, which show very small overall risks to the workers and the general public. 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. As shown in Sections S.5.3 and 2.8.3.10, it is unlikely that the estimated total public radiation exposures from transporting radioactive waste to Hanford for disposal would result in any additional LCFs. An analysis of the transport of GTCC waste is being performed under DOE/EIS-0375. A site for the disposal of GTCC waste has not been selected. Information from the *Draft GTCC EIS* (DOE 2011a) was incorporated into the *Final TC & WM EIS* cumulative impact analyses (see Chapter 6 and Appendix T). 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 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).

218-46 The scope of this *TC & WM EIS* includes non-groundwater remediation activities for tank closure and FFTF decommissioning. As described in Section S.1.3.1 of the *Final TC & WM EIS* Summary, and Chapter 1, Section 1.4.1, various

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retrieval technologies and benchmarks are evaluated. The four waste benchmarks analyzed are 0, 90, 99, and 99.9 percent retrieval of tank waste. Other 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 applicable Federal and state agencies. These other Hanford remediation activities are considered in the *TC & WM EIS* cumulative impacts analysis. 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.

218-47 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.

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.

218-48 The tank closure process, which includes detailed examinations of the tanks and residual waste, requires preparation of a site-specific radiological performance assessment and a closure plan. These documents will provide the information

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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.

218-49 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.

218-50 See response to comment 218-42 for a discussion of mitigation measures.

218-51 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 inventories were identified and considered to be potential contributors to cumulative impacts on groundwater 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 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 and 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. As explained in Appendix S, the inventories for the sites were identified using the most recent information available.

Regarding the lack of uranium chemical inventories in the cumulative impacts analysis inventories (including for US Ecology) provided in Appendix S, 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.

218-52 Although a single Base Case flow model was selected for use in the *Draft TC & WM EIS* analysis, thousands of model runs were evaluated prior to

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selecting the Base Case. The Monte Carlo optimization and uncertainty analysis, as described in Appendix L, Section L.9, of the draft EIS, evaluated over 6,000 Base Case model runs, with each model run having a different set (within a reasonable range) of hydraulic conductivity values for each of the 13 material zones. The Monte Carlo analysis results were used to narrow the field of model runs down to a smaller set of 26 Base Case model runs. These 26 runs had the lowest amount of error when model-simulated heads were compared with historical field-observed heads across the model domain.

This set of 26 of the "best" model runs was further evaluated using particle pathlines analyses. The initial pathlines analysis involved releasing particles in the 200-East Area to simulate the tritium plume originating from the PUREX waste site. These pathlines results were compared with the field-observed tritium plume from the sources at PUREX (see Appendix L, Section L.10, of the draft EIS). A second pathlines analysis called for releasing particles across the 200 Areas within the area confined by what is generally referred to as the "Core Zone Boundary." The number of particles moving north through Gable Mountain–Gable Butte Gap (Gable Gap) were subsequently measured and compared with the number moving east toward the Columbia River (see Section L.10 of the draft EIS).

After selecting the Base Case flow model using the previously mentioned Monte Carlo and pathlines analyses, transport analysis runs were completed to determine the transport models' sensitivity to a variety of transport parameters (see Appendix O, Section O.2.6, of the *Draft TC & WM EIS*). After all testing was completed, the final transport model configuration was selected, which included the selected flow model, and this model was used to perform all Base Case groundwater analyses for the *Draft TC & WM EIS*.

218-53 DOE disagrees with the commentor's assertion that there was no concerted or documented effort to address the propagation of uncertainties along the modeling chain in the *Draft TC & WM EIS*. As described in Appendices L, N, and O, an integrated test of the entire groundwater modeling system was performed on the complex series of sources that produced extensive, regional-scale groundwater plumes. In this analysis, uncertainties regarding inventory, vadose zone flow and transport, and groundwater flow and transport are described and the effect of those uncertainties on specific metrics is discussed. The model calculations were compared with field results, and the factors governing the degree of agreement were identified.

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DOE's view is that NEPA requires a comparison of the impacts of the various alternatives in the context of the cumulative impacts; that the comparison be technically sound and traceable to reliable sources of data; and that important sources of uncertainties in the analyses be identified and their potential implications for decisions and alternatives impacts discussed.

218-54 DOE's view is that the long-term groundwater analysis should provide an unbiased evaluation of the alternatives in the context of the cumulative impact sources (the essential point of a NEPA analysis), and provide a technically defensible analysis based on traceable and referenceable data sources. In addition, a NEPA analysis must describe the assumptions underlying the analysis, and elucidate their relevance to the decisions that are in question.

In this *TC & WM EIS*, a variety of assumptions were required to complete the analyses. The assumptions include some that may be considered pessimistic (e.g., release from grouted tank residuals is primarily convective in nature, waste canisters do not impede the release of the waste they contain, carbon tetrachloride does not degrade in the subsurface), some that may be considered optimistic (e.g., how might impacts be reduced if a deep vadose zone technology were to be deployed that would reduce the flux of contaminants to the aquifer) and some that are neutral (e.g., natural infiltration over the 10,000-year period of analysis is probably around 3.5 millimeters per year).

The point of a NEPA analysis is to compare alternatives and provide information that has bearing on important decisions. DOE also points out that the use of conservative parameters and assumptions may actually weaken a NEPA analysis by damping down or muting differences among the alternatives. Finally, DOE notes that the *TC & WM EIS* groundwater analysis does actually predict upwelling of groundwater and discharge of contaminants, including chromium, into the Columbia River (see Appendix U) and also includes impacts of approximately 1,000,000 gallons of tank waste known or suspected to have leaked from the SST system (see Appendix M, Section M.3.1.1).

218-55 In response to this and other comments, the presentation of input and output data is expanded in Appendix L, which discusses the model development process.

218-56 The *Draft TC & WM EIS* long-term groundwater analyses were based on data through 2006. This *Final TC & WM EIS* contains updates to sampling data and inventory through 2010.

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218-57 The commentor is referred to Appendix D, Section D.1.1.4, Uncertainty in Best-Basis Inventories. This section discusses the uncertainties in the tank waste inventory estimates used in this EIS.

218-58 The International Standard Features, Events, and Processes approach is being addressed by DOE through the site-specific tank closure activities; this includes the preparation of a performance assessment and a closure plan. DOE is currently in the initial process of tank closure for Waste Management Area C.

218-59 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*.

Chapter 1, Section 1.10, describes the results of the *Final Planning Report/ Environmental Impact Statement, Yakima River Basin Water Storage Feasibility Study, Yakima Project, Washington* (BOR 2008), stating that the U.S. Bureau of Reclamation has identified the No Action Alternative, including activities currently planned or under construction, as the Preferred Alternative. This would not involve construction and operation of the Black Rock Reservoir.

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218-60 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. 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.

These regulations ensure that, as cleanup begins, public input will be sought and state MTCA cleanup standards will be considered. For tank farm closure actions and decisions, there will be other forums to provide additional information that DOE and the State of Washington should consider before developing the proposed decision documents. Now that this *Final TC & WM EIS* has been published, the State of Washington will begin developing RCRA/Hazardous Waste Management Act permits and permit modifications to the Hanford sitewide permit and obtaining public comments on the proposed actions, including the application of MTCA standards for cleanup. The permitting process will consider the mitigation measures proposed in this *TC & WM EIS* and may include other measures that the State of Washington determines are necessary to protect human health and the environment.

218-61 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 alternative descriptions identify the information needs necessary 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

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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 that 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 decisionmaking. These regulations ensure that, as cleanup begins, public input will be sought and the state MTCA cleanup standards will be considered.

218-62 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*.

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218-63 Now that this *Final TC & WM EIS* has been published, there will be further opportunities for the public to provide comments when the State of Washington proposes RCRA/Hazardous Waste Management Act permit modifications to the Hanford sitewide permit. In addition, regarding tank farm closure decisions, there will be other forums where the public will have an opportunity to provide additional information that DOE and the State of Washington should consider before developing the proposed decisions and obtaining public comments on the proposed actions.

Based on several discussions among DOE, Ecology, and EPA, additional information has been provided in this *Final TC & WM EIS*. For example, DOE and its regulators recognize the potential negative impacts on Hanford groundwater that the offsite waste poses. The *Draft 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. Therefore, one means of mitigating this impact would be for DOE to limit disposal of offsite waste streams at Hanford. A discussion of this mitigation measure is provided in this *Final TC & WM EIS*. 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.

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.

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 related to a specific 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

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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 decisionmaking. These regulations ensure that, as cleanup begins, public input will be sought and the state MTCA cleanup standards will be considered.

218-64 DOE worked with HAB's Public Involvement Committee to develop additional notification materials beyond those required by NEPA. DOE worked to provide the public with timely and useful information on the *TC & WM EIS* project and meetings. Notices of the comment period and hearings were published in the *Federal Register*. Notices providing the dates, times, and locations of hearings were placed in local newspapers and mailed directly to individuals on DOE's mailing list. Informative posters and factsheets were provided to attendees at the open houses that preceded the public hearings. Project information is also available to the public on Hanford's website (http://www.hanford.gov). Public input is important to DOE, and DOE appreciates the public's participation in these hearings.

DOE mailed copies via Federal Express to all individuals who requested one. For those individuals who requested only a printed copy of the Summary, a CD containing the complete *Draft TC & WM EIS* and a Reader's Guide was attached to the inside cover.

218-65 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 the long-term impacts analysis to the Summary of this *Final TC & WM EIS*.

218-66 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. Analysis of ongoing remedial actions taking place at Hanford under the TPA is not part of the proposed actions and alternatives; however, these remedial actions are considered as part of the cumulative impacts analysis.

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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.

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- and long-term impacts presented in Chapters 4 and 5, respectively. In addition, 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.

DOE disagrees that the EIS Summary and DOE's presentations at the public meetings discouraged public comment. The Summary is intended to provide a brief overview of the material contained in this *TC & WM EIS* and cannot, by nature, include all topics of interest to individual parties. To assist the public in navigating through the information presented in this *TC & WM EIS*, DOE also 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 helps readers review the technical analyses presented. Recognizing that many people may not read beyond the EIS Summary, DOE attempted, with

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the information presented in both the Summary and Reader's Guide, to strike a balance between those readers who want more-technical details about DOE's proposed actions and alternatives and those who seek a simpler overview. As a NEPA document, this *TC & WM EIS*, including the Summary, was prepared in an open manner with opportunities for public input provided at both the scoping meetings and public hearings on the draft EIS. The public hearings on the draft EIS were intended not only to collect comments, but to inform and educate the public as well. In addition to a DOE presentation at the beginning of each public meeting, an hour was provided before each meeting to allow the public to ask questions of staff who supported the development of the draft EIS. Posters and factsheets were made available at each meeting as well. The Hanford website is also available to the public (http://www.hanford.gov) that informs the public of project activities, including development of this *TC & WM EIS*.

218-67 See response to comment 218-4 for information on DOE's preparation of an SA and stakeholder involvement in the EIS planning and development process.

218-68 DOE has satisfied NEPA requirements by responding to public comments on the draft EIS in this CRD and by making changes to the draft EIS where appropriate and necessary. Subsequent to the issuance of the *Draft TC & WM EIS*, DOE prepared an SA to analyze 14 topics it identified where it is unclear whether updated, modified, or expanded information warrants preparation of a supplemental or new draft EIS. 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* is not required. See Chapter 1, Section 1.8.2, for more information.

The public was afforded the opportunity to comment on any portion of the draft EIS as often as desired and in whatever format was preferred. All comments made during the public comment period, whether given orally at the public hearings or sent via mail or email, were considered equally by DOE. All comments received on the *Draft TC & WM EIS* and their approved responses are included in this CRD, a 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 on the DOE NEPA website (http://energy.gov/nepa), and a Notice of Availability will be published in the *Federal Register*.

218-69 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. Pre-hearing 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 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 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.

218-70 DOE has added the names of all people who submitted comments during the public comment period to the EIS distribution list. The *TC & WM EIS* mailing list was developed using the Hanford mailing list and is specific to those individuals who are interested in NEPA. Not everyone interested in this EIS may be interested in TPA activities and, therefore, they are not automatically added. However, DOE sends out postcards and electronic announcements and posts

Commentor No. 218 (cont'd): Susan Leckband, Chair, Hanford Advisory Board

information on the DOE-HQ and site websites in an effort to reach out to people who are interested in Hanford activities.

218-71 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 and to provide mechanisms for alternative viewpoint presentations as well as tables and presentation space for pre-hearing workshops. They were not meant to be mechanisms for collecting comments. All comments made during the public comment period, whether given orally at hearings or sent via mail or email, were considered equally by DOE. All comments received on the *Draft TC & WM EIS* 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 on the DOE NEPA website (http://energy.gov/nepa), and a Notice of Availability will be published in the *Federal Register*.

218-72 To facilitate public comment, DOE and Ecology prepared numerous posters and factsheets summarizing various aspects of the *Draft TC & WM EIS*, which were made available at each of the public hearings. DOE, upon request, has also provided HAB updates on the EIS since the draft was issued. Additional information on project activities, including the development of this EIS, was also posted on Hanford's website (http://www.hanford.gov).

Commentor No. 219: Susan Perkins

From: SUSAN PERKINS [susanperkins@msn.com]
Sent: Thursday, March 18, 2010 3:47 PM
To: tc&wmeis@saic.com
Subject: comments on draft Tank Closure & Waste Management EIS

I have the following comments on the draft Tank Closure & Waste Management EIS:

1. Treat the waste from the FFTF nuclear reactor on-site. The draft EIS's recommendation to ship the most radioactive components to Idaho is unacceptable due to the extreme danger posed in case of an accident. *219-1*

2. The Single Shell Tanks should be removed. Soil that has been contaminated by Single Shell Tank waste or High-Level Nuclear Waste from should be cleaned up to prevent contaminating shallow groundwater off the Hanford Reservation. The preferred alternative in the draft EIS fails to meet requirements of Washington state's hazardous waste law. *219-2*

3. The 200 East landfill proposed for Hanford's nuclear waste and imported waste from off-site would leach nuclear waste to the Columbia River and to groundwater, causing very high cancer rates for 1000 years or longer to future users of groundwater along the river. This is unacceptable. Waste that is capable of leaching should be exported from the Hanford Reservation and disposed of in a deep geologic repository. The 200 East landfill should only be used for waste products that are not susceptible to leaching. *219-3*

4.Importing nuclear waste to Hanford from off-site should not be allowed. The existing vitrification plant will only be able to treat half of the existing waste that needs to be cleaned up already. *219-4*

As a geologist, I am well aware of the potential for groundwater contamination and find the proposed alternatives in the draft Tank Closure & Waste Management EIS a shocking disregard for public health. *219-5*

Sincerely,

Susan Perkins, LG
7731 14th Ave. NW.
Seattle, WA 98117

219-1 Under the Idaho Option, RH-SCs would be shipped to INL for treatment and then disposed of at either Hanford or NNSS; however, an analysis of the transportation risks associated with this option found those risks to be very small (see Chapter 4, Section 4.2).

219-2 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*. This *TC & WM EIS* addresses the potential laws and requirements that would apply, depending on the alternative. Issues concerning the ability to meet legal standards or requirements are also discussed, along with the potential mitigation measures that may be needed and that are feasible for DOE to implement. Additional mitigation measures could be required in future permits issued by the State of Washington, or could be addressed under the scope of the TPA as part of future remedial actions that are subject to CERCLA.

219-3 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.

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.

Commentor No. 219 (cont'd): Susan Perkins

219-4 See response to comment 219-3 for a discussion on the transport and disposal of offsite waste.

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.

219-5 DOE has fully considered the impacts of its proposed alternatives on groundwater contamination and subsequent impacts on both human and ecological receptors. The commentor is directed to Chapter 5 of this *TC & WM EIS*, which addresses groundwater, human health, and ecological impacts of the various Tank Closure, FFTF Decommissioning, and Waste Management alternatives. Detailed discussions of these topics and the supporting analysis are presented in Appendices K, L, M, N, O, P, and Q.

Commentor No. 220: Angela Woodward

Angela Woodward
4008 NW Lavina St
Vancouver, WA 98660

March 18, 2010

Mary Beth Burnadt
Office of River Protection
US Department of Energy
via fax 888-785-2865

Dear Ms. Burnadt,

I attended the public hearing at the Doubletree hotel in Portland, Oregon on February 10, 2010 regarding Hanford. I did not speak at the hearing. At this time I am writing to provide my comments. While the EIS covered many issues, the items that received the most attention were tank cleanup and bringing additional waste to Hanford.

I moved to the area from Southern California four years ago. I had heard about the mess at Hanford, but before the hearing I did not understand the extent of the mess. At the public hearing, I was hearing for the first time that there are 149 single shell tanks, buried 40 to 50 feet underground holding 53 million gallons of nuclear waste with known leaks. This information, conveyed casually by the speakers, including yourself, shocked me.

The Department of Energy's preferred alternative is landfill closure rather than clean closure. Under landfill closure the tanks will be pumped out as much as possible and then capped. Under clean closure, the tanks and the contaminated dirt would be removed and treated. The Department of Energy's own data shows that over long periods of times, thousands of years, landfill closure will result in toxins reaching the river. It was different periods of times for different toxins. In a nutshell, if we chose landfill closure we will be knowingly causing great harm to the environment. Because of the future impacts, this is a moral decision. The correct choice in my opinion is clean closure. ***220-1***

The Department of Energy said that landfill closure was chosen out of a need to balance the short term exposure to the workers doing the clean up against the long term damage to the environment. I do not find this argument convincing.

220-1 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.

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 the contaminants that may have already reached the water table due to past practices, i.e., past leaks and use of 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.

Commentor No. 220 (cont'd): Angela Woodward

On questioning you stated that we should understand that the Department has "never done anything to this scale before." The lack of prior experience does not impress me as a reason not to proceed with clean closure. ***220-1 cont'd***

The suggestion to bring additional waste to the site is adding insult to injury to the environmental activist at the hearing and elicits an emotional reaction. I understand that if we are going to generate nuclear than we need a place to store it. However, on balance, I agree with the environmentalist that nuclear waste should not be stored by a river. ***220-2***

I trust that in making your decision you will take into consideration my urging that we as a society "Do the Right Thing." In this case, "Doing the Right Thing" means clean closure of the tanks and rejecting the idea of bringing additional nuclear waste to Hanford. ***220-1 cont'd***

Sincerely,

Angela Woodward

cc: Governor Gregoire
Via fax 360-753-4110

220-2 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. 221: Marian Grebanier

From: Marian Grebanier [mgrebanier@gmail.com]
Sent: Thursday, March 18, 2010 4:44 PM
To: tc&wmeis@saic.com
Subject: comment on TC & WM EIS re Hanford

Having read summaries of the TC & WM EIS, I am appalled, first of all, that the USDOE is proposing to dump more radioactive wastes at the already overloaded Hanford site. Not only is it overloaded, but the USDOE still has not dealt with the huge amount of problems related to radioactive wastes currently present at the site. This site is unfortunately located over groundwater and next to a major river.....terrible, indeed. *221-1*

Also, to think of driving these truckloads of wastes (estimated at 17,00) is total folly. Driving on major routes throughout the country, with the certainty of some accidents occuring, is irresponsible and unacceptable. The amount of radiation spread over hundreds of square miles (and near my city of Portland, Oregon) in such an event would cause a thousand fatal cancers. Just driving down the highways would expose citizens along the way to increased rates of cancer. I am sure the drivers would also be at great risk. *221-2*

Then, what I see the DOE is suggesting as solutions to the existing problems at Hanford such as increasingly rapid rates of pollution of groundwater and seepage to the Columbia River, is largely a do-nothing attitude. Not to find out what is in the 40 miles of unlined ditches containing highly radioactive and chemical wastes and never attempt to clean them up is unacceptable. *221-3*

I know there are a number of other major concerns at Hanford such as the high-level nuclear wastes contained in aging underground leaky Single Shell Tanks (99.9% tank wastes must be removed if technically possible, treated and dispose of them in a waste facility not near a river nor over groudwatern); the suggested entombing the FFTF as a way of decommissioning the FFTF (no, no--remove it like we did the Trojan reactor); the slow rate at which the vitrification program is being built and (of course way over budget) and the need for at least another LAW to be scheduled to be built within the next year or so. *221-4*

So, a big NO to having more waste added to Hanford. The treatment of what is there is way behind and is still being figured out. *221-1 cont'd*

Sincerely,

Marian Grebanier
4549 NE 20 Ave.
Portland, OR 97211

221-1 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.

221-2 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 this *Final TC & WM EIS*, Chapter 4, Section 4.3, Public and Occupational Health and Safety—Transportation. 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. Rail transport would lead to lower doses to the general population due to the smaller number of transports and lower exposure to populations in the vicinity of stations where reclassification and inspections would take place. In addition, no additional LCFs are expected as a result of an accident involving a rail or truck shipment. Transportation workers (including drivers and escorts) would be monitored for radiation exposure. DOE would administratively limit the radiation exposure of these workers to no more than 100 millirem per year, unless the individual is a trained radiation worker, in which case the administrative limit would be 2 rem annually (DOE Standard 1098-2008). Each individual escort's exposure would be administratively limited to no more than 2 rem per year (DOE Standard 1098-2008).

221-3 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. 221 (cont'd): Marian Grebanier

221-4 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. Under DOE's Preferred Alternative for FFTF decommissioning (Alternative 2: Entombment), 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. In addition, this EIS analyzed supplemental LAW treatment capability by building new treatment facilities that are either part of (expanded LAW capacity) or separate (bulk vitrification, steam reforming, or cast stone) from the WTP. As discussed in Chapter 2, Section 2.12, DOE does not have 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.

Commentor No. 222: Ralph Johnson

From: Ralph Johnson [linktech@ix.netcom.com]
Sent: Friday, March 19, 2010 1:01 AM
To: tc&wmeis@saic.com
Cc: linktech@ix.netcom.com; thesecretary@hq.doe.gov; warrenmiller@nuclear.energy.gov; mark.gilbertson@em.doe.gov; denise.freeman@hq.doe.gov; ighotline@hq.doe.gov
Subject: COMMENTS ON TC&WMEIS [FFTF INCLUDED] due March 19,2010
Attachments: COMMENTS ON EIS-Mar 2010.doc

COMMENTS ON EIS

TC&WMEIS (Hanford)

Comments due March 19, 2010

My comments are short and to the point. They come from a long background of intimate personal knowledge of Hanford and its assorted programs; career service with both contractors and government.

1. The only option worthy to be considered in the draft as written is NO ACTION.
2. My strong recommendation is to provide a mission and put the entire facility back in use. Its suitability for such was determined by specific study completed in the last few years; funded by DOE. Three missions come immediately to mind:
   - ·Production source for medical isotopes in the cancer fight. Today's sources are limited and of questionable quality.
   - Test reactor for advanced nuclear power development. Believed to be one of the best fast test reactors currently available.
   - Provide a source for Pu240 as a vital defense material and of course there is always a vital need for research of all kinds-medical, energy, etc.
3. Clarify the EIS role of the FFTF as a commercial support entity and remove it from a defense environmental EIS that encompasses much of the past Hanford Project. Its environmental authority and traceability via the Environmental Protection Act should fit into the chain of required events and decisions in full regard to satisfying the requirements of the Environmental Protection Act that requires a NEPA process; and not a defense waste removal process. A fully justified Record of Decisions path needs to be made in full compliance with the Act. Past environmental and NEPA documentation appears to be very muddled and perhaps in some cases illegal.

222-1

222-1 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. 222 (cont'd): Ralph Johnson

4. The cost to continue with Deactivation – NO ACTION option – is only $1.2 million per year. This status has been apparently supported by the Washington Ecology and EPA having written, "It is our view that FFTF work should proceeded only until it can be placed in a min-safe configuration...." This is the current status –Deactivation, Surveillance and Maintenance.

222-1 cont'd

Once broken free of the Hanford Defense Mantle, the FFTF could be one of the USA's largest contributions to the World's nuclear non-proliferation programs [a negotiation chip]. It could also well be an advance leader in getting the USA back into a leadership position within the world nuclear market..rej 3-18-10

Ralph Johnson

xxx-xxx-xxxx
4456 41st Ave SW
linktech@ix.netcom.com
Seattle WA 98116

Response side of this page intentionally left blank.

Commentor Number 223 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 218.

Commentor No. 224: Lynn R. and Stephen Schott

Mr Stephen Schott
867 Mingo Mountain Rd
Kettle Falls, WA 99141

3/13/10

To whom it may concern —

I am angry & outraged at recent DOE decisions to ship & store radioactive waste at Hanford. The citizens of Wash. State are opposed to this & have waited years for the DOE to do proper cleanup on the highly contaminated site. It is insane & immoral to dump even more waste when the government has not safely contained the current mess. 224-1

Enough is enough!

The cancer rate in E. Wash. is sky-high already. Please — do not pollute the Columbia River any more, & do your duty to clean up the current waste. 224-2

Any additional investment of federal dollars in nuclear weapons or power is utterly wrong & misguided. 224-3

The voters of WA rejected DOE's proposal some years back, & our wishes must be honored. 224-4

Sincerely, Lynn R. Schott
Stephen Schott

[redacted]

224-1 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.

224-2 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.

DOE is concerned about protecting the Columbia River and has invested a considerable effort in this EIS to understand the movement of contaminants

through the environment and the potential impacts on groundwater and the Columbia River. This *TC & WM EIS* analyzes potential environmental impacts associated with a specific set of proposed actions and reasonable alternatives for the storage, retrieval, treatment, and disposal of tank waste generated from defense materials production activities; closure of SSTs containing HLW; decommissioning of FFTF; and continued management of LLW and MLLW at Hanford. As indicated in Chapter 1, Section 1.3, part of the purpose and need for agency action is to treat tank waste and close the SSTs in a manner that protects human health and the environment and permanently reduces the risk posed by the tank waste. Different technologies for retrieving and treating the tank waste are analyzed and compared in this EIS. Although the actions being considered in this EIS include disposal of LLW and MLLW at Hanford, as described in Chapter 2, all future LLW and MLLW disposal, including the treated tank waste forms, would be in lined trenches.

224-3 Nuclear weapons and nuclear energy production 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.

224-4 Initiative 297, known as the Cleanup Priority Act, was passed by Washington State voters in November 2004. This act would have restricted the importation of offsite waste to Hanford, among other things. DOJ challenged the initiative, arguing it violated the U.S. Constitution. The Federal District Court agreed and ruled the initiative "invalid in its entirety." The State of Washington appealed the ruling, but the Ninth Circuit Court of Appeals affirmed the lower court, declaring the initiative was preempted by the Atomic Energy Act of 1954.

See response to comment 224-1 for a discussion on the transport and disposal of offsite waste.

Commentor Number 225 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 182.

Commentor No. 226: Margaret Carnegie

Margaret Carnegie
11259 126th Ave. N.E.
Kirkland, WA 98033

Tank Closure & Waste Management Environmental Impact Statement
P.O. Box 1178
Richland, WA 99352

March 14, 2010

Department of Energy,

I find it abhorrent that you are even considering such things at the Hanford Site such as not properly cleaning up radioactive waste, leaving unlined soil trenches and leaving nuclear waste in unsafe underground tanks. The health dangers now and far into the future must dictate proper storage. Contaminating the land and water even more than the current conditions must not be an option. The "healthiest" options must be the only solutions. ***226-1***

Thank you for listening and making safety the top priority.

Sincerely,

Margaret Carnegie

226-1 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*.

Commentor No. 227: Darol Streib

1457 Grant Street
Bellingham, WA 98225-4920
March 15, 2010

Tank Closure and Waste Management
Environmental Impact Statement
P.O. Box 1178
Richland, WA 99352

I have been a Washington state resident 59 years.

I understand that our counrty's nuclear power plants generate 4½ million pounds of waste per year that must be stored at those sites.

Since that Hanford Reserve already has at least 150 huge tanks and thousands of buried barrels of radioactive waste, it should not become a repository for additional such detritus. *227-1*

Waste for porocessing should be accepted only when the vitrification plant is operational, with incoming not more than half the output quantity.

Just because Yucca Mt facility has been shelved should not make the Columbia River Basin our country's waste site by default.

There have been excessive delays and overspending on the vitrification plant. Why isn't there competition among several companies? After all, we are certainly going to need more than one such plant. *227-2*

All electric ratepayers have contributed for decades to fund solutions to the problem of radioactive waste, and the mess increases with no end in sight. This is a great disappointment for all citizens and no persons or corporations are held accountable.

Sincerely,

Darol Streib

227-1 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.

227-2 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, 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. Therefore, DOE has no plans to build "more than one such plant."

Commentor Number 228 is not included in this Comment-Response Document because it is a duplicate of Commentor Number 200.

Commentor No. 229: Preston A. Sleeger, Regional Environmental Officer, Office of Environmental Policy and Compliance, U.S. Department of the Interior

From: Mandy Stanford [m-stanford@qwestoffice.net]
Sent: Friday, March 19, 2010 1:54 PM
To: tc&wmeis@saic.com
Cc: 'Preston Sleeger'
Subject: DOI Comments - DEIS for the Tank Closure & Waste Management for the Hanford Site
Attachments: ER09_1129_deis.pdf

Attached, please find the Department of the Interior's comments on the subject DEIS.

Thank you,
Mandy

Mandy Stanford
Regional Environmental Protection Assistant
United States Department of the Interior
620 SW Main Street, Suite 201
Portland, OR 97205
Phone: (503) 326-2489
Fax: (503) 326-2494

Response side of this page intentionally left blank.

Commentor No. 229 (cont'd): Preston A. Sleeger, Regional Environmental Officer, Office of Environmental Policy and Compliance, U.S. Department of the Interior

United States Department of the Interior
OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
620 SW Main Street, Suite 201
Portland, Oregon 97205-3026

9043.1
IN REPLY REFER TO:
ER09/1129

Electronically Filed

March 19, 2010

Mary Beth Burandt
EIS Document Manager
DOE Office of River Protection
P.O. Box 1178
Richland, Washington 99352

Dear Ms. Burandt:

The U.S. Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement for the Tank Closure and Waste Management for the Hanford Site, Richland, Benton County, Washington. The Department offers the following comments for use in developing the Final Environmental Impact Statement for the project.

Section 3.3.6.1.1

- There is no USGS reference for the 100 year floodplain map for the Big Lost River that was stated as having been published in 1998 (page 3-141, bottom of page). *229-1*
- There is no USGS reference for surface water flow estimates attributed to the USGS (page 3-142, top of page). *229-2*

Section 3.3.6.3.1

- There is no USGS reference for aquifer and groundwater flow estimates attributed to the USGS throughout the general site description. *229-3*
- Suggest that the authors check to see if there is an available USGS reference for the water quality data from the network mentioned on page 3-144; it is preferable to cite an original reference rather than a second order reference to a DOE document, if possible. *229-4*

229-1 As referenced by the commentor, the discussion regarding the Big Lost River floodplain and flood hazard to INL facility areas presented in Chapter 3, Section 3.3.6.1.1, of this EIS relates to historical information attributed to the U.S. Geological Survey (USGS) and others. DOE incorporated this discussion by reference into this *TC & WM EIS* as originally presented in DOE's *Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement* (DOE/EIS-0287). This source document is cited as "DOE 2002a" at the end of the paragraph in the *Draft TC & WM EIS* cited by the commentor.

229-2 The discussion that includes flood discharge estimates attributed to USGS, as presented in Chapter 3, Section 3.3.6.1.1, of this EIS, was summarized from DOE's *Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement* (DOE/EIS-0287). As indicated in DOE's response to comment 229-1, this source document is cited as "DOE 2002a" at the end of the paragraph in the *Draft TC & WM EIS* cited by the commentor.

229-3 The reference source for the hydrogeologic characterization presented in the second half of Chapter 3, Section 3.3.6.3.1, of the *Draft TC & WM EIS* is cited as "ANL 2003" at the end of the paragraph. The full reference is entitled, "ANL (Argonne National Laboratory), 2003, *ANL-W Standardized Documented Safety Analysis*, DSA-001-SW, Rev. 0, University of Chicago, Chicago, Illinois, September 5." It is listed in Chapter 3, Section 3.4, of this EIS. USGS is credited in the referenced document as the primary source for the information regarding the thickness of the Snake River Plain Aquifer.

229-4 DOE assumes that the commentor's suggestion relates to the statement in Chapter 3, Section 3.3.6.3.1, of the *Draft TC & WM EIS* that notes that INL has a groundwater-quality monitoring network maintained by USGS. The source for this statement is in fact a primary source, the *Idaho National Laboratory Site Environmental Report, Calendar Year 2006*, wherein monitoring results are reported. This source document is cited as DOE 2007d at the end of Chapter 3 in the *Draft TC & WM EIS*. However, applicable discussions and reference citations throughout Section 3.3 of this final EIS have been updated to reference the latest Idaho National Laboratory Site Environmental Report.

Commentor No. 229 (cont'd): Preston A. Sleeger, Regional Environmental Officer, Office of Environmental Policy and Compliance, U.S. Department of the Interior

Appendices

- There is no reference for the USGS computer program MODFLOW in Appendix N and O. Because there are several versions of the computer program MODFLOW it should be referenced, similarly to the references in Appendix L, so that the reader is aware of the version of MODFLOW used.

Thank you for the opportunity to review and comment on the DEIS. If you have any questions concerning our comments, please contact Gary LeCain, USGS Coordinator for Environmental Document Reviews, at (303) 236-5050 x229 or at gdlecain@usgs.gov. If you have any other questions, please contact me at (503) 326-2489.

Sincerely,

Preston A. Sleeger
Regional Environmental Officer

229-5

229-5 The purpose of Appendix L is to explain how the groundwater flow field was developed for this *TC & WM EIS*. The discussion focuses on the development and use of MODFLOW, and thus a complete reference to the model version is provided. Appendix N discusses the vadose zone flow and transport model and analysis; Appendix O, development of the groundwater transport analysis. These two appendices explain how the analysis interacts with the version of MODFLOW discussed in Appendix L and include references to Appendix L. DOE believes that repeated reference to the specific version of MODFLOW is unnecessary.

Commentor No. 230: Dan Doyle, Project Manager, Division of License Renewal, U.S. Nuclear Regulatory Commission

From: prvs=68759cd89=Daniel.Doyle@nrc.gov on behalf of Doyle, Daniel [Daniel.Doyle@nrc.gov]
Sent: Friday, March 19, 2010 2:23 PM
To: TC&WMEIS@saic.com
Cc: Rikhoff, Jeffrey; Imboden, Andy; Pham, Bo
Subject: NRC comments on TC&WM EIS
Attachments: EJ Comments on TC & WM EIS.doc

Attached please find the U.S. Nuclear Regulatory Commission comments on the Draft Tank Closure and Waste Management Environmental Impact Statement.

Thank you,

Dan Doyle
Project Manager
Division of License Renewal
U.S. Nuclear Regulatory Commission
daniel.doyle@nrc.gov
(301) 415-3748

Response side of this page intentionally left blank.

Commentor No. 230 (cont'd): Dan Doyle, Project Manager, Division of License Renewal, U.S. Nuclear Regulatory Commission

ENVIRONMENTAL JUSTICE

1. **Comment:** DOE's *TC & WM EIS* misinterprets NRC's "Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions" (*69 FR 52040*) (NRC 2004) in Sections 3.2.11 and J.5.

   Section 3.2.11, Page 3–95

   "A community in the impacted area is designated minority or low-income if the percentage of minority or low-income persons in that area significantly exceeds [emphasis added] the percentage of such persons in the general geographic area (defined here as the potentially affected counties and states) in which the impacted area is located. NRC guidance defines "significant" as 20 percentage points above the population of the general geographic area. Yet NRC criteria also allow for designation as a minority or low-income population if minority or low-income persons constitute more than 50 percent of the population of the impacted area (69 FR 52040). The NRC definition is used in this *TC & WM EIS*."

   Section J.5, Page J–4

   "Minority populations and low-income communities were identified where the percentage of minority and low-income population in the impacted areas significantly exceeded [emphasis added] the general population percentage in other reasonable geographic areas of comparison, defined here as the potentially affected counties and states in which the impacted areas are located. The U.S. Nuclear Regulatory Commission considers such percentages "significant" when the total minority or low-income population percentage exceeds the general population by 20 points, or when either the minority or low-income population percentage exceeds 50 percent (69 FR 52040). Table J–1 displays the thresholds used to determine minority and low-income populations."

   The use of the terms "significantly exceeds" and "significantly exceeded" to determine minority and low-income populations is incorrect. CEQ "Environmental Justice Guidance Under the National Environmental Policy Act" (CEQ 1997) identifies Minority populations on the basis of "either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority percentage of the affected area is meaningfully greater [emphasis added] than the minority population percentage in the general population or other appropriate unit of geographic analysis." NRC's "Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions" (*69 FR 52040*) is consistent with this definition. NRC's Policy Statement reads (on page 52048 of the *FR* [see Section 2. Identifying Low-Income and Minority Communities]), "Under current NRC staff guidance, a minority or low-income community is identified by comparing the percentage of the minority or low-income population in the impacted area to the percentage of the minority or low-income population in the County (or Parish) and the State." (NRC 2004)

   These statements misinterpret NRC's Policy Statement (69 FR 52040) by asserting that NRC guidance defines the term "significant" and determines the existence of minority or low-income populations based on "significant" percentages. NRC guidance does not define the term "significant" in its Policy Statement. However, on page 52048 of the *FR* (see Section 2. Identifying Low-Income and Minority Communities), the term "significantly" is defined by "staff guidance to be 20 percentage points." The purpose for this percentage is to determine whether "EJ will be considered in greater detail." It is not

230-1 **230-1** The language in Appendix J, Section J.5, and Chapter 3, Section 3.2, of this *TC & WM EIS* has been modified to reflect current CEQ and NRC guidance.

Commentor No. 230 (cont'd): Dan Doyle, Project Manager, Division of License Renewal, U.S. Nuclear Regulatory Commission

and should not be used to determine the existence of minority or low-income populations.

Basis:

NRC's Policy Statement reads, "Under current NRC staff guidance, a minority or low-income community is identified by comparing the percentage of the minority or low-income population in the impacted area to the percentage of the minority or low-income population in the County (or Parish) and the State. If the percentage in the impacted area significantly exceeds that of the State or the County percentage for either the minority or low-income population then EJ will be considered in greater detail. ''Significantly'' is defined by staff guidance to be 20 percentage points. Alternatively, if either the minority or low-income population percentage in the impacted area exceeds 50 percent, EJ matters are considered in greater detail." (NRC 2004, see page 52048 of the *FR* [see Section 2. Identifying Low-Income and Minority Communities])

CEQ's EJ Guidance reads, "Minority population: Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis." (CEQ 1997, see page 25)

230-1 cont'd

Recommendation:

DOE should revise text in both sections as necessary to accurately reflect current NRC and CEQ guidance.

Reference:

NRC. "Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions." Federal Register 69: 52040-52048. August 24, 2004.

CEQ. "Environmental Justice Guidance Under the National Environmental Policy Act." Available on-line at http://ceq.hss.doe.gov/nepa/regs/ej/justice.pdf. December 10, 1997.

2. **Comment:** Total population growth from 1989 to 1999 of 39 percent and 27 percent for 10-county area in Section 3.2.11.2.1 could not be replicated based on total population numbers presented in Table 3-19 and 3-20. Total population growth over the same period for the two-state region of Washington and Oregon could be replicated.

Section 3.2.11.2.1, Page 3–104

"From 1989 to 1999, the total population of the 10-county area increased by approximately [redacted] percent, while the low-income population increased by approximately [redacted] percent. Over the same period, the two-state region of Washington and Oregon saw an increase in total population of approximately [redacted] percent, with an increase in low-income population of approximately [redacted] percent over the 10-year period."

230-2

230-2 The text has been revised to reflect total population and low-income population increases of 23 percent and 13 percent, respectively, from 1989 to 1999.

Commentor No. 230 (cont'd): Dan Doyle, Project Manager, Division of License Renewal, U.S. Nuclear Regulatory Commission

The numbers in the tables below are from Table 3–19 and Table 3–20 in DOE's *TC & WM EIS*, Section 3.2.11.2.1, page 3–104.

Counties Surrounding the Hanford Site	Total population	Low-income population
Total population in 1999 (Table 3–20)	676,966	109,693
Total population in 1989 (Table 3–19)	551,349	96,773
Difference	125,617	12,920
Percent		

Washington and Oregon	Total population	Low-income population
Total population in 1999 (Table 3–20)	9,112,868	1,001,110
Total population in 1989 (Table 3–19)	7,516,910	862,800
Difference	1,595,958	138,310
Percent	.2	.0

230-2 cont'd

Basis:
N/A

Recommendation:

DOE should verify and validate numbers in the tables are correct and revise text as necessary.

Response side of this page intentionally left blank.

Commentor No. 231: Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

From: Callie Ridolfi [callie@ridolfi.com]
Sent: Friday, March 19, 2010 2:45 PM
To: tc&wmeis@saic.com; David Brockman
Cc: Russell Jim
Subject: Tank Closure & Waste Management EIS Comments
Attachments: ERWM_EIS_Comments_100319.pdf

Dear Mr. Brockman and Ms. Burandt:

On behalf of Russell Jim and the Yakama Nation ERWM Program, this is to submit the comments of the Yakama Nation related to the Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site dated October 2009. Please find them attached.

Thank you.

Callie A. Ridolfi, P.E., LEEDAP
Director

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www.ridolfi.com

Response side of this page intentionally left blank.

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

Confederated Tribes and Bands of the Yakama Nation

Established by the Treaty of June 9, 1855

March 19, 2010

David A. Brockman, Manager
Richland Operations Office
U.S. Department of Energy
P.O. Box 550
Richland, Washington 99352

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

Dear Mr. Brockman and Ms. Burandt:

Thank you for the opportunity to comment on the Draft Tank Closure and Waste Management Environmental Impact Statement (Draft TC & WM EIS) for the Hanford Site, Richland, Washington (DOE/EIS-0391-D) prepared by the U.S. Department of Energy (USDOE). This letter, including the attachments, summarizes and transmits the Yakama Nation's comments and concerns regarding the alternatives presented in the Draft TC & WM EIS.

The Yakama Nation's vision for the cleanup and closure of the Hanford Site includes the following objectives:

1. Compliance with Yakama Nation Treaty Rights, including full access to cultural resources by the Yakama Nation and its members within its ceded land and aboriginal territory, including on the Hanford Site. *231-1*
2. Protection of the health of Yakama Nation tribal members and the environment in the following ways: *231-2*
   - The Hanford Site and all its resources (including, but not limited to, the Columbia River, the islands in the Columbia River, other surface waters, geologic resources, groundwater, air, and biological resources including plants, fish, and wildlife) are safe for all exposure scenarios and tribal uses.
   - The cleanup actions must achieve cleanup goals that are protective based on the exposure parameters and lifestyle described in the Yakama Nation exposure scenario[1]. *231-3*

[1] Yakama Nation Exposure Scenario for Hanford Site Risk Assessment, Richland, Washington, prepared for the Yakama Nation ERWM Program by RIDOLFI Inc., September 2007.

Post Office Box 151, Fort Road, Toppenish, WA 98948 (509) 865-5121

231-1 DOE recognizes that some tribes have treaty-protected and other federally recognized rights to resources and resource interests located within reservation boundaries and outside reservation and jurisdictional boundaries. DOE will appropriately protect these treaty and trust resources and resource interests and related concerns in these areas. DOE works closely with the tribes to ensure that reasonable access is provided to traditional cultural properties located at Hanford to allow tribes to conduct important religious ceremonies. Tribes are also invited to participate in field surveys associated with Hanford ecological and cultural resources programs. DOE conducts quarterly Cultural Resources Management Program meetings to discuss topics of interest and importance to the tribes and the status of ongoing or planned activities at Hanford. As part of the TPA process, DOE program and senior managers travel to meet with tribal councils and representatives to solicit input and engage in government-to-government consultations. These are examples of some of the ways DOE attempts to honor its relationship with, and responsibilities to, American Indian tribes in the vicinity of Hanford.

231-2 DOE does not believe that all resource areas could be safe for all tribal scenarios at all locations at Hanford. This *TC & WM EIS* presents a comparison of impacts on surface water (including the Columbia River), geologic resources, groundwater, air, and biological resources (ecological resources) under the alternatives considered.

231-3 This *TC & WM EIS* presents a comparison of impacts under the alternatives considered. Specific cleanup goals will be implemented in the future when a specific course of action has been decided upon. In response to this comment and others, a new appendix (i.e., Appendix W) was added to this *Final TC & WM EIS*. In Appendix W, Section W.3, exposure data provided by the tribes are used to estimate peak impacts on a Yakama hunter-gatherer and on a Confederated Tribes of the Umatilla Indian Reservation (CTUIR) hunter-gatherer for a representative alternative combination, Alternative Combination 2, without non–*TC & WM EIS* sources. Inclusion of these scenarios does not mean DOE agrees with the Yakama Tribe that all cleanup must be protective for exposure parameters and lifestyles described in the tribal scenarios for Hanford. The comparison of those analyses to those for the *TC & WM EIS* hunter-gatherer described in Appendix Q suggests that both the exposure pathways modeled and the parameter values used for the *TC & WM EIS* hunter-gatherer are representative for use in the EIS analyses. In addition, one or two exposure pathways account for essentially all of the peak impacts (and variability) across the hunter-gatherer scenarios.

- The cleanup actions must be protective of all ecological resources that have been or may be affected by Hanford releases and activities. *231-2 cont'd*

3. Cleanup actions must comply with all applicable or relevant and appropriate federal and state regulatory requirements. *231-4*
4. Cleanup actions must be compatible with clean closure of the tanks. For example, cleanup actions such as grouting of the tanks, which would preclude clean closure, should not be implemented.
5. Cleanup actions are complete and permanent and must not rely on long-term stewardship and institutional controls to address long-lived radionuclide contamination at the Hanford site. Long-term stewardship and institutional controls will not be effective for wastes that remain dangerous for hundreds or thousands of years. *231-5*
6. The Draft TC & WM EIS clearly shows that importing wastes from off-site would result in drinking water standards being exceeded. USDOE should abandon plans to resume importation of wastes from off-site. *231-6*
7. The Draft TC & WM EIS also clearly shows that risks associated with contamination in the vadose zone and groundwater will exceed protective levels for thousands of years. USDOE should indicate what kinds of concurrent actions it intends to take in regard to groundwater and the vadose zone to ensure that the cleanup of the site reduces risks to levels that are protective of Tribal subsistence uses without relying on long-term stewardship and permanent institutional controls. *231-7*

The description of alternatives provided in the Draft TC & WM EIS does not present overall alternatives in a straightforward way that allows for the direct comparison of the various alternatives and their impacts, and does not provide a clear basis for choice among the numerous combinations of options. We respectfully request that you revise the EIS to identify preferred alternatives that meet the cleanup objectives described above and address the attached specific comments, and that a revised EIS be circulated for public review and comment. *231-8*

Sincerely,

Harry Smiskin, Chairman, Yakama Tribal Council

cc/enc: Moses Squeochs, General Council Chairman
Donald Isadore, Jr., Yakama Tribal Council
Warren Spencer, Jr., Yakama Tribal Council
Lavina Washines, Yakama Tribal Council
Sam Jim, Sr., Yakama Tribal Council
Phil Rigdon, YN DNR Deputy Director
Russell Jim, Manager, ER/WM Program

231-4 This EIS is not being prepared under CERCLA; therefore, the applicable or relevant and appropriate requirements (ARARs) process does not apply. The scope of the proposed actions evaluated in this *TC & WM EIS* does not include CERCLA remedial actions. Chapter 6 addresses cumulative impacts, including CERCLA activities. All environmental restoration actions conducted at Hanford under CERCLA must evaluate the "legally applicable, relevant and appropriate requirements of Federal and State laws and regulations" to establish the appropriate cleanup level that must be achieved at an individual cleanup site.

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. This is not the same as an "ARARs analysis" under CERCLA, and it serves a different purpose. The identification of legal requirements in a NEPA document assists an agency in its planning, funding, and decisionmaking process. It also provides full disclosure to members of the public, stakeholders, and other agencies regarding the potential scope of an agency's effort to implement a proposed action (or an alternative) in terms of the subsequent permitting, other approvals, consultations, and coordination requirements.

231-5 This *TC & WM EIS* indicates that over the long term, removal of the waste from the SSTs and closure of the tanks has long-term benefits over not closing the SSTs. Following completion of the mitigation action plan and before implementing closure actions, DOE will develop a tank farm system closure plan that will be implemented for each of the waste management areas. The first waste management area to be addressed is Waste Management Area C. The TPA has a milestone for the completion of a soil investigation for Waste Management Area C (M-045-61), submittal of a closure plan (M-045-82), and completion of Waste Management Area C closure (M-045-83). DOE will complete the soil investigation to determine the nature and extent of the contamination. To inform the decision process for closure, DOE will complete a Waste Management Area C performance assessment and risk assessment. Following completion of the tank retrievals, data collection activities for residuals in the pipelines, ancillary equipment, and soil, the performance assessment will be revised to include all data. This revised performance assessment and closure plan, which will address any needs for long-term stewardship and institutional controls, will be presented for public review and comment, and the Waste Management Area C closure plan will be modified and incorporated into the Hanford sitewide permit.

231-6 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

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

Attachment 1

Yakama Nation ERWM Program General Comments on the *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington* (USDOE/EIS-0391).

This Attachment 1 presents the Yakama Nation Environmental Restoration and Waste Management (ERWM) Program's general comments on the U.S. Department of Energy's (USDOE) Draft Tank Closure and Waste Management Environmental Impact Statement (hereinafter referred to as "the EIS") for the Hanford Site, Richland, Washington. The general comments presented here summarize the major issues and concerns identified by ERWM on behalf of the Yakama Nation. Attachment 2 presents targeted comments keyed to specific sections or pages in the EIS. Attachment 3 provides additional detailed information prepared by the Institute for Energy and Environmental Research (IEER, 2010).

ERWM finds that all of the proposed alternatives are deficient in numerous ways. Primarily, none of the alternatives would achieve compliance with environmental regulations or important criteria such as the drinking water standards. It is our position that key elements of the EIS should be reanalyzed and reevaluated in a substantially revised EIS that meets the criteria identified by the Yakama Nation in its letter to the USDOE dated March 12, 2010, to which this document is an attachment. Those criteria are expanded upon below. ***231-9***

Overview: The EIS Is Deficient in Numerous Ways

Insufficient Detail, Poor Organization

Overall, the EIS is difficult to follow and does not provide adequate information for evaluating environmental impacts and risks to human health and ecological resources. The EIS is incomplete and inconsistent in many respects. For instance, the reader is directed to numerous other reports for the parameters and concentrations used as inputs in groundwater modeling, air emissions modeling, and risk analysis equations. This makes it impossible to construct a coherent technical picture of the analysis underlying the alternatives in the EIS. Also lacking is a clear explanation of the process for screening contaminants of potential concern and the rationale for determining receptors of concern and exposure pathways. The USDOE should provide this information in a concise and consistent format throughout the EIS and its appendices. ***231-10***

In addition, the EIS does not facilitate straightforward comparison of the environmental and health impacts of each alternative. Instead, a number of alternatives are grouped together as "preferred," although their impacts could differ widely and some of this grouping is not technically appropriate. Further, some alternatives seem to be preferred for reasons unrelated to ***231-11***

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 illustrate 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.

231-7 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.

231-8 The alternatives presented in this *TC & WM EIS* were developed under NEPA to address the essential components of DOE's three sets of proposed actions 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 the *Draft TC & WM EIS*, allowing an indepth comparison of the alternatives by resource area. The impacts analysis presented in Chapter 2 (in tabular form for ease of comparison) is a summary of the short- and long-term impacts presented in Chapters 4 and 5, respectively. Decisions made by DOE on the proposed actions

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

environmental or compliance considerations. For example, the USDOE appears to have rejected Alternative 6B based on a policy aversion to treating all tank waste as high-level waste, even though it is currently defined as such under the Nuclear Waste Policy Act of 1982.

231-11 cont'd

The USDOE should present each alternative as a comprehensible set of actions for tank waste management, including tank waste storage, retrieval, treatment, and closure, plus the associated impacts of low-level waste and mixed waste streams generated in the process. For all alternatives, future post-remediation impacts should be clearly presented in tables and graphs showing the future variation over time of concentrations of all major contaminants and the evolution of compliance with applicable or relevant and appropriate requirements (ARARs).[1]

Unacceptable Environmental Consequences

231-12

Most important, all of the alternatives fail to meet drinking water standards for groundwater—even the standards for single radionuclides—even when institutional controls are assumed to be in effect inside the core zone.

A revised EIS should present at least one alternative that meets all applicable drinking water standards for groundwater within the core zone without the need for institutional controls following cleanup actions for both tank farm and non-tank-farm 200 Areas.

231-13

The preferred alternative of landfill closure for the single-shell tank system would result in chemical and radiological groundwater contamination that would persist at concentrations above federal and state standards for the entire 10,000-year analysis period presented in the EIS. Selecting this preferred alternative would result in adverse environmental impacts to groundwater of sufficient magnitude and duration that they would be unacceptable from the standpoint of public health or welfare and environmental quality.

A revised EIS should include clean closure as the preferred alternative.

Cumulative Impacts

231-14

The cumulative impacts of the proposed actions, in combination with other past, present, and reasonably foreseeable future actions, would be environmentally unacceptable, and mitigation measures necessary to meet federal and state laws and regulations and to protect human health and the environment are not included in any of the proposed alternatives.

[1] Additional detailed information provided in Attachment 3.

231-9

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 has satisfied NEPA requirements by responding to public comments on the draft EIS in this CRD and by making changes to the draft EIS where appropriate and necessary. Subsequent to the issuance of the *Draft TC & WM EIS*, DOE prepared an SA to analyze 14 topics it identified where it is unclear whether updated, modified, or expanded information warrants preparation of a supplemental or new draft EIS. 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* is not required.

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 231-8 for information regarding the SA issued by DOE.

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

A revised EIS should include mitigation measures that address these issues.

231-14 cont'd

The EIS Does Not Comply with Yakama Nation Treaty Rights

The Yakama Nation holds treaty-reserved rights to resources on and affected by the Hanford Site. It is the responsibility of both the Yakama Nation and the federal government to ensure that those resources are protected and maintained for current and future generations. Through its *American Indian Policy* (USDOE, 2006), the USDOE indicates that the most important doctrine arising from the relationship between the federal government and tribal governments is "the trust responsibility of the United States to protect tribal sovereignty and self-determination, tribal lands, assets, resources, and treaty and other federally recognized and reserved rights." Further, the USDOE indicates that it "will pursue actions that uphold treaty and other federally recognized and reserved rights of the Indian nations and peoples…and will, to the extent of its authority, protect and promote these treaty and trust resources and resource interests." Unfortunately, this policy is not reflected in the EIS. Not only does the EIS fail to adequately consider the impacts of the proposed actions on the Yakama Nation's treaty-reserved rights and resources, it actively denies that many of those rights exist.

231-15

All statements included in the EIS that convey the USDOE's "beliefs" or "positions" regarding the extent of tribal treaty rights, including repeated statements that it is the USDOE's position that Hanford is not "open and unclaimed land," should be removed from this document. All potential impacts to treaty-reserved rights and resources should be thoroughly evaluated and considered in a revised EIS, and the preferred alternative should be consistent with the USDOE's American Indian Policy, with the federal trust responsibility, and with the terms of the Treaty of 1855.

The EIS Does Not Adequately Identify or Protect Yakama Nation Cultural Resources

There is no issue of greater importance to the Yakama Nation than protection of, and respect for, its treaty-reserved rights. The Hanford Site lies within the ceded area of the Confederated Tribes and Bands of the Yakama Nation. Within this ceded area, the Yakama Nation retains the rights to natural and cultural resources, including areas of ancestral use, archaeological sites, and burial grounds. These resources are sacred and sensitive to the Yakama Nation, and they must be managed to preserve, protect, and perpetuate the resources that are inseparable from its way of life.

231-16

Only the Yakama Nation can determine what is significant to its people or, in the words of the USDOE, the "American Indian Interest." Many cultural and geographic features within the site are of significant cultural value to the Yakama Nation. The USDOE cannot speak on its behalf by assigning an arbitrary value to these resources. As an example, we point to the statement that "culturally important geographic features include Rattlesnake Mountain, Gable Mountain, Gable

Early stakeholder participation in the EIS planning and development process is important to DOE and the agency has provided numerous opportunities for such interaction. Hanford-area tribes have had the opportunity to provide, and have provided, extensive input to the *TC & WM EIS* preparation process and analysis. Chapter 8, Section 8.3, and Appendix C, Section C.3, of this *TC & WM EIS* identify the process for tribal interaction and the primary occasions for DOE's interactions with the tribes on the subject of the *TC & WM EIS* preparation process. In addition, Chapter 8 of this *Final TC & WM EIS* includes a description of the outcomes of the meetings with the tribes, and a new appendix, Appendix W, describes the tribal perspective as provided by the Hanford-area tribes.

231-10 DOE disagrees that the information is not adequate for evaluating environmental impacts and risk to human health and the environment. To assist the public in navigating through the information presented in this *TC & WM EIS*, DOE has 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.

DOE has provided more information in Appendix Q of this final EIS to clarify the process for screening COPCs and the rationale for determining receptors of concern and exposure pathways. All references cited in this EIS are available upon request or at reference libraries (e.g., the Hanford Public Reading Room).

231-11 See response to comment 231-8 regarding the EIS alternatives and future DOE decisions. In addition, see response to comment 231-4 for a discussion of ARARs and CERCLA with regard to this EIS.

231-12 See response to comment 231-9 for a discussion of the development of the alternatives presented in this *TC & WM EIS*.

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

Butte, Coyote Rapids and the White Bluffs portion of the Columbia River" (Section 3.2.8.3.1). In fact, the entire Columbia River is culturally significant to the Yakama Nation, as are many other features within the site that the USDOE has entirely failed to identify. Such a simple example makes clear that these determinations can and should be made only by the people of the Yakama Nation.

Further, the "American Indian Interest" sections of the EIS are significantly deficient because of failures to address the loss of tribal cultural activities and resources.

231-16 cont'd

The Yakama Nation cannot be separated from its natural and cultural resources. It is therefore incumbent on the USDOE to present a clear and definitive plan for restoring both the resources and the Yakama Nation's access to them to a state that will allow the people of the Yakama Nation to continue their way of life without concern for their safety or health.

The EIS Must Comply with Federal and State Environmental Laws

National Environmental Policy Act (NEPA)

Issues related to compliance with NEPA requirements are discussed in the following sections. We believe that significant revisions will be required to adequately address these issues.

Alternatives Analysis

The Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508) for implementing NEPA state that the analysis of alternatives is "the heart of the environmental impact statement" and should "present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public."

231-17

The presentation of alternatives in Chapter 2 of the EIS does not allow for direct comparison of the alternatives and their impacts and does not provide a clear basis for choice among the numerous combinations of options.

A revised EIS that complies with NEPA regulations and allows for direct comparison of the alternatives as a basis for decision making should be prepared.

Reasonable Alternatives

The CEQ regulations for implementing NEPA require that an EIS "rigorously explore and objectively evaluate all reasonable alternatives." Among other things, this means that reasonable alternatives should meet the purpose of and need for the proposal. One of the purposes of the EIS is "to treat the waste and close the single-shell tank…system in a manner that complies with

231-18

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. This *TC & WM EIS* does incorporate vadose zone remediation in some of its Tank Closure alternatives, which did indicate improvement in the vadose zone and groundwater modeling results: Alternative 4 includes deep soil remediation under two tank farms and Alternatives 6A and 6B include deep soil remediation under the tank farms and cribs and trenches (ditches).

The *TC & WM EIS* analysis shows that receipt of offsite waste streams that contain specific amounts of certain isotopes, particularly 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.

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.

It should be noted that it is DOE policy (DOE Policy 454.1, April 9, 2003) to use institutional controls as essential components of a defense-in-depth strategy that uses multiple, relatively independent layers of safety to protect human health and the environment (including natural and cultural resources). DOE will implement institutional controls, along with other mitigating or preventive measures as necessary, to provide a reasonable expectation that if one control temporarily fails, other controls will be in place, or other actions will be taken, to mitigate significant consequences.

231-13 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. These include Tank Closure Alternatives 4, 6A, and 6B, which evaluate 99.9 percent retrieval of

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

Federal and applicable Washington State laws and USDOE directives to protect human health and the environment." It is the position of the Yakama Nation that none of the proposed alternatives complies with federal and state laws or is protective of human health and the environment.

231-18 cont'd

A revised EIS should present alternatives that meet the definition of reasonable by better addressing the purpose and need of the proposed action.

Compliance with Other Laws

The CEQ regulations for implementing NEPA require that an EIS "shall state how alternatives considered in it and decisions based on it will or will not achieve the requirements of…other environmental laws and policies." The EIS does not adequately discuss how the alternatives considered will or will not comply with other federal or state environmental laws or policies, including among others the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act, Nuclear Waste Policy Act, and Atomic Energy Act and Washington State's Model Toxics Control Act (MTCA). While most environmental permitting and cleanup decisions based on those environmental laws will be made by regulatory agencies other than the USDOE, the decisions made by the USDOE in a NEPA Record of Decision (ROD) for this EIS should not prejudice or limit the ability of other environmental regulators to independently carry out their responsibilities for cleanup and closure.

231-19

A revised EIS should provide sufficient information to support informed decisions by environmental regulators, including clearly stating whether actions proposed in the EIS will or will not comply with federal and state environmental laws.

Other Environmental Regulations

CERCLA/MTCA Integration

When evaluating the extent to which various alternatives considered in the EIS comply with CERCLA requirements, the USDOE should also comply with the requirements of MTCA. Section 120(a)(4) of CERCLA states that "State laws concerning removal and remedial action, including State laws regarding enforcement, shall apply to removal and remedial action at facilities owned or operated by a department, agency, or instrumentality of the United States." Based on this provision, MTCA requirements are legally applicable to CERCLA cleanups at federal facilities in Washington State, including the Hanford Site.

231-20

While the USDOE's practice has been to apply MTCA risk requirements only to non-radiological contaminants, MTCA defines radionuclides as hazardous substances. Although

the tank waste and clean closure of all or part of the SST system. See response to comment 231-8 regarding future DOE decisions.

231-14 DOE disagrees that mitigation measures have not been included in any of the proposed alternatives. 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 EIS. Chapter 7, Section 7.5, was added to discuss and summarize these results.

231-15 DOE's *American Indian & Alaska Native Tribal Government Policy* outlines seven principles DOE uses in its decisionmaking and interaction with federally recognized tribal governments. Under the policy, all departmental elements are to ensure tribal participation and interaction regarding pertinent decisions that may affect the tribes. There is no dispute that the actions proposed in this EIS could affect Yakama Nation interests. The Yakama Nation properly cites the policy language, but the policy continues and states: "When internal policies, regulations, and statutes, or other barriers prohibit or hinder the DOE trust protection actions or participation in eligible program initiatives, the Secretary will direct the agency to seek corrective protection measures and tribal government program inclusion." This EIS identifies the relevant laws, regulations, policies and the tribal nation treaties that would be involved in implementing the proposed actions and alternatives. DOE sought and encouraged tribal participation

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

MTCA does not include cleanup levels for individually named radionuclides[2], it clearly states that "radionuclides are hazardous substances under the act." [Washington Administrative Code (WAC) 173-340-200]. Radionuclides are carcinogens, and MTCA defines the maximum allowable incremental cancer risk level for individual carcinogens as $1x10^{-6}$. It defines the maximum allowable incremental lifetime cancer risk level for multiple carcinogens and multiple exposure pathways as $1x10^{-5}$.

MTCA's inclusion of both chemicals and radionuclides in assessing cancer risks is consistent with U.S. Environmental Protection Agency (USEPA) guidance on establishing cleanup levels for CERCLA sites with radioactive contamination (USEPA, 1997). That guidance states that:

- The USEPA uses a consistent methodology for assessing cancer risks at CERCLA sites no matter the type of contamination.
- The USEPA classifies radionuclides as known carcinogens.
- Cancer risks for radionuclides should generally be estimated using the slope factor approach.
- Cancer risks from radiological and non-radiological contaminants should be summed to provide risk estimates for persons exposed to both types of carcinogenic contaminants.
- The USEPA is aware of "no technical, policy, or legal rationale for treating radiation risks differently from other risks addressed under CERCLA."

Based on the requirements of MTCA and CERCLA regulations the radiological and non-radiological cancer risks should be combined and compared to the standard that Washington State has determined is protective of human health. This standard has an upper limit of lifetime risk for carcinogens of $1x10^{-5}$.

231-20 cont'd

Radiation Protection Standards and ARARs[3]

The EIS uses 100 millirem (mrem) per year whole body total effective dose equivalent as the reference value for its health protection dose calculations. This appears to be at odds with USDOE Order 5400.1, which requires program plans to meet drinking water standards. Further, this reference value is inappropriate because it yields a lifetime fatal cancer risk of 1 in 238, which is far higher than the upper bound CERCLA risk level of 1 in 10,000 or the MTCA upper

231-21

[2] MTCA includes groundwater cleanup levels for radium and for gross alpha and gross beta particle activity.
[3] Additional detailed information provided in Attachment 3.

and interaction throughout the lengthy timeframe for development of this *TC & WM EIS*, consistent with the principles of the *American Indian & Alaska Native Tribal Government Policy* as well as with the NEPA statute and regulations, as more fully described in Appendix C of this *TC & WM EIS*. DOE has also carefully considered the views and input from the Yakama Nation and other tribes as well as the public, to whom DOE also has resource responsibilities. A copy of the Yakama Nation's positions and views is provided in Appendix W of this *Final TC & WM EIS*. There may be barriers, including technical and financial barriers, to protecting and restoring all of the resources on Hanford. DOE has and will continue to seek and consider any corrective protection measures that the Yakama Nation and others identify as DOE proceeds to implement decisions reached based on this EIS's analyses.

Regarding the Yakama Nation's perspectives about tribal treaty rights and its request that DOE remove all statements in this *TC & WM EIS* concerning DOE's beliefs or positions regarding the extent of tribal treaty rights at Hanford, DOE respectfully disagrees. This *TC & WM EIS* presents relevant and essential information important to the evaluation of potential environmental impacts, consistent with NEPA's primary goal of full disclosure to the public as well as agency decisionmakers. This includes discussion of the history of the settlement of Hanford and the treaties entered into between tribal nations and the U.S. Government. There is substantial documentation indicating that the tribes understood at the time these treaties were signed that the lands were no longer "unclaimed" when they were claimed for the purposes of the white settlers' activities. 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 U.S. Bureau of Land Management ownership), as well as all the acquired lands, were closed to all access initially under authority of the War Powers Act and then under authority of the Atomic Energy Act. It is, therefore, DOE's position that the Hanford lands are neither "open" nor "unclaimed."

231-16 See response to comment 231-15 regarding treaty rights.

DOE recognizes that the Yakama Nation feels a strong connection and association with its surrounding environment, including Hanford and the entire Columbia River. DOE agrees that only the Yakama Nation can determine what is significant to it, and DOE is grateful that the tribe has shared that information with DOE. DOE developed the discussions in this *TC & WM EIS* regarding American Indian

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

bound risk level of 1 in 100,000. In addition, CERCLA indicates that when considering many radionuclides and hazardous materials, a $1x10^{-6}$ risk level should be used as a starting point.

The EIS states that the remediation of the "non-tank-farm 200 Areas is being addressed under CERCLA." However, it does not reconcile how risk levels at least two orders of magnitude greater for radionuclides alone are compatible with a CERCLA cleanup for the non-tank-farm 200 Areas or how the tank farm cleanup can be made compatible with CERCLA when no alternative in the EIS meets those requirements.

The CERCLA framework indicates that the USDOE should use a $1x10^{-6}$ lifetime cancer incidence risk for individual chemicals and radionuclides, as required by law. The lifetime cancer risk level should not exceed $1x10^{-5}$, an upper bound value required by MTCA when multiple carcinogens are present.

231-21 cont'd

Tank Closure and Waste Management Options Must Be Compatible with Clean Closure[4]

Tank Storage and Waste Retrieval Alternatives

The technologies for retrieving waste from the tanks are complex and pose a variety of technological risks. The assumption made in the EIS that the amount of residual radionuclides is proportional to residual volume does not take into account the technical history of the tanks, specifically the effects of waste neutralization. Residuals of strontium-90, plutonium, and several other radionuclides are likely to be far greater than assumed while residual cesium-137 may be far less.

At least 99 percent of the waste volume should be removed. Approaches that could create more hazardous wastes and increase the risk of new tank leaks and tank corrosion should be deemphasized or avoided. Residual radionuclide amounts should be carefully characterized. No actions should be taken that would make waste retrieval beyond 99 percent impossible. This precludes alternatives such as grouting. (Grouting would also make clean closure by tank removal, part of Alternative 6B for instance, impossible.) Yakama Nation does not support the construction of new double-shell tanks (DSTs).

231-22

Waste Treatment

Certain core elements of the waste treatment plant (WTP)—notably, pretreatment of the waste and glass melters—are common to all alternatives[5]. A common mode failure is therefore

231-23

[4] Additional detailed information provided in Attachment 3.
[5] In this discussion, the term "all alternatives" excludes the no-action alternative.

interests to capture and explain the information provided by the Yakama Nation and other tribes, including information regarding the tribal use scenarios.

The Yakama Nation and others have requested in several forums a plan for restoring Hanford resources. It is DOE policy to integrate natural resource and restoration concerns through the CERCLA cleanup process. This process is being conducted at Hanford under the TPA and provides multiple opportunities for tribal governments and other interested parties to participate in cleanup decisionmaking. The *U.S. Department of Energy American Indian & Alaska Native Tribal Government Policy* (Bodman 2006) recognizes there may be circumstances where corrective protection measures will be needed to ensure tribal government inclusion in DOE's initiatives to protect and restore resources on Hanford. The CERCLA injury assessment process is also ongoing, and DOE appreciates the Yakama Nation's participation in the natural resource injury assessment. The Hanford Natural Resource Trustee Council has discussed a restoration plan at various times. The Yakama Nation has represented in that forum that a restoration plan is premature pending an injury assessment. A restoration plan is not part of the scope of this EIS, but could be a part of the council activities.

DOE does not anticipate that the tank farms will be an appropriate location for American Indian access for use of cultural resources or cultural activities, but continues to allow access to the parts of Hanford that are appropriate. DOE has taken, and is continuing to take, substantial actions to reduce DOE's "footprint" on Hanford. Those efforts are consistent with the Yakama Nation's goals for restoration and access.

231-17 See response to comment 231-9 for a discussion on the development of the alternatives presented in this *TC & WM EIS*.

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 (in tabular form for ease of comparison) is a summary of the short- and long-term impacts presented in Chapters 4 and 5, respectively.

231-18 See response to comment 231-9 for a discussion on the development of the alternatives presented in this *TC & WM EIS*.

231-19 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

possible. In this context, the concerns of Defense Nuclear Facilities Safety Board (DNFSB, 2009) regarding accidental criticalities, build up of explosive gases, non-uniform settling of particles, and possible failure of pulse jet mixers are especially worrisome. Further, the present design of the WTP does not include provisions for incorporation of technetium-99 (Tc-99) or iodine-129 (I-29) into immobilized high-level waste (IHLW). On-site disposal of much or most of these radionuclides would likely eventually violate drinking water standards. Finally, the results in Appendix Q and Appendix U for Tc-99 and I-129 water contamination are inconsistent; this indicates that at least one set of calculations is incorrect; it may be that both are incorrect.

The revised EIS should include provisions for the full implementation of the DNFSB's recommendations. There should be no onsite disposal of immobilized low-activity waste (ILAW) or any treatment option such as bulk vitrification or stone casting that would result in any tank waste being disposed of onsite. All tank waste should be immobilized either as IHLW or ILAW. The approach in Option 2B for two high-level waste and six low-activity waste melters would meet this goal. Treatment should include alternatives for incorporating almost all Tc-99 (as in Alternative 2B) and iodine-129 (not presently in any alternative) in IHLW. The calculations for Tc-99 and I-129 need to be carefully checked for consistency, quite apart from issues associated with the validity and accuracy of the models.

231-23 cont'd

Treatment of the Cesium and Strontium Capsules

All alternatives include vitrifying the cesium and strontium in the capsules with IHLW.

The cesium and strontium capsules should be moved into dry storage and a wider range of alternatives to treatment in the WTP should be considered.

231-24

Tank and Tank Farm Closure

The tanks are likely to have large residual source terms for radionuclides such as strontium-90 and plutonium-239/240, even in the case of 99 percent volume retrieval. Grouting the tanks or simply abandoning the tanks after a period of surveillance (the year 2193 is suggested in Alternative 2A) would be inappropriate.

The "Option Case" for Alternative B, including removal soil and ancillary equipment and clean closure of six cribs and trenches, is broadly acceptable for tank closure, provided that on-site secondary waste disposal meets the overall lifetime cancer risk criterion of $1x10^{-5}$ as an upper limit for multiple carcinogens in all other wastes to be disposed of on site. Additionally, clean closure of the DSTs and associated ancillary equipment should be considered in a revised EIS.

231-25

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. 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 the compliance with regulatory requirements, see the CRD, Section 2.7, Topics of Interest.

231-20 See response to comment 231-4 for a discussion of ARARs and CERCLA with regard to this EIS.

231-21 See response to comment 231-4 for a discussion of ARARs and CERCLA with regard to this EIS.

The commentor brings up the issue of integration and cleanup of CERCLA and RCRA units, which could influence each other. 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 (which include cribs, trenches [ditches], and tile fields), as well as sources of plutonium, are being addressed under CERCLA, 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 during the SST closure process. The cumulative impacts analysis for this *TC & WM EIS* (see Appendix U and Chapter 6) includes the vadose zone of the 200 Areas in addition to other areas of Hanford.

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.

231-22 As described in Appendix D, Section D.1.3, DOE identified three methods for estimating the residual waste in the storage tanks following retrieval and chose the first method: multiply the existing total tank inventory by a ratio of the final waste volume to the current waste volume (volume retrieval). DOE considers

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

Waste Management and Disposal

The waste in the Hanford tanks is high-level waste by law and cannot be disposed of as transuranic waste. All tank waste should be converted into IHLW or ILAW. Adequate provision must be made for on-site storage of all IHLW, because there is no high-level waste repository on the horizon. ILAW waste should be managed as high-level waste when stored on site (as proposed in Alternative 6B) and disposed in a deep geologic repository off site as Greater than Class C (GTCC) waste; the latter is not currently part of any alternative. There should be no shallow land disposal of GTCC waste at any site, including the Hanford Site.

231-26

Waste Importation

The USDOE's source terms for radionuclides in imported waste are incomplete and speculative. Nonetheless, they still indicate that the majority of I-129 and Tc-99 impacts on groundwater would derive from waste imported from off site. Other major source terms are the wastes generated as a result of remediation elsewhere on the Hanford Site, such as the 100 and 300 Areas, and disposed of in the Environmental Restoration Disposal Facility (ERDF). As with imported wastes, some ERDF source terms would by themselves cause exceedances of drinking standards in groundwater.

231-27

There should be no import of off-site wastes onto the Hanford Site. It will eventually be essential to clean-close the ERDF as one in a series of steps to fully remediate the site. Plans for doing so should be part of the CERCLA process for the Central Plateau.

Central Plateau Cleanup

None of the tank farm closure alternatives meets CERCLA and MTCA requirements. Further, the EIS does not address an intensive cleanup of the non-tank-farm 200 Areas in compliance with CERCLA (including drinking water standards).

A plan that addresses the removal of the contamination in the non-tank-farm 200 Areas is an essential complement to a preferred alternative that will meet all ARARs, including drinking water standards for groundwater, and allow use of the Hanford Site without institutional controls after remediation is complete.

231-28

A revised EIS should contain an alternative in which the tank farm cleanup occurs in an overall context of meeting CERCLA requirements, including drinking water standards, for all parts of the Central Plateau and the rest of the Hanford Site.

this method for estimating the residual waste characteristics appropriate for use in this EIS.

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. For a more comprehensive discussion of this topic, see Section 2.2 of this CRD.

231-23 DOE is not clear if the commentor is referring to the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2009-1 "Risk Assessment Methodologies and Defense Nuclear Facilities," which is stated in the comment, or meant DNFSB Recommendation 2010-2 "Pulse Jet Mixing at the Waste Treatment and Immobilization Plant." In either case both recommendations are open and DOE is working with the DNFSB on implementation plans. This EIS uses a baseline set of operational plans, facility designs, effluent projections, and safety analysis information to compare the environmental impacts of several alternative courses of action, which is not inconsistent with either recommendation.

DOE does not agree with the commentor's view that the results in Appendix Q and Appendix U for technetium-99 and iodine-129 concentrations are inconsistent. DOE is also not of the view that one or both of the calculations are incorrect. In Appendix U, the alternative combination tables that include non–*TC & WM EIS* sources are dominated by the impacts of these sources. In Appendix Q, only tank closure, FFTF decommissioning, and waste management sources are considered. In Appendix U, impacts from 1940 through 11,940 are shown. In Appendix Q, the presentation is limited to impacts occurring between 2050 and 11,940. Because both the sources considered and the timeframes involved are different, results in Appendix U are not directly correlatable to results presented in Appendix Q.

With respect to the comment regarding potential groundwater exceedances of technetium-99 and iodine-129, DOE agrees that groundwater concentrations at

Reliance on Institutional Controls for Thousands of Years is Unrealistic[6]

The EIS closure strategy places unwarranted reliance on the use of institutional controls and long-term stewardship. As the National Research Council (NRC) Board on Radioactive Waste Management has stated (NRC, 2000):

> The committee believes that the working assumption of USDOE planners must be that many contamination isolation barriers and stewardship measures at sites where wastes are left in place will eventually fail, and that much of our current knowledge of the long-term behavior of wastes in environmental media may eventually be proven wrong. Planning and implementation at these sites must proceed in ways that are cognizant of this potential fallibility and uncertainty.

231-29

Rather than adopt the stance that some areas such as the Central Plateau will be irretrievably sacrificed (either through institutional controls or to severe and extensive contamination or both), it would be prudent to focus on cleaning up the site to a standard that will allow for future unrestricted access and be fully protective of human health and the environment. In fact, the USDOE did just this in the 2003 Tank Closure EIS Notice of Intent, which included clean closure alternatives that "supported future use on an unrestricted basis and that did not require post-closure care" [68 Federal Register 1052].

We support incorporation of a clean closure alternative into a revised EIS.

The EIS appears to assume institutional control for 10,000 years. No government on Earth, let alone a government department, has existed for anything close to that time. The NRC, in reviewing USDOE cleanup plans, has explicitly advised the USDOE on this point in the past and said that "DOE's intended reliance on long-term stewardship is at this point problematic" (NRC, 2000). The EIS does not address the risk of technical failure over such long periods.

231-30

The USDOE should not rely on institutional controls significantly beyond the cleanup period. A reasonable approach is to assume institutional controls for the duration of the cleanup required by a given alternative, with complete release thereafter. Such an approach is consistent with the advice of the NRC, with historical and technical realities, and, assuming a thorough cleanup, with the unrestricted exercise of treaty rights by the Yakama Nation.

[6] Additional detailed information provided in Attachment 3.

the IDF-East barrier are projected to be near and above benchmark standards for substantial periods of time under Waste Management Alternative 2, Disposal Group 1, Subgroup 1-A (which contains waste generated from Tank Closure Alternative 2B and FFTF Decommissioning Alternative 2 or 3; see Chapter 5, Table 5–94, of this *Final TC & WM EIS*). DOE does not agree that these radionuclides are not incorporated into IHLW glass, or that the exceedances projected for the Preferred Alternative are a consequence of the lack of incorporation of technetium-99 and iodine-129 into IHLW glass. Each Tank Closure alternative incorporates, to some degree, technetium-99 and iodine-129 into IHLW glass. The estimated inventories of each of these radioactive constituents of concern in IHLW glass are included in Appendix D, Tables D–35 through D–70. As discussed in Chapter 7, Section 7.5, of this EIS, the degree of incorporation of technetium-99 and iodine-129 in IHLW glass is subject to some uncertainty; the EIS base case analysis took a conservative view of the degree of incorporation, and assumed that recycling the secondary-waste stream back into the primary WTP waste-stream feeds could be an effective mitigation measure. DOE is also of the view that the projected technetium-99 and iodine-129 exceedances at the IDF-East barrier could be mitigated by other means, including improved secondary-waste-form performance and restriction of the inventories of technetium-99 and iodine-129 associated with offsite waste disposal. As discussed in Section 7.5, DOE is actively investigating these potential mitigation measures.

The scenario of immobilization of all tank waste as either IHLW or ILAW and no onsite disposal of tank waste at Hanford is evaluated under Tank Closure Alternatives 6A and 6B. Under both of these alternatives, ILAW is managed as IHLW for disposal. The results of the analyses of these two alternatives should provide the commentor with the necessary insight.

231-24 As noted by the commentor, the *Draft TC & WM EIS* included one option for the disposition of the capsules—preparation of the capsules for treatment in the WTP and disposal of the inventory as IHLW. Based on production rates, it was calculated that treatment of the capsule inventory would require a separate campaign in the WTP that would last 1 year and produce approximately 340 IHLW canisters. In response to comments received on the *Draft TC & WM EIS*, DOE provided information on dry storage of the capsules at a new facility in the 200-East Area; this final EIS compares potential impacts of this option with those associated with vitrifying and disposing of the capsules as IHLW. The short- and long-term environmental impacts of storing the capsules were analyzed and are summarized in Appendix E, Section E.1.2.3.4.5, of this final EIS. As stated in

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Barriers are not Designed to Last for Thousands of Years[7]

The EIS closure strategy places unwarranted reliance on the use of barriers as a primary component. As quoted above, this is also a concern of the NRC Board on Radioactive Waste Management.

Available evidence suggests that there is no verified barrier design that can ensure proper functionality over the period during which the covered wastes will remain dangerous without extensive monitoring, maintenance, and periodic replacement. Furthermore, while a properly functioning barrier may protect against surface infiltration, by design such a barrier does not mitigate lateral subsurface flow, which would reach and mobilize remaining contamination.

We oppose the USDOE's proposal to leave large volumes of leaked, spilled, and intentionally discharged tank wastes in place and cover it with a barrier.

231-31

Vadose Zone Modeling Is Deficient

The model used in the EIS has deficiencies that require additional attention, of which the most significant is the persistent reduction in uncertainty as modeled results are passed from the source to vadose and ultimately to groundwater models. These uncertainties directly affect risks and impacts predicted for the site and should be carefully accounted for throughout the model, as well as presented with the modeled results to provide context. Values entered for waste source geometry should be explicitly identified and compared with characterization data. Model sensitivity analysis should incorporate distribution coefficients and discuss the additional uncertainty introduced by assigning a singular assumed value for this parameter, since it is known to change with environmental variables.

In addition, the revised EIS should include:

- A detailed description of the constituent solubility limited release model.
- Results for and discussion of sensitivity analyses performed for all other chemical and constituent distribution coefficients in addition to I-129.
- Discussion of the selection process used to assign the distribution coefficient to plutonium in contaminated soil of 150 ml/g (Table M-10). This value does not reflect the more conservative values measured by Delegard and Barney (1983) that are still used today (PNNL-13895). Many Delegard's measured values are significantly lower than the value selected for the EIS model indicating more rapid movement in the subsurface.

231-32

[7] Additional detailed information provided in Attachment 3.

the *TC & WM EIS* Summary, Section S.1.3.2, and Chapter 1, Section 1.4.2, DOE is not making a final decision on the disposition of the capsules at this time; their ultimate disposition will be determined at a later date subject to appropriate NEPA review.

231-25 The disposal of secondary waste on site will be dependent upon the final risk analyses and a comparison with the established risk criterion. Closure of the disposal facilities would require detailed examination of the disposed waste to support the preparation of site-specific radiological performance assessments and closure plans. These analyses would require detailed waste sampling and sample analyses and assessments of the structural stability of the tanks and risk to human health and the environment. These documents would provide the information and analysis necessary for DOE and regulators to make decisions on what levels of waste are acceptable in terms of short- and long-term risks.

See response to comment 231-8 regarding future DOE decisions.

Regarding the closure of DSTs and ancillary equipment that support the DST waste system, Section S.1.3.2 of the Summary and Chapter 1, Section 1.4.2, define the facilities and operations at Hanford that are not within the scope of this *TC & WM EIS* and for which decisions will not be made. Included is the closure of the DSTs and the WTP, all of which would be subject at a later date to the appropriate NEPA review.

231-26 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.

Regarding the onsite storage of IHLW, this EIS assumed the IHLW canisters would not be shipped immediately after the IHLW generation and analyzes interim storage of all the IHLW canisters. Storage capacity for the IHLW canisters was analyzed under the short-term impacts analysis for onsite IHLW interim storage. This EIS analyzes three Tank Closure alternatives, 6A, 6B, and 6C, under which

- Additional justification for the discrepancy between the chemical constituents addressed in the source release models and vadose zone transport models.

231-32 cont'd

Uncertainties should be carried forward into the groundwater model and presented with modeled results in a revised EIS. As listed above, other revisions should be made in performance of the modeling and in discussion of modeled results.

The Vadose Zone Must Be Remediated

Contamination within the vadose zone continues to provide a source term for groundwater contamination. Previous remedial actions at the Hanford Site have frequently been limited to identified process waste facilities (e.g., cribs and trenches) and restricted to usually less than 20 feet below the ground surface. To support groundwater remediation efforts, the vadose zone must also be appropriately addressed. While the USDOE has pursued some experimental technologies, the best approach uses mature and proven methods that permanently remove contamination. We do not favor *in situ* methods for vadose zone remediation for the following reasons:

- *In situ* methods frequently require contact with a reducing agent or other catalyst to reduce contaminant mobility. It is difficult to ensure an appropriate time for the reaction between the two species.
- Placement of the treatment chemical and verification of its delivery to the zone of contamination cannot be ensured.
- The permanence of many *in situ* methods has not been proven; long-term monitoring is required.
- Changes in subsurface aqueous chemistry or geochemistry cannot be accurately predicted or accounted for, necessitating a more experimental approach than may be appropriate for field-scale remediation.

231-33

Future remedial actions in the vadose zone should address the full extent of contamination, both inside and outside of waste structures. Additional characterization data should be gathered to minimize uncertainty in the selection and design of the remedial actions.

Groundwater Modeling Is Deficient

The groundwater model used in the EIS has deficiencies that require attention:

- Model uncertainty is not adequately addressed. Modeled results are frequently reported with a level of precision that cannot be fully justified.

231-34

all tank waste would be managed as HLW. These alternatives allow DOE to examine the benefits and impacts of not implementing the DOE Manual 435.1–1 waste incidental to reprocessing evaluation determination process, which supports the separation of the tank waste into two fractions, high-level and low-level. Separation and treatment of tank waste is one of the decisions to be made by DOE.

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.

231-27 Chapter 5 of this *TC & WM EIS* discusses the iodine-129 and technetium-99 groundwater impacts as they relate to the alternative sources. The commentor is correct in the assertion that, over the long term (i.e., more than several hundred years in the future), imported waste would be a major contributor to the impacts. Chapter 6, Section 6.4.1, of this *TC & WM EIS* discusses the iodine-129 and technetium-99 groundwater impacts as they relate to the cumulative impact sources, including the 100 and 300 Areas, the ERDF, and over 400 additional source areas. Chapter 6 clearly identifies non-tank-farm-related sources (including the ERDF) as contributing significantly to long-term groundwater impacts. This *Final TC & WM EIS* provides this information as context for the comparison of the Tank Closure, FFTF Decommissioning, and Waste Management alternatives. Any potential future decisions or actions taken with respect to ERDF are not within the scope of this *Final TC & WM EIS*.

231-28 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 cribs, trenches [ditches], and unlined solid-waste trenches) is being addressed under CERCLA, 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 during the SST closure process. The cumulative impacts analysis for this *TC & WM EIS* (see Chapter 6 and Appendix U) includes the vadose zone of the 200 Areas in addition to other areas of Hanford.

See response to comment 231-4 for a discussion of ARARs and CERCLA with regard to this EIS.

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

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- The model does not account for the many subsurface heterogeneities at the Hanford Site or interactions between geologic strata[8], which can result in significant model error that may be difficult to quantify or left unquantified.
- Even within individual geologic units, hydraulic parameters can vary over orders of magnitude (Shannon & Wilson, 2009), which the model does not address. Rather, each geologic unit is assigned a single set of hydraulic parameters assumed to apply throughout each layer.
- Source terms are frequently defined using broad but unjustified or incorrect assumptions. An example is the unrealistic assumption that tank waste residual radionuclides and residual volume are directly proportional. There could be significant ramifications for the modeled results if estimated source terms do not accurately reflect site conditions.
- Long-term predictions for contaminant fate and transport are based on speculative underlying assumptions about climate and site conditions (for instance, future rainfall) that cannot be verified. The natural variability in several of these parameters adds to the uncertainty, but is not directly addressed in the modeled results.

231-34 cont'd

231-35

231-36

In addition, significant discrepancies in solutions to the Base and Sensitivity (referred to as the Alternate) cases result from relatively small differences in input parameters. An example is illustrated in Table 1, which shows that a small change in the top-of-basalt surface results in significant change in hydraulic conductivity (affecting groundwater flow patterns, travel times, and simulated contaminant concentrations).

231-37

[8] The USDOE has previously provided hydraulic conductivity values for the Ringold Gravels as low as less than 1 meter per day (PNNL-17439, 2008) and for Hanford Gravels as high as more than 2,000 meters per day (PNNL-16435, 2007).

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.

231-29 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 of Tank Closure Alternatives 6A and 6B, the assumption is that the SST system would be cleaned to levels that would allow for unrestricted use.

See response to comment 231-28 for a discussion of the new sensitivity analysis.

231-30 Although this *TC & WM EIS* analyzes the long-term impacts for 10,000 years, it assumes institutional control for only 100 years after the last action. This EIS assumes several different types of end-state management, as described in Chapter 2, the Glossary, and the Summary. These include administrative controls, active institutional controls, and postclosure care, as appropriate. Each of these end-state management options would take place at the completion of an action and is assumed to occur for 100 years following the end of the action (e.g., active institutional controls would be maintained for 100 years following final placement of waste in a storage facility). The 10,000-year time period described in this *TC & WM EIS* represents the period of analysis used for the long-term impact analyses for groundwater, human health, and ecological risk; it does not represent the assumed period of institutional controls. For clarity, the definition of "10,000-year period of analysis" is included in this final EIS in Chapter 2, the Glossary, and the Summary, as appropriate.

231-31 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 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. A full description of the modified RCRA Subtitle C and Hanford barriers, both of which are considered in the EIS analysis, is provided in Appendix E, Section E.1.2.5.4.1.

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

Table 1. Comparison of calibrated hydraulic conductivity values (in meters per day) for the Base and Alternate models.*

Parameter	Base Case	Alternate Case	Difference
Hanford mud	0.171	0.481	181%
Hanford silt	6.8	21.8	221%
Hanford sand	123.6	30.4	-75%
Hanford gravel	156	222.1	42%
Ringold sand	3.57	0.83	-77%
Ringold gravel	19.2	18.7	-3%
Ringold mud	1.514	1.958	29%
Ringold silt	1.51	0.77	-49%
Plio-Pleistocene sand	96.8	84.2	-13%
Plio-Pleistocene silt	5.81	6.87	18%
Cold Creek sand	99.13	39.4	-60%
Cold Creek gravel	62.7	5.6	-91%
Highly conductive Hanford gravel	3982	4331	9%

***The change in hydraulic conductivity for each unit that results from a small adjustment in the top-of-basalt surface by approximately 3 meters. Data taken from Tables L-20 and L-24 of USDOE/EIS-0391.**

Although they appear modest when compared with natural variability in hydraulic conductivity, these differences significantly influence the model because of the large area modeled and the assumption made in the modeling that each stratigraphic layer is homogeneous.

The USDOE's decision to promote model stability by fixing boundary inflows is also a concern, especially because this is one of the parameters to which the model is more sensitive. Additional information is needed to justify the value of 49 million cubic meters annually, which is more than twice any input value used recently by others (Pacific Northwest National Laboratory [PNNL]-11801, 1997; PNNL-13447, 2001; PNNL-13623, 2001; PNNL-14753, 2006).

Selection of the Base case result over the Alternate case result is insufficiently justified. The Alternate case fits the measured head data better than the Base case, and so is more defensible based on the data. In its singular application to one-time, point-source releases of Tc-99 in the year 2100, modeled results for the Alternate case indicate significantly greater concentrations of technetium at the Columbia River than in the Base case. This difference justifies further effort to determine which model provides the most reasonable and conservative evaluation of future site conditions.

231-37 cont'd

postclosure care. Postclosure care is identified as the monitoring and management activities that must be conducted during the period following closure of a hazardous waste disposal system (e.g., a landfill) to preserve the integrity of that disposal system and continue preventing or controlling releases from the disposal unit. For analysis purposes, in this EIS it was assumed that the postclosure care period following landfill closure of the SST system would be extended to 100 years. The postclosure care program proposed for Hanford is described in Appendix E, Section E.1.2.5.4.2, Postclosure Care.

After this assumed 100-year period of institutional control the caps are assumed to degrade and rate of recharge through the cap is assumed to increase to the background condition for the Hanford site identified in the *Technical Guidance Document* (DOE 2005). That is, the barriers are not assumed to maintain design function indefinitely, but are assumed to degrade after 100 years. In addition, the *TC & WM EIS* analysis was a three-dimensional modeling approach that reflects lateral movement consistent with conditions of an individual source and local geologic conditions appropriate for that source.

231-32 DOE disagrees with the commentor's concern that this EIS was deficient with respect to the propagation of uncertainties along the modeling chain in the *Draft TC & WM EIS*. As described in Appendices L, M, N, and O, an integrated test of the entire groundwater modeling system was performed on the complex series of sources that produced extensive, regional-scale groundwater plumes. In this test, uncertainties regarding inventory, vadose zone flow and transport, and groundwater flow and transport were described, and the effect of those uncertainties on specific metrics was discussed. The model calculations were compared with field results, and the factors governing the degree of agreement were identified.

DOE's view is that NEPA requires a comparison of the impacts of the various alternatives in the context of the cumulative impacts; that the comparison be technically sound and traceable to reliable sources of data; and that important sources of uncertainties in the analyses be identified and their potential implications for decisions and alternatives impacts discussed.

The constituent solubility limited-release model was not used in the *TC & WM EIS* analysis. To avoid confusion, the detailed description of the constituent solubility limited-release model in Appendix M has been deleted in this *Final TC & WM EIS*.

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There is considerable specific and cumulative uncertainty associated with many of the model parameters, including source terms, boundary inflow, geologic parameters, and interactions as well as more general variables such as site topography and annual precipitation. However, the uncertainty has not been explicitly recognized and incorporated into the model or the dose and risk calculations. Together, the factors demonstrate that the degree of precision presented in the EIS is not currently justified.

These deficiencies are also noted by the USDOE itself in its Quality Assurance Follow Up to the EIS (USDOE, 2008), which states that:

The evaluation was "limited by insufficient documentation in many areas including model development, input/output process controls, and modeling uncertainties" (p. 4).

There are omissions in the quality assurance materials such as "…the appendices containing details of the groundwater modeling" and "a number of yet-to-be-developed SAIC calculations and analyses packages" are lacking (p. 7).

A revised EIS should address the following points:

- ***Concentrations, doses, risks, and hazard quotients should be calculated with the Alternate case model as well as the Base case model.***
- ***Appendix L should include specific information regarding water balances and boundary inflows, which should be compared to previously modeled results for the Hanford Site. Any differences should be justified or resolved.***
- ***Boundary inflows either should be estimated as part of model calibration or used to develop alternate models, similar to the approach used to develop the alternate model for the cutoff elevation in the Gable Gap area.***
- ***Approaches for combining uncertainties and risks associated with multiple alternate models (e.g., Meyer et al., 2007) should be used to combine predictions of the Alternate and Base models.***
- ***The USDOE's quality assurance team should review all appendices, calculations, and analyses that were not available for its October 2008 review. The team should be provided with public comments on the EIS for use in this review.***

231-38

231-33

DOE is in agreement with the comment that the distribution coefficient for contaminant in soil for plutonium-239 does not reflect the values measured by Delegard and Barney as referenced in PNNL-13895. DOE's view is that PNNL-13895 discusses the 1983 Delegard and Barney results in the context of a variety of measurements of distribution coefficients for plutonium-239 applicable to Hanford. The concluding sentence summarizing recommendations for the distribution coefficient for plutonium-239 in PNNL-13895 is "Based on the limited data available for Pu, it appears that Pu will be fairly immobile except at very low pH values or high ethylenediaminetetraacetic acid concentrations." The distribution coefficients used in this *TC & WM EIS* are consistent with this recommendation.

The difference between the number of chemical constituents addressed in the source release model results (Appendix M, Section M.4) and those addressed in the vadose zone transport model results (Appendix N, Section N.4) has been clarified in this *Final TC & WM EIS* to ensure consistency in the constituents addressed in the two appendices.

DOE notes the commentor's concern regarding the interrelation of the contaminants in the vadose zone and groundwater contamination at Hanford.

Regarding the use of methods that would permanently remove contamination instead of in situ approaches, in situ soil remediation (freezing of soil and contaminants) is discussed in Appendix E, Section E.1.3.5.2. This technology was reviewed, but not evaluated, in this EIS for reasons described in Section E.1.3.5.2.

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. The Section 7.5 mitigation discussion acknowledges uncertainties concerning the technical implementation of mitigation measures and references current development efforts. The analysis was formulated in general terms, using flux reduction to account for specific uncertainties in deployment and implementation of various technologies.

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Groundwater Remediation Must Be Integrated with Remediation of the Vadose Zone

The USDOE acknowledges that groundwater at the Hanford Site interacts directly with the Columbia River. During high flows, the river recharges groundwater in the banks of the channel. During low flows, groundwater seeps into the channel to support baseflow. Groundwater at the Hanford Site must be protected against further contamination and restored to the highest beneficial use possible, whether as drinking water or to support aquatic life in the Columbia River, a significant cultural resource for the Yakama Nation.

Groundwater remediation is unlikely to be successful in the absence of protection against future contamination. For this reason, groundwater remediation should be closely tied to remediation of the overlying vadose zone. Previous attempts using an *in situ* approach have suffered in part because contamination of groundwater is ongoing, not static. Additional concerns regarding *in situ* approaches include:

- The target zone is deep in the subsurface and placement of remedial agents is uncertain and unverifiable.
- Many *in situ* precipitates have not proven stable and permanent.[9]
- All *in situ* approaches require ongoing monitoring and often maintenance. Plans and funding for these actions have not been provided.
- The time periods over which monitoring and maintenance would be required surpass even the most extensive institutional memory on record.

The Yakama Nation supports a more conventional and mature approach to remediating subsurface contamination that will permanently remove contamination and does not require long-term monitoring or maintenance.

231-39

Human Health Must Be Protected Under All Exposure Scenarios and Tribal Uses

The human health risk analysis does not adequately address potential risks to the Yakama Nation.

Short-Term Risk Analysis

The short-term risk analysis in Appendix K is inadequate because it does not evaluate an appropriate Native American Indian scenario.

231-40

[9] Most notably, *in situ* treatments that attempted to produce autunite in the 300 Area (PNNL-17480, 2008).

Regarding the availability and adequacy of site characterization data and the limitations of vadose zone remediation technologies, DOE's view is that the groundwater model predictions for current conditions presented in the *Draft TC & WM EIS* are within an order of magnitude of recent field measurements. The discussion of areas of agreement and disagreement regarding this issue are expanded in Appendix U, Section U.1.3, of this *Final TC & WM EIS*. DOE also believes that the expanded mitigation section in Chapter 7, Section 7.5, of this final EIS addresses some of the questions regarding the near-, mid-, and long-term mitigation actions that could support the decisionmaking process.

231-34 DOE agrees with the commentor's assertion that hydraulic parameters can vary by orders of magnitude within individual geologic units. DOE does not agree that the groundwater models do not address this variability. The models do not assign single sets of hydraulic parameters to each geologic unit. Single sets of hydraulic parameters are assigned to specific texture types within each geologic unit, and the spatial distribution of the texture types within each geologic unit is determined by the boring log data for that unit. For example, the hydraulic properties of the Ringold Formation (a geologic unit in the model) vary from place to place across the model depending on the relative proportions of gravel, sand, silt, and mud within the unit.

231-35 DOE notes that NEPA analysis is a comparison of the alternatives under consideration; that assumptions used in the analysis must be clearly identified and the uncertainties discussed; and that the assumptions underlying the analyses should not bias one or more alternatives relative to the others. In Appendix D, Section D.1.1, of this *TC & WM EIS*, the derivation of the inventory in the SSTs is discussed. In Appendix M, Section M.3, modeling assumptions are discussed, including those related to the portrayal of tank farm residuals. It should be noted that the same modeling assumptions were used to derive environmental consequences for all alternatives.

231-36 Future rainfall (i.e., infiltration), as well as a number of other parameters and assumptions, was agreed upon by DOE and Ecology. These agreements are documented in the *Technical Guidance Document*, dated March 25, 2005. Uncertainties in model parameters were analyzed in the draft EIS. For example, Appendix M, Section M.5.4 (including Figure M–127), analyzes how a grouted waste form would vary its release of technetium-99 based on changes in the infiltration rate. Infiltration rates of 0.9, 3.5, 50, and 100 millimeters per year were included in this analysis. In another example, Appendix N, Section N.5, analyzes how travel times through the vadose zone change when infiltration rates

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Members of the Yakama Nation are much more dependent on natural resources for their way of life than are members of the general public. What's more, they pursue their way of life within the areas evaluated in the short-term analysis:

- 50-mile radius of the site: The Yakama Reservation is located 20 miles west of the Hanford Site.
- Maximally exposed individual: The Yakama people hunt and fish in and along the Columbia River, just outside of the boundary representing the "maximally exposed individual."
- Site workers: Staff of the Yakama Nation evaluate on-site cultural resources as part of investigation activities.

In its evaluation of short-term risks, the EIS does not consider exposure to contaminants from ingestion of wild plants, game, and fish, all of which are consumed by members of the Yakama Nation for medical, nutritional, and cultural reasons, potentially resulting in disproportionate impacts to this highly exposed population. The EIS also does not consider exposure to contaminated water, which could occur via drinking and inhalation during traditional sweat-lodge ceremonies. The inhalation, soil contact and/or ingestion, and food ingestion exposure rates used to represent the general population and on-site workers for the short-term risk analysis are too low to reflect a traditional tribal member engaged in hunting, fishing, plant gathering, and other cultural activities.

A revised EIS should evaluate an Native American Indian scenario for short-term risks under each alternative to reflect the lifestyle and exposure rates described in the Yakama Nation Exposure Scenario (Ridolfi, 2007), which was provided to the USDOE in 2007.

231-40 cont'd

Long-Term Risk Analysis

The long-term risk analysis in Appendix Q is inadequate because the American Indian scenarios—American Indian resident farmer and American Indian hunter-gatherer—do not fully represent the Yakama Nation. Pathways presented in the EIS appropriately included exposure to radionuclide and chemical contamination from inhalation of fugitive dust; ingestion of soil, water, fish, meat, and plants; and participation in a sweat lodge, however, some exposure scenarios were incomplete. The resident farmer was assumed to consume domestic meat, milk, and garden plants and either groundwater or surface water; however, an evaluation of both water sources would be more complete. The hunter-gatherer was evaluated based on exposure to both groundwater and surface water and was assumed to consume game and wild plants. However,

231-41

are changed. This analysis used the same infiltration rates as the Section M.5.4 analysis. Additional sensitivity analyses to characterize model uncertainties were included in Section N.5, including: (1) the dependence of solute flux at the water table on the magnitude of aqueous discharge at the source, (2) the dependence of solute flux at the water table on the thickness of silt layers, (3) the role of the tilting of layers in directing flow, (4) the role of dikes in directing or focusing flow, (5) the dependence of estimates of impacts on the recharge rate for sitewide and IDF conditions, (6) the dependence of impacts on the magnitude of the distribution coefficient of iodine in the vadose zone, and (7) the role of the efficiency of iodine capture in ILAW glass. Other examples of sensitivity analyses to characterize model uncertainties are included in Appendix L, Section L.7, and Appendix O, Section O.6.

231-37 The first part of this comment questions the differences between the hydraulic conductivities arrived at for the Base Case and Alternate Case flow models. DOE does not consider it a discrepancy that the optimized hydraulic conductivity values are different for the Base Case and Alternate Case flow models. The optimized hydraulic conductivity sets for each model are unique to each model and it is reasonable to expect differences given a different top of basalt. DOE does not agree the differences in optimized values are alarming given the range of reasonable hydraulic conductivity values for each material type.

The second part of this comment questions fixing boundary inflows to enhance model stability. It is assumed that this refers to the Generalized Head Boundary (GHB) boundary conditions encoded in the western region of the model. The modeled head values are more sensitive to changes in GHB head when GHB conductance values are high. This is as expected because the influence of the GHB increases with increasing conductance values. In addition, it was found that model stability increased with increased conductance values. Therefore, it was determined that the EIS modeling process would fix the GHB conductances at a high value to achieve both model stability and more control over modeled heads when making adjustments to GHB heads. This approach allowed the calibration process to proceed more smoothly in an area where there is uncertainty.

The commentor's reference to "49 million cubic meters annually" could not be found; therefore, no response is provided to this part of the comment. DOE does not have this number in its analysis.

The last part of this comment appears to make the assumption that the intent of comparing the Base Case and Alternate Case flow model results included

the hunter-gatherer lifestyle does not preclude the consumption of domestic products (e.g., meat, milk, garden plants).

The exposure parameters in the American Indian scenarios are generally too low to represent a a Yakama Nation lifestyle as described in the Yakama Nation Exposure Scenario (Ridolfi, 2007). For example, the inhalation, soil contact and/or ingestion, and food ingestion rates and fraction of time spent outdoors do not reflect a subsistence lifestyle that includes active hunting, fishing, and gathering of wild plants and cultural activities such as ceremonies performed on dirt floors. The Yakama people consume more meat and plants than the general population. They also consume much more fish from local sources, including the Columbia River, as a primary part of their diet.

231-41 cont'd

Comparison of Yakama, USDOE, and EIS Exposure Parameters

Prior to release of the EIS, the USDOE developed a tribal scenario in which some exposure parameters for the Yakama Nation and the Confederated Tribes of the Umatilla Indian Reservation[10] were merged and proposed for use in Hanford Site risk assessment. Table 2 compares the USDOE-developed exposure parameters with Yakama Nation parameters documented in Ridolfi (2007) as well as with those used in Appendix K and Appendix Q of the EIS. The table illustrates that generally lower rates are assumed in the EIS than were developed by either the Yakama Nation or the USDOE; in particular, the fish consumption rate used in the long-term risk assessment is about one-third of the Yakama Nation subsistence rate.

231-42

Table 2. Native American Indian adult exposure parameters.

Exposure Parameter	Unit	Yakama Nation[a]	USDOE Pre-EIS White Paper[b]	USDOE EIS Short Term[c]	USDOE EIS Long Term[d]
Inhalation rate	m^3/hr	1.08	1.08	0.83	0.96
Soil ingestion rate	mg/day	200	400	120	120
Water ingestion rate	L/day	4(1)	4(1)	--	2
Fish consumption rate	g/day	519	620	--	170
Meat consumption rate	g/day	704	125	508	422
Plant consumption rate	g/day	1,417	1,350	836	1,082(2)
Milk ingestion rate	L/day	1.2	--	--	0.6

[10] Developed using frequency and duration assumptions not agreed to or accepted by the Yakama Nation and Umatilla Indians.

determining which case should be propagated forward and used to perform the draft EIS groundwater analysis for the alternatives and cumulative impacts. This is not a valid assumption. The Base Case and Alternate Case are required by the March 25, 2005, *Technical Guidance Document* (DOE 2005), which is an agreement between DOE and Ecology that provides guidance on a variety of modeling parameters. The Alternate Case is provided to allow comparison of a finite set of modeling results (run in both the Base and Alternate Cases) so that the reader can understand how the uncertainty in the top-of-basalt cutoff elevation in Gable Gap affects model results. The results of this comparison are included in Appendix O, Section O.6. It was intended from the start that the Base Case, which represents predominant flow to the east, would be used as the primary draft EIS flow model. The *Technical Guidance Document* implies this direction as well by its naming conventions used to identify the two flow models (Base Case versus Alternate Case). It should also be noted that the *Draft TC & WM EIS* groundwater model development process included structured independent reviews by a Technical Review Group made up of modeling experts from academia and industry. In addition to this review group's participation, which included reviewing and commenting on each stage of the model development process and then reaching agreement with the modeling team on resolution of comments, a Local Users' Group (local users of groundwater modeling tools at Hanford) was also included in a review and comment process at each stage of model development. This process of Technical Review Group and Local Users' Group review and comment assisted the modeling team in viewing the model development process from a wide variety of perspectives and resulted in an improved model for use in this *TC & WM EIS*.

231-38 Calculation and analysis packages were required to be completed before publication of the *Draft TC & WM EIS*. The timing of the quality assurance review (noted in the first part of this comment) was prior to completion of all calculation and analysis packages. As part of the quality assurance review, the team evaluated draft documents and, although no issues were found, the report acknowledges that some of the quality assurance documentation was incomplete at the time of the quality assurance review. All quality assurance documents were completed prior to publishing the *Draft TC & WM EIS* in October 2009.

There are no plans to perform any additional analysis using the Alternate Case flow model. The development and analysis of this model were included in Appendices L and O of the draft EIS, per the requirements of the *Technical Guidance Document* (DOE 2005), and no further development or analysis is planned.

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Notes:

[a] Yakama Nation Exposure Scenario (Ridolfi, 2007)

[b] U.S. Department of Energy Tribal Scenario (USDOE, 2009)

[c] The EIS, Appendix K

[d] The EIS, Appendix Q
Includes water consumption during sweat lodge use
Includes grain consumption
m^3/hr = cubic meters per hour; mg/day = milligrams per day; L/day = liters per day; g/day = grams per day

231-42 cont'd

Yakama Nation Exposure Scenario Chronology

To fully understand our objection to exposure parameters used in the EIS, it is important to understand how the Yakama Nation Exposure Scenario was developed. The process began with a facilitated meeting on January 18, 2006, that was attended by representatives of the Yakama Nation, the USDOE, and the USEPA. The purpose of the meeting was to discuss the technical work necessary to improve the risk assessment process for the Hanford Site. At this meeting, the parties agreed on the need for an exposure scenario that reflected the unique pathways and risks to the Yakama people and resources. Subsequently, a scope of work was developed for the Yakama Nation and approved by the USDOE in 2006. The majority of the work, including literature research and interviews with Yakama members, was conducted in 2007. The Yakama Nation Exposure Scenario was completed on September 7, 2007, and submitted to the USDOE for use in the Hanford Site risk assessment.

On November 14, 2007, the USDOE Office of River Protection posed questions about the scenario to the Yakama Nation, which responded with further clarification on December 11, 2007. At about the same time, the USEPA Office of Environmental Assessment submitted comments on the Yakama Nation Exposure Scenario in a memorandum dated January 3, 2008.

231-43

In a submittal dated December 19, 2007, the USDOE's subcontractor, Neptune and Company, Inc., presented an approach for applying the scenario to the risk assessment process. This approach, which was provided to the Yakama Nation on January 16, 2008, included exposure assumptions not identified in the scenario but recommended by the USEPA. The Yakama Nation agreed to these assumptions and has since been anticipating application of the scenario in Hanford Site risk assessments.

The USDOE has failed to apply the Yakama Nation Exposure Scenario in any of its risk evaluations and analyses, including the EIS. The Yakama Nation Exposure Scenario should be applied in a revised EIS.

Water balance and some boundary inflow data are included in Appendix L of the draft EIS for both the Base Case model (Figures L–54 and L–55 and related text) and the Alternate Case model (Figures L–86 and L–87 and related text). No comparability studies (to prior or ongoing work) are planned for any of the groundwater pathway model inputs or results. Boundary inflows, with the exception of natural recharge, which was specified by the *Technical Guidance Document*, and artificial recharge, which was developed using site waste discharge data, were treated as calibration parameters. The GHB inflows along the western boundary of the model were estimated and then adjusted to achieve preliminary model calibration (see Appendix L, Section L.7, of the *Draft TC & WM EIS*).

As stated above, the Alternate Case model was developed and analyzed in the *Draft TC & WM EIS* per the requirements of the *Technical Guidance Document*. No additional development or analysis of the Alternate Case model is planned. The Base Case model was updated based on emerging data and this updated Base Case model was used in the *Final TC & WM EIS* analysis. DOE will perform future quality assurance reviews and/or audits as appropriate, per the *TC & WM EIS* project quality assurance procedures.

231-39 See response to comment 231-33 for a discussion of in situ approaches and the expanded sensitivity analysis in this *Final TC & WM EIS*.

231-40 As the commentor states, a purely American Indian exposure scenario such as that described in Ridolfi (2007) was not included in evaluating short-term impacts. However, Appendix J, Section J.5.7, includes a number of analyses that estimate that any doses to individuals exposed during the period defined as short term in this EIS would remain low and that the average dose to an American Indian is similar to, or lower than, the average dose to a member of the total population. Section J.5.7 presents the incremental impact on an MEI who lives at the boundary of the Yakama Reservation, about 20 miles west of Hanford. Due to prevailing winds and the distance from Hanford, the dose to this individual would be much lower than the dose presented in Chapter 4, Section 4.1.10, for the hypothetical MEI living along the Columbia River.

An analysis of the potential incremental impacts on the hypothetical individual who lives a subsistence lifestyle in which he consumes food grown on a family farm as well as wild game and fish is presented in Section J.5.7. This individual was assumed to consume surface water, fish, and a larger portion of potentially contaminated meat. During the operational phase, the alternatives considered in this EIS would not result in any significant water contamination. Therefore, exposure from participating in a sweat-lodge ceremony was not considered in the

Cumulative Risk

A comprehensive cumulative risk assessment should consider exposures to both chemical and radiological contaminants (which are present in all Hanford Site media, including the vadose zone), taking into account the sum of all contaminant exposures. In addition, a cumulative risk assessment should evaluate all possible pathways, including such pathways as drinking water wells drilled by individuals for their own use.

231-44

Contaminant Selection

Potential exposure to radiological and hazardous chemical contaminants was evaluated for both the short- and long-term human health risk analyses presented in the EIS. Appendices D, K, and Q refer to an initial inventory of 46 radionuclides that was screened to arrive at a final set of constituents retained for detailed analysis. The complete inventory list is not presented in the EIS, and the EIS does not provide a thorough description of the screening process used to retain the final set.

231-45

As stated in the EIS, radioactive inventories were also not adjusted to account for differences in the duration of each alternative; the justification for this is that radioactive decay over time will only reduce the radioactivity. To the contrary, however, some radionuclide concentrations will actually increase over time (e.g., the decay of plutonium-241 will lead to an increase in its daughter product, americium-241, until equilibrium is reached). Another limitation occurred in the evaluation of direct intrusion into residual contamination, in which hazardous chemicals were not evaluated because of an assumed limited exposure time. In addition, the drinking water pathway was not evaluated.

231-46

231-47

Human Health Risk Analysis Results

The results of the short-term human health risk analysis in the EIS indicate that the average project impact for a full-time worker with a 40-year exposure period is at least 10 times the USEPA's maximum acceptable lifetime cancer risk of $1x10^{-4}$ for every alternative.[11]

231-48

The analysis results demonstrate that no proposed alternative is adequately protective of worker health.

[11] In the short-term risk analysis, only latent cancer fatality rates (as opposed to cancer risk incidence) were presented for the general population and maximally exposed individual.

short-term scenarios. However, the potential for exposure is assumed to increase in the long term, when it is assumed that individuals would have more access to Hanford.

Appendix Q, Section Q.3, presents an analysis of potential human health impacts for a number of long-term exposure scenarios. Among these are an American Indian resident farmer who uses onsite groundwater or surface water domestically, for irrigation, and in ceremonial sweat-lodge/sauna ceremonies, and an American Indian hunter-gatherer who is exposed to both groundwater and surface water; consumes game, fish, and wild plants in a more traditional American Indian lifestyle; and participates in sweat-lodge/sauna ceremonies. As shown in this appendix, these traditional lifestyles could result in higher doses than those received by the typical resident farmer.

231-41 DOE notes the concerns expressed by the Confederated Tribes and Bands of the Yakama Nation regarding the American Indian scenarios evaluated in the *Draft TC & WM EIS*. All hunter-gatherer scenarios in this EIS should be considered American Indian hunter-gatherer scenarios. As noted in the comment, both the resident farmer and hunter-gatherer scenarios consider a reasonable range of exposure pathways. In response to this comment, DOE has reviewed regulatory guidance and tribal recommendations regarding this scenario and has increased the fish intake and sweat lodge use for the American Indian hunter-gatherer alternative analyses. In Appendix W, Section W.3, exposure data provided by the tribes are used to estimate peak impacts on a Yakama hunter-gatherer and on a CTUIR hunter-gatherer for a representative alternative combination, Alternative Combination 2, without non–*TC & WM EIS* sources. The comparison of those analyses to those for the *TC & WM EIS* hunter-gatherer described in Appendix Q suggests that both the exposure pathways modeled and the parameter values used for the *TC & WM EIS* hunter-gatherer are representative for use in the EIS analyses. In addition, one or two exposure pathways account for essentially all of the peak impacts (and variability) across the hunter-gatherer scenarios.

231-42 DOE notes the concerns expressed by the Confederated Tribes and Bands of the Yakama Nation regarding the exposure parameters used in the American Indian scenarios. DOE does feel that the discussions held between DOE and the Yakama Nation staff between November 2004 and January 2005 to discuss the American Indian scenario used in the draft EIS were conducted in good faith by both parties. The intent of those scenarios was to reflect American Indian lifestyles for the purpose of comparing the alternatives. Both the activities and parameters used in those scenarios are based on existing reports and compilations. For example,

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Every alternative also shows a long-term radiological risk above the maximum cancer risk level in at least one location (core zone boundary, river nearshore, and barriers), with the core zone boundary showing unacceptable cancer risks under all alternatives.

For the drinking water well user, all tank closure alternatives for B Barrier, T Barrier, and the core zone boundary exceed the 10 mrem per year criteria used in the EIS. Further, doses to an American Indian "intruder" engaged in residential agriculture following well drilling at the tank farms exceed the USDOE dose guideline of 500 mrem per year in at least one tank farm for every alternative. The EIS acknowledges these exceedances, but does not discuss how this issue might influence decision making or alternative selection. ***231-49***

No alternative presented in the EIS is adequately protective in the long term for groundwater use. Other alternatives must be considered in a revised EIS.

Ecological Resources Must Be Protected Under All Exposure Scenarios and Tribal Uses

None of the tank closure alternatives presented in the EIS is protective of ecological resources. Each alternative or combination of alternatives shows an unacceptable risk to aquatic biota, including salmonids exposed to hexavalent chromium via groundwater discharging to the Columbia River at the nearshore area. Each also shows unacceptable risk to terrestrial resources exposed to contaminants such as mercury, xylene, and formaldehyde via air deposition. And, although the EIS has a 10,000-year horizon, it does not address how conditions at the site will more than likely change over time as a result of climate change, dam alterations, or river channel migration.

Although the EIS concludes that a few ecological resources will be impacted by unacceptable risks, even this evaluation is inadequate. Many integral elements of the ecosystem are not included in the impacts evaluation and risk analyses. In addition, impacts to numerous receptors are not evaluated, nor are all exposure pathways. For example, the only exposure pathway evaluated for terrestrial receptors is air releases; the exposure pathway via ingestion of plants and invertebrate and vertebrate prey by salmonids is not evaluated; and plants are not included as riparian or aquatic receptors. ***231-50***

A revised EIS must take into consideration all relevant ecological receptors and exposure pathways.

the fish consumption rates are in the 95th percentile for the "Native American Subsistence Populations" as presented in the EPA's *Exposure Factors Handbook* (EPA 1997).

See response to comment 231-41 regarding the American Indian exposure scenarios analyzed in Appendix W.

231-43 See response to comment 231-41 regarding the American Indian exposure scenarios analyzed in Appendix W.

231-44 The radioactive and chemical constituents used in the *TC & WM EIS* analysis are the product of extensive database compilations, reviews, and a drinking-water-based preliminary human health risk assessment, as described in detail in Appendix S. The preliminary risk assessment determined that many of the radioactive and chemical constituents in the initial compilations would not contribute significantly to either the alternative or cumulative impacts in this *TC & WM EIS*. Thus, radionuclides contributing less than 1 percent of impacts under drinking-water well scenarios were eliminated from the detailed analyses, as were chemicals present in the inventories at levels at or below health-based limits. The screening resulted in reduction of the original set of radioactive and chemical constituents to the final set of 14 radioactive constituents and 26 chemical constituents for use in the final analysis.

There are other scenarios that may be postulated, but it was not DOE's intent to analyze all possible exposure scenarios and pathways. The scenarios were selected for analysis in this EIS to inform a relevant comparison of EIS alternatives. The scenarios chosen accommodate lifestyles representative of the region and incorporate exposure pathways originating from groundwater contamination, but also involving the other environmental media. Both long-term and intruder receptors were considered. Four types of long-term receptors were analyzed. The first type, a drinking-water well user, was assumed to use groundwater as a source of drinking water. The second type, a resident farmer, was assumed to use groundwater for drinking water, livestock drinking water, and irrigation of crops and fodder. It was assumed that garden size and crop yield would be adequate to produce approximately 25 percent of the receptor's average requirements for crops and animal products. The third type, an American Indian resident farmer, was also assumed to use groundwater for drinking water consumption, ceremonial sweat lodge/sauna ceremonies, and irrigation of crops. Garden size and crop yield were assumed to be adequate to produce the entirety of the receptor's average requirements for crops and animal products. There are also scenarios in which the resident farmer and American Indian receptors use surface

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Aquatic Resources

The EIS excludes the Columbia River from evaluation (excepting a small portion of nearshore habitat), despite the fact that the Columbia River and the Hanford Reach provide habitat for a wide range of aquatic and terrestrial species.[12] Both the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service and the U.S. Fish and Wildlife Service (USFWS) have designated critical habitat for salmonid species throughout the Columbia River basin, which includes the Hanford Reach.[13]

The EIS assumes that exposure of ecological resources to contaminated groundwater is inconsequential because there are few seeps along the river and discharges occur under water or flow through the riparian zone for only 16.6 feet. This assumption is subjective and provides inadequate basis for discounting the risks to aquatic resources. During the fall, seasonal water levels in the river are at their lowest; as a result, undiluted contaminated groundwater discharging from the seeps is more accessible to ecological resources (Fabre, 2007). Additionally, seeps in the nearshore area are not the only points where contaminated groundwater discharges to the river. Preliminary results from a recent study (Tiller et al., 2009) show hexavalent chromium concentrations in excess of USEPA water quality criteria at several groundwater upwelling locations in the Hanford Reach.

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The Columbia River, the Hanford Reach, and their biological resources must be considered in a revised EIS because these resources will be affected by the discharge of contaminated groundwater for the foreseeable future.

Terrestrial Resources

The only exposure pathway evaluated for terrestrial species is air deposition. However, as acknowledged in the EIS, plants and animals are routinely observed in the upland portions of the Hanford Site. Numerous springs, vernal pools, and ponds in the upland habitats provide an important source of water for terrestrial animals. The EIS states that mammals and waterfowl have been observed using ponds and upland aquatic habitats in the core zone. The EIS also

231-52

[12] The riverbanks along the Hanford Reach are vegetated with riparian plant species typical of Columbia Basin shrub-steppe ecosystems as well as introduced species. The riparian and upland portions of the Hanford Reach are used by numerous plants, insects, mollusks, amphibians, reptiles, birds, and mammals. The Hanford Reach, part of a National Monument, is characterized by diverse riverine habitats consisting of cobble substrates, riffles, deep pools, backwater sloughs, islands, and gravel bars. The Hanford Reach provides spawning, rearing, and migratory habitat for salmonids and other fish species, including white sturgeon. Critical spawning and rearing habitat for fall Chinook salmon is also found in the Hanford Reach (USFWS, 2008).

[13] Critical habitat has been designated for upper and mid-Columbia River steelhead, upper Columbia River Chinook, and bull trout (NOAA, 2010; USFWS, 2010).

water instead of groundwater. These scenarios differ from the groundwater scenarios in that they include fish consumption. The fourth long-term type, an American Indian hunter-gatherer, would be impacted by both groundwater and surface water because he or she was assumed to drink surface water and consume game animals, which use surface water, and wild plant materials, which use groundwater. Both groundwater and surface water are used in ceremonial sweat lodge/sauna ceremonies. Also in Appendix W, Section W.3, data provided by the tribes are used to estimate peak impacts on Yakama and CTUIR hunter-gatherers for a representative alternative combination, Alternative Combination 2, without non–*TC & WM EIS* sources.

Three types of intruder scenarios were analyzed. The home construction intruder was assumed to excavate a foundation for a home, spending a specified length of time in the excavation. The excavation work would generate airborne dust that would be inhaled by the worker. The worker was also assumed to be simultaneously exposed to direct radiation emitted from radioactive material in the surrounding soil. The well-drilling intruder was assumed to complete a well, to inhale dust mobilized by the drilling activity, and to be exposed to direct radiation emitted by waste brought to the surface in the drilling mud. The residential agriculture intruder was assumed to be an individual that lives in a home and cultivates a garden on soil containing residual contamination, resulting in exposure to radionuclides through ingestion, inhalation, and direct exposure.

231-45 The complete inventory list that was used prior to screening is provided in the references listed in each of the noted appendices. Appendix Q, Section Q.2, of this *Final TC & WM EIS* has been revised to provide a more detailed discussion on the screening process.

231-46 DOE agrees with the commentor's observation that the concentration of daughter products can increase with time and that, given enough time, a closed system will attain a state of secular equilibrium. This was considered in developing the screening process for determining the COPCs used in this *TC & WM EIS*; the rate of production of the daughter products turns out to be small (for the conditions relevant to a 10,000-year groundwater analysis). A discussion of this issue has been added to Appendix Q, Section Q.2, of this *Final TC & WM EIS*.

231-47 The discussion in Appendix Q, Section Q.2.3, Intruder Scenario Models, indicates that, in the case of chemicals, acceptance criteria are yet to be established. Explanation of why doses due to ingestion of drinking water are not included in the intruder analysis was provided in Section Q.2.3.2.3 of the *Draft*

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states that dense blooms of watercress (an aquatic plant) occur in springs in the upland area and that these springs support aquatic insect populations in greater numbers than do mountain streams. This information supports the need for consideration of these habitats and their associated receptors.

A revised EIS must evaluate groundwater as an exposure pathway for terrestrial resources. Additionally, the assumption that institutional controls will preclude plants and animals from entering the upland terrestrial habitat in the core zone for 10,000 years is inadequate to provide for the protection of ecological resources.

231-52 cont'd

Fast Flux Test Facility

The EIS also presents alternatives for the Fast Flux Test Facility (FFTF). The Yakama Nation supports implementation of Alternative 3 using the Idaho Options for treatment of bulk sodium and remote handled special components (RH-SCs). We support disposal of the RH-SCs at the Nevada Test Site as presented in the EIS. Based on estimates provided by the USDOE, the difference in cost between Alternative 3 and Alternative 2, the USDOE's preferred alternative, is less than 3 percent. However, implementation of Alternative 3 would result in significant improvement of the 400 Area's end state. As part of Alternative 3, the USDOE should remove subgrade concrete and other rubble from the site before backfilling with clean material to leave as little residual contamination in place as possible.

FFTF operations have not yet resulted in the type of extensive and severe environmental contamination pervasive throughout much of the Hanford Site. Implementing Alternative 2 would be a significant step away from appropriate closure of the site. The Yakama Nation does not support Alternative 2 for the following reasons:

231-53

- Entombment (i.e., grouting waste in place) makes future remedial actions difficult if not impossible.
- Entombment of waste will ultimately lead to heavy contamination of an area that is not now as severely impacted as other portions of the Hanford Site.
- Alternative 2 relies on institutional controls and barriers to temporarily prevent contamination from mobilizing and migrating into the environment. However, the EIS acknowledges that this contamination will ultimately be released into the environment.
- Constructing a new sodium reaction facility (i.e., exercising the Hanford Reuse Option for bulk sodium) will commit significant resources to building, operating, and then destroying a facility that is redundant of a nearly identical existing facility at the Idaho National Laboratory.

TC & WM EIS. The reasoning is that intrusion impacts result from transport of waste to the surface due to human activity and occur primarily in the near term. Impacts for the drinking water pathway involve transport of radionuclides through the vadose zone to groundwater and occur in the future, with reduction of dose due to decay of short-lived radionuclides. Therefore, doses due to ingestion of drinking water are not included in the intruder analysis and are reported in the long-term impacts analysis.

231-48 The commentor cites the wrong criterion for evaluating proper protection of DOE radiation workers. Protection of worker health from radiation exposure is established by 10 CFR 835. Chapter 4, Sections 4.1.10, 4.2.10, and 4.3.10, of this EIS explains that a full-time equivalent worker is a worker assumed to have a 2,080-hour worker year. In the context of worker dose, the full-time equivalent worker is used as a mechanism for comparing occupational doses for the different EIS alternatives. In actual practice, the number of individuals involved in an activity may exceed the estimated number of full-time equivalent workers used in the analysis. Therefore, the doses received by individual workers would be lower than the doses calculated for each full-time equivalent worker.

Section 4.1.10 also explains that worker dose would be limited to levels lower than the regulatory limit of 5 rem per year and further constrained by engineering and administrative controls (such as using more workers to perform an activity with a high dose rate) designed to keep worker doses ALARA. Such controls and worker protection practices would maintain doses to individual workers within established limits and lower than the doses calculated for the average full-time equivalent worker.

As the commentor notes, the short-term impact assessment uses LCFs based on a nominal risk factor of 0.0006 LCFs per rem or person-rem of exposure as the measure for evaluating impacts. The EIS tables that present health impacts of normal operations and hypothesized facility accidents give both the doses and the resulting risk to an exposed individual or the number of LCFs in an exposed population. Appendix K, Section K.1.1.6, discusses the scientific evidence relating radiation exposure to incidence of cancers, both fatal and nonfatal. This discussion indicates that use of the fatal cancer risk factor of 0.0006 is conservative, but also provides the reader with the information from which the incidence of nonfatal cancers can be estimated.

231-49 A conservative approach was taken to calculate the maximum concentrations used to estimate the human health impacts of the alternatives. DOE reviewed

Implementing Alternative 3 with both Idaho Options would meet the USDOE's vision of responsibly shrinking the Hanford footprint by not leaving residual contamination in place. The USDOE acknowledges that preferred Alternative 2 will ultimately lead to the release of significant contamination into the environment, resulting in further impacts to human health and the environment. Given that Alternative 3 with both Idaho Options results in minimal future impacts to the environment, it is supported by the Yakama Nation with the stipulations stated above.

231-53 cont'd

this approach for this final EIS and determined that, as a result of advances in computational machinery, a less-conservative approach was available (i.e., an approach that was able to pick the highest concentration in a single point at the barrier, rather than a cumulative concentration along the barrier). This less-conservative, but more-realistic, approach was implemented for the analysis performed for this *Final TC & WM EIS*.

In the *Draft TC & WM EIS*, it was observed that many times the concentration plumes often tended to overlap and the highest concentrations at any given time were limited to a few locations. Hence, for each species, an expedient and conservative approach—summing the (barrier) perimeter concentrations—was adopted to arrive at a conservative upper-bound concentration for each year in the 10,000-year simulation. Thus, the reported "maximum" for each contaminant was simply the maximum summed value from the simulation. In this *Final TC & WM EIS*, for each year, a maximum concentration along the barrier is determined for each species; the maximum for the simulation is determined from that set of values.

See response to comment 231-8 regarding future DOE decisions.

231-50 The analysis does not analyze every exposure pathway and the incremental contribution to potential impacts are not quantified. The most important pathways from sources to receptors (air emissions and subsequent deposition on soil, releases to groundwater) evaluated in this EIS are common to all alternatives, but vary in magnitude between alternatives. The amounts released via these pathways and the resulting concentrations in different media to which receptors are directly or indirectly exposed vary under the different alternatives, but the extent to which receptors are exposed to the different media does not vary between alternatives. Therefore, the risk to receptors from the different alternatives does not change if common but minor exposure routes are not included in the risk estimates for receptors as long as the risk estimates for all alternatives are calculated in the same way for the same set of exposures and receptors. See Appendix P for more information on the analysis of ecological resources.

231-51 Ecological risk information used to assess and compare the alternatives is presented in this EIS, including risk estimates for every chemical and radionuclide included in the models of releases to air and groundwater and subsequent discharge to the Columbia River at the point of maximum concentration at discharge. This EIS does not state or assume that biota in any portion of the Hanford Reach of the Columbia River are not potentially exposed to contaminants

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References

Defense Nuclear Facilities Safety Board (DNFSB). 2009. Staff Issue Report: Inadequate Mixing, Waste Treatment Immobilization Plant. November.

Fabre, R.J., 2007. *Aquatic and Riparian Receptor Impact Information for the 100-NR-2 Groundwater Operable Unit*. November. Prepared for the U.S. Department of Energy Assistant Secretary for Environmental Management (USDOE/RL-2006-26 Revision 0).

Institute for Energy and Environmental Research (IEER). 2010. *Comments on Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington (TC&WM EIS) (DOE//EIS-0392)*, EIS October 2009. March.

Meyer, P.D., M. Ye, M.L. Rockhold, S.P. Neuman, K.J. Cantrell, and T.J. Nicholson, 2007. Combined Estimation of Hydrogeologic Conceptual Model, Parameter, and Scenario Uncertainty with Application to Uranium Transport at the Hanford Site 300 Area. Pacific Northwest National Laboratory, Prepared for U.S. Nuclear Regulatory Commission, Washington, DC. Report NUREG/CR-6940. July.

National Oceanic and Atmospheric Administration (NOAA). 2010. ESA Salmon Listings. Available at: http://www.nwr.noaa.gov/ESA-Salmon-Listings/ (accessed February 18, 2010).

National Research Council (NRC), Board of Radioactive Waste Management, Commission on Geosciences, Environment, and Resources, 2000. *Long-Term Institutional Management of U.S. Department of Energy Legacy Waste Sites*. Washington, DC: National Academy Press, pages 3-5.

PNNL-11801, 1997. Cole C.R., S.K. Wurstner, M.P. Bergeron, M.D. Williams, and P.D. Thorne. Three-Dimensional Analysis of Future Groundwater Flow Conditions and Contaminant Plume Transport in the Hanford Site Unconfined Aquifer System: FY 1996 and 1997 Status Report. Pacific Northwest National, Laboratory, Richland, Washington.

PNNL-13447, 2001. Cole, C.R., M.P. Bergeron, S.K. Wurstner, P.D. Thorne, S. Orr, and M.I. McKinley. *Transient Inverse Calibration of Hanford Site-Wide Groundwater Model to Hanford Operational Impact – 1943 to 1996*. Pacific Northwest National, Laboratory, Richland, Washington. May.

PNNL-13623, 2001. Vermeul, V.R., C.R. Cole, M.P. Bergeron, P.D. Thorne, and S.K. Wurstner. Transient Inverse Calibration of Sitewide Groundwater Model to Hanford Operational Impacts from 1943 to 1996 – Alternative Conceptual Model Considering

released to air or groundwater. As stated in Appendix P, Section P.2.1, comparing alternatives is the primary purpose of the ecological risk analysis in this *TC & WM EIS*. Seep and sediment pore water concentrations were assumed to equal the modeled peak annual average groundwater concentration at the Columbia River. Seep concentrations were used to assess potential impacts on wildlife receptors drinking water in the riparian zone. Peak annual average nearshore surface water concentrations were used to estimate adverse impacts on aquatic biota in the Columbia River. Exposure estimates assumed discharge to shallow low-flux areas, where dilution would be small relative to midchannel high-flux areas.

231-52 Potential impacts on terrestrial ecological resources were evaluated for multiple exposure pathways and sources (air emissions and subsequent deposition on soil, releases to groundwater). Impacts on terrestrial receptors were evaluated at the maximum onsite location (air deposition only) and offsite/Columbia River location (air deposition and groundwater discharge). For consistency with other *TC & WM EIS* assessments of long-term impacts, the line of analysis for the maximum terrestrial exposure location was the Core Zone Boundary in the predominant downwind direction. This EIS does not state or assume that terrestrial receptors are never exposed to groundwater in upland habitats; however, discharge of contaminated groundwater beneath the Core Zone to upland habitats is considered a minor pathway.

The most important pathways from sources to receptors that are evaluated in this EIS are common to all of the alternatives, but vary in magnitude under different alternatives. The amounts released via these pathways and the resulting concentrations in the different media to which receptors are directly or indirectly exposed also vary under the different alternatives, but the extent to which receptors are exposed to the different media does not vary. Therefore, the risk to receptors under the different alternatives does not change if common but minor exposure routes are not included in the risk estimates for the receptors as long as the risk estimates for all alternatives are calculated in the same way for the same set of exposures and receptors.

231-53 Regarding FFTF Decommissioning Alternative 3 and treating or processing the associated RH-SCs and bulk sodium at INL, although nearly all elements of FFTF and the two adjacent support facilities would be removed under this alternative, the lower portion of the Reactor Containment Building 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.

Interaction with Uppermost Basalt Confined Aquifer. Pacific Northwest National Laboratory, Richland, Washington.

PNNL-14753, Rev. 1, 2006. Thorne, P.D., M.P. Bergeron, M.D. Williams, and V.L. Freeman. *Groundwater Data Package for Hanford Assessments*. Pacific Northwest National Laboratory, Richland, Washington. January.

PNNL-16435, 2007. B.A. Williams, C.F. Brown, M.J. Nimmons, R.E. Peterson, B.N. Bjornstad, D.C. Lanigan, R.J. Serne, F.A. Spane, and M.L. Rockhold. *Limited Field Investigation Report for Uranium Contamination in the 300-FF-5 Operable Unit at the 300 Area, Hanford Site, Washington.* Pacific Northwest National Laboratory, Richland, Washington. November.

PNNL-17439, 2008. 300 Area VOC Program Slug Test Characterization Results for Selected Test/Depth Intervals for Wells 399-2-5, 399-3-22, 399-4-14. Pacific Northwest National Laboratory, Richland Washington.

PNNL-17480, 2008. Wellman, D.M., V.R. Vermeul, J.S. Fruchter, and M.D. Williams. *Challenges Associated with Apatite Remediation of Uranium in the 300 Area Aquifer*. Prepared for the U.S. Department of Energy. April.

RIDOLFI Inc. (Ridolfi), 2007. *Yakama Nation Exposure Scenario for Hanford Site Risk Assessment, Richland, Washington*. Prepared for the Yakama Nation ERWM Program. September.

Shannon & Wilson Inc., 2009. Modeling Review for the Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington. Submitted to Washington Department of Ecology. June 18.

Tiller, B., B. Chadwick, J. Groves, R. Paulsen, and C. Smith, 2009. Mapping and Characterization of Hanford Site Releases Via Groundwater Upwellings into the Columbia River: Preliminary Phase II(B) Results: 100BC Area. Power Point Presentation. October.

U.S. Department of Energy (USDOE), 2006. U.S. Department of Energy American Indian & Alaska Native Tribal Government Policy.

U.S. Department of Energy (USDOE), 2008. Report of the Review of the Hanford Tank Closure & Waste Management Environmental Impact Statement (EIS) Quality Assurance Follow Up. November.

DOE's preference is for FFTF Decommissioning Alternative 2. Under this alternative, 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.

Regarding the effectiveness of institutional controls and barriers, it is DOE policy (DOE P 454.1, April 9, 2003) to use institutional controls as essential components of a defense-in-depth strategy that uses multiple, relatively independent layers of safety to protect human health and the environment (including natural and cultural resources). DOE would implement institutional controls, along with other mitigating or preventive measures as necessary, to provide a reasonable expectation that, if one control temporarily fails, other controls will be in place, or other actions will be taken, to mitigate significant consequences. Chapter 7, Sections 7.1 and 7.5, discuss potential mitigation measures that include developing better-engineered landfill barriers and waste-form performance, among other potential measures.

See response to comment 231-8 regarding future DOE decisions.

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U.S. Department of Energy (USDOE), 2009. White Paper, U.S. Department of Energy Tribal Scenario. March.

U.S. Environmental Protection Agency (USEPA), 1997. *Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination*. OSWER No. 9200.4-18. August 22.

U.S. Fish and Wildlife Service (USFWS). 2008. Final Hanford Reach National Monument Comprehensive Conservation Plan and Environmental Impact Statement; Adams, Benton, Grant, and Franklin Counties, Washington. August.

U.S. Fish and Wildlife Service (USFWS). 2010. USFWS Species Profile for Bull Trout (*Salvelinus confluentus*). Available at: http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E065#crithab (accessed February 18, 2010).

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Comment ID No.	Section	Subsection	Page	Figure, Map or Table Number	Comment	
1	General				Remediation approaches that leave pipes, valves and other high level waste-handling equipment in place are incompatible with the Nuclear Waste Policy Act, which requires high level waste to be disposed in a deep geologic repository. The removal of the facilities and equipment that have handled high level waste and have residuals in them needs to be evaluated in a revised EIS.	231-54
2	General				Please address the fact that USDOE's preferred alternatives do not include removing source material that could result in groundwater being restored to a usable condition in a reasonable time frame.	231-55
3	General				Cleanups based on a specific risk level which is derived from known contamination at the site cannot be implemented effectively at many areas because there is too much uncertainty or unknowns regarding the site (e.g., wastes and contaminated media are not sufficiently characterized to make informed decisions). Provide a plan to resolve these data gaps.	231-56
4	General				Disposing of wastes from other USDOE sites at Hanford will adversely affect the environment and significantly increase site-related risks, particularly with respect to groundwater as a source of drinking water. This is particularly significant for disposal of off-site wastes containing I-129 and Tc-99. At least one Alternative should be provided that excludes the import of off-site waste and meets all drinking standards and aquatic life criteria.	231-57
5	General				Provide justification that the two points of compliance included in the EIS (core-zone boundary and the Columbia River) are sufficient, and address the possible need for evaluation at other locations on the site.	231-58
6	General				Please address the fact that there is a significant amount of variability in the time series graphs of the groundwater modeling results presented in the EIS and the affects this may have on the reliability of results.	231-59
7	General				The document cites compliance with potentially applicable regulatory requirements. Clarify that all actions will comply with all ARARs.	231-60
8	General				State Environmental Protection Act (SEPA) requirements may not have been met under this NEPA action. Clarify how SEPA requirements will be met where they are found to apply.	231-61
9	General				Clarify and define the term selective clean closure.	231-62
10	General				Clarify how failure of institutional controls will impact the projected risk evaluation.	231-63
11	General				Permitting of a new solid-liquid separations facility will require SEPA coverage. Clarify how this EIS would be adequate to meet the needs of the SEPA checklist for this facility.	231-64
12	General				Clarify whether air emissions from steam reforming facilities are included in the risk evaluation.	231-65

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231-54 The commentor states that contaminated ancillary equipment, piping and valves are HLW and must be disposed in a deep geologic repository. DOE disagrees and does not believe that this issue needs to be evaluated in a revised EIS. As stated in the *TC & WM EIS*, at Hanford, the requirements for management of DOE HLW, LLW, TRU waste, and the radioactive component of mixed waste are provided in DOE Order 435.1 and its associated manual and guidance, which are compatible with the Nuclear Waste Policy Act, and are described in Chapter 8 of this *TC & WM EIS*. Furthermore, as discussed in the *TC & WM EIS* Summary, Section S.5.2.1.4, the final waste classifications of certain waste streams, including those listed above, have not yet been determined. Nevertheless, to ensure consideration of the full range of alternatives, this EIS analyzes two alternatives, Tank Closure Alternatives 6A and 6B, both of which assume that the tank waste is all managed as HLW, including the ancillary equipment, either because (a) the waste has been determined to be HLW, or (b) the historical processing data for the waste streams do not support management of the waste as non-HLW. It is also important to note that DOE is not making decisions based on this *TC & WM EIS* on the ultimate disposition of waste streams that are currently managed as HLW at Hanford, and will make those decisions in accordance with applicable law.

231-55 As stated in Chapter 1, Section 1.4.2, this *TC & WM EIS* is not making a decision on CERCLA groundwater remediation as part of the proposed actions evaluated, but it does address alternatives for retrieval of tank waste, past leaks, and spills. Tank farm past leaks and associated contamination in the vadose zone are being evaluated under the RCRA Facility Investigation/Corrective Measures Study process. As such, the vadose zone contamination associated with tank farm past leaks is considered an RCRA operable unit.

With regard to the scope of this *TC & WM EIS*, DOE believes that its Preferred Alternatives, as discussed in Chapter 2, Section 2.12, address these considerations even as DOE continues to work to characterize past leaks and spills and to address uncertainties in contamination fate and transport through RCRA facility investigations and conceptual groundwater models, such as that developed for this *TC & WM EIS*. Regardless, Tank Closure Alternatives 4, 6A, and 6B, as analyzed in this *TC & WM EIS*, are representative of remediation that results in removal of the source of contamination from the vadose zone (i.e., contaminated soils beneath the tank farms to the groundwater). This type of remediation could include the use of subsurface barriers. A more complete discussion on the potential remediation actions to achieve vadose zone remediation is described in Chapter 7, Section 7.5.

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Comment ID No.	Section	Subsection	Page	Figure, Map or Table Number	Comment	
13	General				Explain how risks and impacts will be calculated and included for temporary storage of high-level waste (HLW) on the Hanford site, define the timetable for storage and include this in the risk and impact calculations.	*231-66*
14	General				Provide the site conceptual hydrogeologic model for review including specific assumptions used in the model, such as data selection, qualification and justification.	*231-67*
15	General				Provide a more detailed explanation of how transuranic (TRU) waste can/will be stored on site until it can be shipped to Waste Isolation Pilot Plant. Include the location and specifications of the TRU Waste Interim Storage Facility in particular.	*231-68*
16	General				Bulk vitrification test demonstrations have shown it is not suitable for low-activity waste (LAW) that contains Tc-99. Revise the alternatives to exclude the use of this technology.	*231-69*
17	General				Address the need for plans to conduct a thorough characterization in every tank farm where a leak or release has occurred to identify the contaminants. Explain how plans will be developed for removing residual contamination, sampling and analysis of residual waste, radiological assessment of the structural steel of the tanks, assessment of risk to human health and the environment from future releases of radiation due to tank degradation.	*231-70*
18	General				Include plans for sampling waste transfer lines between facilities and evaluating residual waste solidified in place. Leaving these lines in place threatens the vadose zone and groundwater in the future as contaminants are remobilized. As such, a work plan for vadose zone remediation should be developed.	*231-71*
19	General				Revisit the alternatives for removing tanks which overlay known areas of contamination and provide a more detailed analysis of the feasibility of removing all single-shell tanks (SST). Include an estimate of the time to completion for full removal and identify sources for clean fill material.	*231-72*
20	General				The EIS states the Resource Conservation and Recovery Act (RCRA) barrier can last 500 years before needing maintenance, and the Hanford barrier can last 1,000 years. However, the National Research Council has noted that existing test results cannot be reliably extrapolated out to these lengths of time (National Research Council, 2000). Provide justification for these predictions including any assumed maintenance and monitoring activities which will be conducted.	*231-73*
21	General				Include plans to conduct sampling and analysis of residual waste that will be left in the tanks, including radiological assessment of the structural steel.	*231-74*
22	General				Provide a cost analysis for long-term institutional controls. Include in the comparison the cost of future remediation as a result of residual waste mobilization versus the cost of clean closure in present day dollars.	*231-75*

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231-56 Information on how each waste management area will be closed, which will address these issues, has been added to Chapter 7, Section 7.1.

231-57 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, particularly 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 are discussed in Chapter 7, Section 7.5, of this final EIS.

231-58 For the alternatives groundwater impacts analysis, multiple lines of analysis were considered: the tank farm barriers, FFTF barrier, IDF-East barrier, IDF-West barrier, RPPDF barrier, 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-field, mid-field, and far-field groundwater impacts, (2) meet Ecology's SEPA requirements, and (3) provide a point of comparison with anticipated future analyses for permitting requirements. DOE's views are that the lines of analysis allow a 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.

231-59 A guide to interpretation of the concentration-versus-time plots has been added to this *Final TC & WM EIS* in response to this and other related comments. The reader will find this guide at the start of Chapter 5.

231-60 This EIS is not being prepared under CERCLA. See response to comment 231-4 for a discussion of ARARs and CERCLA with regard to this EIS.

231-61 Please see Ecology's foreword to this *Final TC & WM EIS*.

231-62 A definition for this term has been added to Chapter 9, "Glossary," and a text box in Chapter 2, Section 2.2.2.4.

231-63 The EIS risk assessment assumed that institutional control would be maintained for 100 years, after which it was assumed that institutional control would be lost.

231-64 See response to comment 231-61.

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Comment ID No.	Section	Subsection	Page	Figure, Map or Table Number	Comment
23	General				Reliance on process records and institutional knowledge cannot substitute for appropriate site characterization data. Reliance on historic records and process knowledge frequently does not identify all contamination. Provide a plan for conducting comprehensive site characterization in each alternative.
24	General				Provide a comprehensive suite of parameters that ensure proper characterization of extent of contamination.
25	Section 2	2.3.3.2.2	2-44		Provide the details of the remote handled special components (RH-SCs) storage facility within Hanford, including location, dimensions, shielding and emergency systems, beyond the site near the sodium storage facility (page 2-110). These specifics are not addressed in the Environmental Assessment of Sodium Residuals Reaction/Removal (USDOE/EA-1547F).
26	Section 2	2.3.3.3.2	2-47		The Idaho National Labs (INL) Sodium Processing Facility (SPF) has day tanks that are 2,570 liters each (page E-202). The proposed day tanks for the Hanford Sodium Reaction Facility (SRF) are significantly larger than INL's SPF (16,300 liters each-page 2-46). The estimate for 7,600 liters per day of 50% weight sodium hydroxide solution is justified for SPF based on past operating experience at INL (E-209), but appears to be applied to the proposed Hanford facility as well (2-47) without proper justification or accounting for the fact that the new facility tanks are approximately 6 times larger than the existing facility's. Justify these differences and address the operational and facility lifespan consequences as part of the Hanford SRF Option.
27	Section 2	2.3.3.3.2	2-47		Address in detail the transfer of the caustic sodium hydroxide solution produced at the Hanford SRF to the Waste Treatment Plant (WTP). According to the Hanford Site Sodium Disposition Evaluation Report (HNF-33211 R0), the WTP's Pretreatment facility will be equipped with an exterior flanged pipe connection for routing from truck deliveries to the site. This should be included as part of the EIS.
28	Section 2	2.5.3	2-105	2-3, 2-6	Both tables incorrectly indicate that Alterative 3 will include onsite disposal of the reactor vessel and depleted uranium shield in the reactor containment building (RCB). Revise the tables presented with Alternative 3 to be consistent with the text of the EIS.
29	Section 2	2.5.3.1	2-107		Provide more detail regarding the specific waste to be left within the subgrade portion of the RCB in this description. In particular, explain the final disposition of the reactor vessel and depleted uranium shielding, and estimate the amount of internal piping which would be treated in place and left on site. While facility disposition (p. 2-109) notes the reactor vessel remains in place with Alternative 2, this is not revisited in detail. Address disposal of depleted uranium shielding in particular within the text and correct the tables on pages 2-105 and 2-135, which incorrectly specify Alternative 3 for its onsite disposition.

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231-76 *231-77* *231-78* *231-79* *231-80* *231-81* *231-82*

231-65 Steam reforming (thermal supplemental treatment) was evaluated as part of Tank Closure Alternative 3C, which included air emissions. Nonradiological impacts on the public are discussed in Chapter 4, Section 4.1. Criteria and toxic pollutant nonradioactive emissions estimates from steam reforming used in the analysis are presented in Appendix G, Section G.2. Concentrations of the evaluated toxic pollutants to which the public could be exposed would be less than the Acceptable Source Impact Levels and therefore were not evaluated further.

231-66 This final EIS analyzes the impacts and risks of storing all of the IHLW canisters under each of the Tank Closure alternatives for the length of WTP operations. This information is in Appendix E, Section E.1.2.4.1.1.

231-67 A site conceptual hydrogeologic model has been added to Appendix L, Section L.2, of this *Final TC & WM EIS*. The conceptual model is depicted at a general/summary level. Additional details regarding data selection, qualification, and justification are included in appropriate sections within this EIS and/or in EIS calculation and analysis packages.

231-68 Details of the TRU Waste Interim Storage Facility can be found in Appendix E, Section E.1.2.3.11.4.

231-69 DOE included bulk vitrification as one of several representative supplemental treatment technologies to analyze the impacts of its construction, operation, and deactivation, as well as the long-term impacts of its waste form. As discussed in Appendix E, Section E.1.2.3.5.1, Supplemental Technology Selection, technologies for treating Hanford tank waste have been researched and evaluated for a number of years. For example, in 2002, DOE evaluated over 50 options for potential supplemental technologies, with the results being that seven representative technology options warranted a more detailed evaluation. From this list of seven, three technologies met the study goals, selection criteria, and measures: bulk vitrification, cast stone, and steam reforming. Thus, this EIS analyzes these three supplemental LAW treatment technologies, which are considered representative of both thermal and nonthermal technologies. Also as discussed in Appendix E, Section E.1.2.3.6.5, the capture of several select radionuclides in the final waste form product is an important consideration when evaluating the performance of the bulk vitrification process as a potential supplemental thermal LAW treatment option. Engineering-scale testing of the bulk vitrification process suggests that some modifications to the final production facility design may be required to eliminate some unfavorable waste-form characteristics. During engineering- and large-scale testing, results suggested

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30	Section 2	2.5.3.2	2-109		No mention of institutional controls other than the surface barrier is made regarding facility disposition in Alternative 2. Identify additional institutional controls beyond the landfill barrier and specific post-closure security and maintenance activities (if any).
31	Section 2	2.5.3.2	2-110		Bulk sodium is described as being stored in solid form in Section 2.3.3.3, whereas this section describes all Fast Flux Test Facility (FFTF) sodium to be in liquid form. Resolve this inconsistency, and correct the rest of the text.
32	Section 2	2.7.2	2-135	Table 2-6	Table 2-6 indicates on site disposal of the reactor vessel and attached depleted uranium shield for Alternative 3: Removal. Resolve this inconsistency in the text of the EIS. Include more detail and subcategories for post-closure care and administrative/institutional controls which will be implemented. The information currently provided for these categories are too broad and vague to be properly evaluated.
33	Section 2	2.7.4	2-142		Appendix E (E-193) estimates that complete processing of all available bulk sodium currently stored at the FFTF and 200-West will produce less than 40% of the total sodium hydroxide solution needed for the WTP pretreatment process. Justify the statement that there is some uncertainty as to whether all of the caustic solution would be used, and provide further explanation.
34	Section 2	2.9.2.1	2-230	2-24, 2-25	Include the radioactively contaminated bulk sodium as a contaminants of potential concern (COPC) under Alternative 1. The large inventory of bulk sodium would be left on-site and available for environmental release.
35	Section 3	3.2.5.1.1	3-28		There is inadequate documentation and citation of original sources in this discussion (Figure 3-9 for example). Provide references to original source documents for all materials including figures which are cited from other sources. Perform a thorough check for all references throughout the EIS.
36	Section 3	3.2.5.2	3-37		Format this section to follow the same basic organization and nomenclature as the previous sections. Include basic physical and hydrogeologic information and data used to prepare the models. Revise the EIS so that separate sections are consistent and complementary to one another.
37	Section 3	3.2.5.4	3-38		Format this section to follow the same basic organization and nomenclature as the previous sections. Include basic physical and hydrogeologic information and data used to prepare the models. Revise the EIS so that separate sections are consistent and complementary to one another.
38	Section 3	3.2.6.2.1 & 3.2.6.2.4	3-46 & 3-48		Provide the reader with useful, accurate, and documented information on vadose zone conditions and properties (e.g., bedding and other heterogeneities) in this Section.

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that technetium-99 might present itself in a more soluble form when deposited as a vesicular glass layer on top of the bulk vitrification melt. This would affect the release rates from the final waste form in an IDF. The very high temperatures associated with bulk vitrification would volatilize and drive off technetium-99 from the waste feed prior to its incorporation into the vitrified glass matrix. The volatilized technetium-99 would then condense on the surface of the melt prior to being carried away in the offgas. As shown in the Summary, Section S.5.5; Chapter 2, Section 2.10; and Chapter 5, Section 5.3, of this EIS, the bulk vitrification waste forms are problematic in the long term. These issues will be addressed in DOE's ROD.

231-70 Following the completion of a mitigation action plan and before implementing any closure actions, DOE will develop a tank farm system closure plan that will be implemented for each of the waste management areas. For details of this process, see Chapter 7, Section 7.1.

Prior to tank closure, waste remaining within the tanks, as well as the tanks themselves, would undergo detailed examinations to support preparation of site-specific radiological performance assessments and closure plans. These examinations would require detailed waste sampling and analyses, assessments of the structural stability of the tanks, and assessments of risk to human health and to the environment. These documents would provide the information and analysis necessary for DOE and regulators to make decisions on what levels of residual tank waste are acceptable in terms of short- and long-term risks. Tank farm past leaks and associated contamination in the vadose zone are being evaluated under the RCRA Facility Investigation/Corrective Measures Study process. As such, the vadose zone contamination associated with tank farm past leaks is considered an RCRA operable unit rather than a CERCLA operable unit and is assessed in this *TC & WM EIS*.

231-71 The scope of this *TC & WM EIS* does include the transfer lines and ancillary equipment that are within the SST and DST farm systems. The Tank Closure alternatives take into account the closure of these lines and ancillary equipment, along with the tanks themselves. The old transfer lines that are not part of the SST and DST systems were included in the waste inventories discussed in Appendix S, "Waste Inventories for Cumulative Impact Analyses," and in the long-term impacts discussed in Appendix U, "Supporting Information for the Long-Term Cumulative Impact Analyses."

231-72 DOE disagrees the alternatives need to be revisited. DOE believes that it has fully analyzed all aspects of those Tank Closure alternatives that would remove

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39	Section 3	3.2.6.3.1	3-49		In this Section a water table map, geologic cross-section with superimposed water table, and a paragraph description of the suprabasalt aquifer system are provided, but no conceptual groundwater model is discussed. Aquifer property information useful to the analysis is not provided. Revise this section to include the conceptual hydro model, and provide the basic data and information useful for the numerical modeling in the appendices.
40	Section 5	5.2.1.1.2	5-373		Consider COPC concentrations driving risk/hazards for water from a well which is drilled directly through the FFTF Barrier near or through the entombed waste as well as at the edge of the barrier. Such a scenario is highly plausible over the course of the 10,000-year period of analysis in which most, if not all, institutional controls should be expected to fail.
41	Section 5	5.2.1.2	5-379		For Alternative 2, provide a spatial distribution of groundwater tritium concentrations at the time of peak concentration.
42	Appendix D	D.1.4	D-24		Include all recorded tank leaks in this section, specifically address tank overflow events and other unplanned releases. For example, the overflow event at tank T-101, which was probably as large or larger than the T-106 leak.
43	Appendix D	D.1.5	D 24-27		Revisit and revise the Section that describes the past practice of disposal to cribs and trenches and correct factual errors to more accurately estimate the magnitude of materials disposed in this manner.
44	Appendix D	D.1.5	D-24		Clarify that discharge to ponds was frequently contaminated. In particular explain that the original ditch leading to T- Pond was abandoned and covered because of very high surface radioactivity.
45	Appendix D	D.1.5	D-24	Table D-28	Reconcile the low radionuclide contents reported in Table D-28 with the history of discharges to the T cribs and tile fields that included large quantities of tank supernatant overflow at the end of tank cascades.
46	Appendix D	D.1.5	D-26	Table D-28	Correct errors and omissions in the grouping on this page (including that 216-T-23 should be listed with T and not TY, TY should include 216-T-27, the 216-T-19 crib and tile field located at the south end of TY should be included. T-19 received approximately 455 million liters of evaporator condensate containing very high concentrations of tritium and I-129).
47	Appendix D	D.2.1.6	D-110	Table D-28	This section identifies 37,694 kilograms of depleted uranium as part of the hazardous materials inventory which is not in the bulk sodium residuals. Clarify whether this uranium comprises the depleted uranium shielding which is part of the reactor vessel, or if it is in addition to it. Specifically address the disposal of the depleted uranium shielding within each action alternative, and reconcile inconsistencies between the EIS text and Appendices regarding depleted uranium disposition.
48	Appendix D	D.2.3.3	E-191		Provide a detailed description of the "monitoring program" which would be established under Alternative 3. Include details of any institutional controls and future land use plans.

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231-91 ***231-92*** ***231-93*** ***231-94*** ***231-95*** ***231-96*** ***231-97*** ***231-98*** ***231-99*** ***231-100***

the SSTs (Alternative 4 for the BX and SX tank farms and Alternatives 6A and 6B for all tank farms), including the actual removal of the tanks. The commentor is directed to Chapter 2, Section 2.2.2.4.2, for a discussion of the activities that would take place under clean closure. A summary of short-term impacts is provided in Chapter 2, Section 2.8.1; of long-term impacts, in Section 2.9.1. A detailed analysis is provided in Chapters 4 and 5 (for short- and long-term impacts, respectively). Timelines for closure under Tank Closure Alternatives 4, 6A, and 6B are presented in Chapter 2, Section 2.5.2. In all cases, clean fill material would come from Borrow Area C (see Chapter 2, Section 2.2.2.4.4).

231-73 A full description of the modified RCRA Subtitle C and Hanford barriers is provided in Appendix E, Section E.1.2.5.4.1. As noted in that section, 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 to provide containment and protection 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 monitoring and maintenance activities conducted during the period following closure of a hazardous waste disposal system (e.g., a landfill) 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 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 administrative control details (e.g., access restrictions) are to be developed in the future.

The principal evidence for the potential longevity of engineered caps is provided by natural analogues. Data in reports from the International Atomic Energy Agency (IAEA 2001, page 16) and NRC (Schmidt et al. 2006) provide evidence that constructed earthen covers can survive for long periods of time (between 1,000 and 5,000 years). In addition, evidence on the service life of individual components of engineered caps is available. For example, the National Institute of Standards and Technology (Clifton and Knab 1989, page xii) and Atomic

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49	Appendix D	D.2.4	D-115		Itemize the ancillary buildings and their internal equipment and components which will be left onsite as part of this action alternative description.
50	Appendix D	D.2.4.2	D-116		Indicate specifically what is expected to be included as part of the uncontaminated material classification. Identify process components specifically included or excluded from this group.
51	Appendix D	D.2.4.2.9	E-199		Provide estimates of operating emissions which will be produced during conversion of bulk sodium to sodium hydroxide at the Hanford SRF, including estimates of radionuclides included in the exhaust and the volume of exhaust expected to pass through the filtration system.
52	Appendix D	D.2.4.3.8.8	E-207		Provide operating records for the Idaho National Labs SPF.
53	Appendix D	D.2.4.4	D-116		The text incorrectly states that demolition waste handling would be the same between Alternatives 2 and 3. One of the major differences between the Alternatives is the disposition of demolition and radioactively contaminated waste onsite inside the RCB and adjacent building foundations in Alternative 2 while Alternative 3 calls for the removal of all this waste to an integrated disposal facility (IDF). Clarify this text throughout the document and provide additional descriptive detail.
54	Appendix D	D.2.4.4.1	E-210		The text of this section is inconsistent with the flow charts provided in Figures 2-65 and 2-68, both of which exclude disposal of Hanford treated RH-SCs at the Nevada Test Site (NTS). Explain this discrepancy specifically (that is, why Hanford treated RH-SCs cannot be sent to NTS).
55	Appendix D	D.2.4.4.2.8	E-218		It is not clear that the irradiated and contaminated metal components which will be delivered to the induction melter in the RH-SC processing facility will meet the typical induction melter requirements such as charge materials be of known composition and clean of oxidation products. Include specific text explaining how these challenges will be met.
56	Appendix D	D.2.4.4.2.8	E-219	E-48	Provide dimensions for the induction melter on Figure E-48.
57	Appendix D	D.2.4.5	D-117		Provide a detailed description of the planned post-closure care program planned for the site; including any barriers not already mentioned, fencing, access restrictions or other institutional controls as well as funding available to maintain these facilities.
58	Appendix K	K.1.1.1	K-2		The details provided in the example (i.e., half-lives and emissions) are only accurate for the U-238 decay chain. The example should specify the isotope of uranium in order to be accurate and complete.
59	Appendix K	K.1.1.3	K-7		The rationale for multiplying the health risk factor by 2 for individual doses > 20 rem was not discussed. Indicate how this factor was selected (research, arbitrarily selected for a more conservative estimate of cancer risk, etc.)

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Energy Research Establishment (Atkinson and Hearne 1984, page i) report that the service life of concrete and cement would be on the order of 500 years and 500 to 1,000 years, respectively. Rowe and others (Rowe et al. 2004, pages 99 and 423) report estimates of the service life of drainage layers between 135 and 750 years and service life of geomembrane liners on the order of 300 years.

231-74 Prior to tank closure, waste remaining within the tanks, as well as the tanks themselves, would undergo examinations to support preparation of site-specific radiological performance assessments and closure plans. These examinations would require waste sampling and analyses, assessments of the structural stability of the tanks, and assessments of risk to human health and to the environment. These documents would provide the information and analysis necessary for DOE and regulators to make decisions on what levels of residual tank waste are acceptable in terms of short- and long-term risks.

231-75 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.

231-76 DOE and Ecology believe there is sufficient characterization information to proceed with the EIS. NEPA is applied early in the process, before all information may be known. This EIS also identifies data uncertainty throughout the document and explains how certain information should be evaluated.

231-77 Regarding further characterization of waste sites, defining such a suite of parameters to ensure the proper characterization of a waste site is beyond the scope of this EIS. Such detail would be defined in follow-on activities such as performance assessments and closure plans once characterization activities are complete.

231-78 Additional details on the Sodium Storage Facility, including location and dimensions, are provided in Appendix E, Section E.2.4.2.1, of this *TC & WM EIS*. Figure E–46 in Appendix E shows the location within the 400 Area, and Figure E–47 is a photograph of the exterior of the storage facility.

231-79 In the *Draft TC & WM EIS*, Chapter 2, Section 2.3.3.3.1, the second bullet incorrectly referred to carbon steel sodium day tanks, each with a volume of 16,300 liters (4,300 gallons). As discussed in Appendix E, Sections E.2.4.2 and E.2.4.3, the day tanks have a capacity of 2,760 liters (730 gallons) and 2,570 liters (680 gallons) for Hanford's proposed Sodium Reaction Facility

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60	Appendix K	K.1.2.4	K-8		Occupational exposure to chemicals must be maintained within OSHA permissible exposure limits [29 CFR 1910]. The American Conference of Governmental Industrial Hygienists threshold limit values are recommendations or guidelines rather than regulatory requirements, and should not be used.	231-112
61	Appendix K	K.1.2.6	K-9		The exposure assessment assumes air is the only medium and inhalation is the only exposure pathway for a chemical impact assessment. This assumes any incident will result only in an air release. Address chemical incidents that may result in a release to soil or water (such as a liquid spill) and potential exposure via dermal contact or ingestion.	231-113
62	Appendix K	K.2	K-11		Human receptors for radiological exposure include: 1) a member of the general population within 50 miles of the site, 2) a maximally exposed individual (MEI) hypothetical member of the public located just outside the site boundary (with the highest yield impacts), and 3) an MEI onsite worker at specific locations. None of these scenarios includes Native Americans, who are considered a exposure population unique from the general public or site workers, and may be exposed to releases during normal operations and accidents during cleanup actions. Also, the onsite MEI only considers workers at the Columbia Generating Station and Laser Interferometer Gravitational-Wave Observatory. Consider and include exposure scenarios for workers at US Ecology, ERDF, or other waste management areas; and include an exposure scenario for Native Americans.	231-114
63	Appendix K	K.2.1.1.1	K-11/13	Figure K-1	When first introducing the off-site MEI (as shown on the figure), indicate how the off-site MEI locations were determined from the assumed emission sources.	231-115
64	Appendix K	K.2.1.1.1	K-13	Figure K-1	Include the onsite MEI locations.	231-116
65	Appendix K	K.2.1.1.1.1	K-14		Regarding the internal dose, also account for wild plants, game, and fish, which are harvested by Native Americans, as well as, water used during traditional sweats, via ingestion, inhalation, and dermal contact. Any of these activities may be practiced by Native Americans within 50 miles of the site and in the hypothetical off-site MEI locations during normal operations and accidents. Consider utilizing the GENII computer code ENV module, which has the capacity to calculate exposure based on multiple media sources and pathways, or address reasons for not utilizing this module.	231-117

and INL's Sodium Processing Facility (SPF), respectively. A separate sodium storage tank (which precedes the day tanks) in the INL SPF has the 16,300-liter (4,300-gallon) capacity and receives sodium from the Experimental Breeder Reactor II (EBR-II) sodium boiler building. This bullet has been revised accordingly in this final EIS.

231-80 The decision regarding sodium reuse will be made through this EIS and after the ROD, approval of design will follow. This level of construction detail on the exterior flanged piping connection to the truck is not necessary to support the analyses in this *TC & WM EIS*, or to compare impacts among the EIS alternatives.

231-81 Chapter 2, Tables 2–3 and 2–6, indicates that the reactor vessel, internal piping and equipment, and attached depleted-uranium shield would be disposed of on site. This is consistent with the text within Chapter 2, Sections 2.5.3 and 2.7.2, which indicates that onsite disposal of these items would be in an onsite IDF.

231-82 Regarding the commentor's identification of an inconsistency between Chapter 2 and Appendix D, DOE has reviewed these two sections of the draft EIS and revised Appendices D and E in this final EIS. Specifically, the descriptions in Sections D.2.1.6, D.2.2.2, D.2.3.2, and D.2.4.2 were revised in this final EIS to reflect that the depleted uranium shielding would remain in FFTF following deactivation activities for all the FFTF Decommissioning alternatives. Therefore, under FFTF Decommissioning Alternatives 1 and 2, the depleted uranium shielding would remain with the FFTF reactor vessel; under FFTF Decommissioning Alternative 3, the depleted uranium shielding would also remain with the reactor vessel, but would be eventually removed and disposed of in an IDF. In addition, Tables D–73, D–74, and D–75 and Figures D–64, D–65, and D–66 were revised to reflect in this final EIS the inventory of depleted uranium remaining in FFTF. The narrative in Appendix E, Sections E.2.1, E.2.3.1, and E.2.3.2, were revised as well. These revisions did not result in any changes to the conclusions drawn from the EIS analyses. No associated change was required to the facility disposition description presented in Chapter 2, Section 2.5.3.2, as the discussion already indicated that a modified RCRA Subtitle C barrier would be constructed over the reactor vessel and depleted uranium shield under FFTF Decommissioning Alternative 2. Similarly, the depleted uranium shield information presented in Tables 2–3 and 2–6 was correct and required no change. Regarding an estimate of the internal piping that would be left under each alternative, such a level of detail was not available during preparation of this EIS. However, Appendix D, Tables D–69 through D–72, provides estimates of the FFTF radionuclide inventory and associated contamination.

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66	Appendix K	K.2.1.1.3.1	K-16		Justify the reasoning that, in this section, a 30-foot height was assumed for evaluating meteorological data to model transport of releases from the Supplemental Treatment Technology Site-East and West (vs. a 200-foot stack emission from the WTP) to an off-site MEI. This is inconsistent, however, with Section K.2.1.1.1.1 that states that the emission would be assumed to be at ground level (resulting in a reduced dispersal, and a more highly concentrated plume) for these supplemental treatment sites. Revise the document to be consistent where necessary.
67	Appendix K	K.2.1.1.3.3	K-23	Table K-5	The footnote to this table states that "food consumption rates represent the portion of the diet consisting of contaminated food." Explain how this portion is calculated, consider a worst case scenario where 100% of the diet is contaminated for a MEI. Include fish consumption since off-site MEI locations are along the Columbia River.
68	Appendix K	K.2.1.1.3.3	K-23	Table K-5	Provide parameter inputs to reflect a traditional tribal member as presented in the tribal lifestyle described in the Yakama Nation Exposure Scenario provided to USDOE in 2007 (Ridolfi, 2007). Correct the assumption that the MEI would be exposed only 50% of the time (i.e., provide a 100% scenario) because it is unlikely that individuals spend half of their time elsewhere.
69	Appendix K	K.2.1.1.3.3	K-24		The MEI was assumed to consume a larger portion of their diet from fruits & vegetables grown in a family garden. Native Americans with a traditional tribal lifestyle would ingest wild foods and medicines (plant, fish, and animal origins) hunted or harvested from locations closer to the source term than the location of a residential garden.
70	Appendix K	K.2.1.1.3.4	K-24		Provide the source and location of the screening analysis that was conducted for each Alternative to identify key radionuclides that would be released during normal operations. For example, explain how neptunium-237 and thorium-232 (which are site contaminants and which were included in the detailed analysis in Appendix Q) were eliminated.
71	Appendix K	K.2.1.1.3.4	K-25		The Best-Basis Inventories include radionuclide estimates for 46 radionuclides. Appendix K indicates a total of 14 radionuclides were included in the air pathway dose analysis. Appendix K should identify the complete list of 46 radionuclides, and a thorough description of the criteria used to eliminate radionuclides from the detailed analysis.
72	Appendix K	K.2.1.1.4	K-33		For the radionuclide analysis, radioactive inventories should be adjusted to account for differences in the duration of the alternatives. Radioactive decay over time would reduce the radioactivity of each radionuclide. Both plutonium (Pu)-241 and its daughter, americium (Am)-241, are included in the air pathway dose analysis. The half-life of Pu-241 (14.4 years) is significantly shorter than that of Am-241 (432.7 years) resulting in an increase in the Am-241 concentration until equilibrium conditions are reached.

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231-83 Chapter 2, Section 2.5.3.2, has been clarified to identify that postclosure care and institutional controls would be maintained for 100 years following revegetation of the site. Information on postclosure care activities is presented in Appendix E, Section E.1.2.5.4.2.

231-84 Chapter 2, Section 2.5.3.2, has been revised to indicate that bulk sodium would be stored in solid form in the Sodium Storage Facility.

231-85 Chapter 2, Tables 2–3 and 2–6, indicates that the reactor vessel, internal piping and equipment, and attached depleted-uranium shield would be disposed of on site under FFTF Decommissioning Alternative 3. This is consistent with the text within Chapter 2, Sections 2.5.3 and 2.7.2, which also indicates that onsite disposal of these items would be in an onsite IDF. An overview of administrative and institutional controls is presented in Chapter 2, Section 2.5.1. Detailed information on postclosure care activities is presented in Appendix E, Section E.1.2.5.4.2, of this *TC & WM EIS*.

231-86 As discussed in Appendix E, Section E.1.2.3.1.7, WTP Assumptions and Uncertainties, the volume of sodium required at the WTP depends on a number of treatment operations, e.g., caustic leaching and sodium hydroxide recycling implemented in the WTP. The use of sodium hydroxide projected in this *TC & WM EIS* is based on the best information available at the time of its publication.

231-87 Appendix Q, Section Q.2, of this *TC & WM EIS* describes how the COPCs were identified for the long-term impacts analysis. The bulk sodium contaminants were screened out during this process and thus were not included in the list of COPCs. DOE would like to note that the Preferred Alternative for FFTF decommissioning (Alternative 2) would reuse the bulk sodium for WTP operations and that only under the No Action Alternative (Alternative 1) would the bulk sodium be stored on site and not utilized.

231-88 For all figures not specifically generated by the *TC & WM EIS* alternatives analysis, including Figure 3–9, the source for each figure is listed, typically at the bottom of the figure, identifying the reference. The details of the reference are listed at the end of the applicable chapter or appendix.

231-89 In the *Draft TC & WM EIS*, DOE presented analysis results consistent with DOE guidance contained in its *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements* (DOE 2004b), in which DOE expands on CEQ instructions for preparing EISs (40 CFR 1502.2 and 1502.15)

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73	Appendix K	K.2.1.2.1	K-48		In the assessment of doses to radiation workers, dose was calculated based on a 2,080-hour work year. In the case of the noninvolved workers, dose was calculated based on a 2,000-hour work year. These exposure durations are inconsistent and should be resolved.
74	Appendix K	K.2.1.2.1	K-49	Table K-48	The average project impact for a full-time worker with a 40-year exposure period is at least 10 times the maximum acceptable increased lifetime cancer risk for every Alternative. Provide incidence rates as well, and compare to an acceptable risk level for each Alternative being proposed including the No Action Alternative.
75	Appendix K	K.2.2.1.1	K-57		For the FFTF decommissioning Alternatives, ground-level radiological emissions were assumed, and the statement was made that "this conservative assumption resulted in overestimation of the impacts." Indicate whether a sensitivity analysis was done to determine if a more dispersed plume would impact a larger population.
76	Appendix K	K.2.2.1.4	K-64		Impacts under FFTF Alternative 1 (No Action) are not evaluated here because they are considered part of the "Hanford Baseline." Revise to evaluate impacts under every Alternative, including No Action.
77	Appendix K	K.3.9.1	K-127	Table K-102	It is insufficient to evaluate only those chemicals used in the waste treatment process (vitrification plant) and supporting operations to determine chemical impacts from an accident, and not include those contained within the process streams or process byproducts. Although the quantities may not be as great, these additional chemicals may be extremely hazardous; there is no way of knowing from Table K1-102 what chemicals are not considered here. Identify and evaluate the chemicals contained within process streams or process byproducts to determine chemical impacts from an accident.
78	Appendix K	K.3.9.3.1	K-137	Table K-106	Provide the criteria used to condense the list of 400 hazardous materials to 24 that could potentially result in significant impacts on workers and clearly explain the process for eliminating chemicals. Provide the elimination criteria and explain the screening evaluations which were performed for all chemicals.
79	Appendix K	K.4	K-153		Justify the use of industrial safety impact rates only between 2001 and 2006. This "recent history" provides a low-end estimate of recordable cases and fatality rates (2 per 200,000) that may not be reflective of actual incident rates. This is particularly true as construction activities (private industry total recordable rate of 6.7 per 200,000) will likely increase with the implementation of Alternatives. As such, the occupational safety impacts calculated for each of the Alternatives may currently be underestimated.
80	Appendix L	L.1	L-1		Define and use consistent geologic terminology. Distinguish the difference in the EIS analysis between silt, mud and clay. Specific information should include grain size information and geochemistry as appropriate.

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by stating that affected environment discussions should be no longer than necessary to understand the effects of the alternatives; data and analyses should be commensurate with the importance of the impacts; and impacts should be discussed in proportion to their significance.

231-90 Detailed hydrogeologic data relative to the Hanford vadose zone and its use in building the groundwater flow model for this *TC & WM EIS* are presented in Appendices M and N, rather than in Chapter 3. The commentor is also referred to DOE's response to comment 231-89 for additional discussion.

231-91 The purpose of Chapter 3, Section 3.2, of this *TC & WM EIS* is to provide a succinct discussion of the Hanford affected environment as a whole and as relevant to the entire scope of proposed actions and alternatives considered in this EIS. Such is the case with the level of detail presented in the groundwater section (Section 3.2.6.3) of Chapter 3. Detailed hydrogeologic data that were compiled and used in developing the groundwater flow model are presented in Appendix L, rather than in Chapter 3. The commentor is also referred to DOE's response to comment 231-89 for additional discussion. Additional hydrogeologic data specific to the evaluation of long-term impacts on the vadose zone are presented in Appendices M and N, with data and interpretation specific to the groundwater transport analysis included in Appendix O. The results and discussion of the analytical modeling performed to evaluate long-term impacts on groundwater are presented in Chapter 5. The detailed technical data are presented in the aforementioned appendices in accordance with CEQ direction and guidance for preparing EISs (40 CFR 1502.18), which state that material that is analytic in nature, such as that composed of lengthy technical discussions and modeling methodology, is best reserved for an appendix so as to aid the readability of the main body of the document.

231-92 The long-term analyses do consider drinking water well impacts (e.g., maximum dose, risk, Hazard Index) at the boundaries of the facility areas, including FFTF. Given the finite extent of the source, one would anticipate the maximum drinking water dose to occur near this location. Please see Appendix Q, Sections Q.2.3, Intruder Scenario Models, and Q.3.2.1.4, FFTF Decommissioning Intruder Scenario, for more information.

231-93 As discussed in Chapter 5, Section 5.2.1.2.2 of this *Final TC & WM EIS*, the COPC driver that is discussed in detail in this section is technetium-99. Technetium-99 is mobile (i.e., moves with groundwater) and long lived (relative to the 10,000-year period of analysis). It is essentially a conservative tracer. The

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81	Appendix L	L.2	L-3		The USDOE notes: "In the Gable Gap area near Gable Mountain and Gable Butte, the elevation of the basalt/suprabasalt sediment interface is uncertain." There are more than 800 boring logs which reach the top of basalt in the Hanford site (page L-19). The USDOE should provide the specific data (e.g., well logs) which were used, along with measurement uncertainty which was assigned, to better estimate the elevation of the basalt/suprabasalt sediment interface. Discuss the sensitivity of the model to basalt elevation and explain how uncertainty in determining this surface is carried forward to model results.
82	Appendix L	L.2	L-4		"For the purpose of this regional-scale model, the water balance in the unconfined aquifer beneath Hanford is assumed to have remained relatively constant since 1940, except for anthropogenic recharges resulting primarily from operations at Hanford." Provide data and discussion of how pumping at Hanford impacted the water balance in the unconfined aquifer. Data should note whether pumping has increased or decreased over the years. Also, explain the impacts of the basalt aquifer pumping and alluvial recharge associated with irrigated farming in Cold Creek Valley.
83	Appendix L	L.4.1	L-7		Provide the slice maps (e.g., elevation layers) in the report that show how elevation layers vary across the model domain.
84	Appendix L	L.4.1.2	L-8		"The model domain is divided into a 200- by 200-meter (656- by 656-foot) horizontal grid, with a "fringe" of partial cells on the northern, eastern, and southern sides." Provide justification for these grid dimensions.
85	Appendix L	L.4.2	L-11		Near the northern boundary of the 200-East Area a series of erosional windows through the Elephant Mountain Member of the Saddle Mountains Basalt are known to occur. While for many areas within the model the basalt may be accurately modeled as a no-flow boundary, this area needs to be addressed in detail. Provide discussion of how erosional unconformities are handled in the model, and where they are included (if at all).
86	Appendix L	L.4.2.2	L-13		"The EIS MODFLOW groundwater flow model sets streambed thickness at 2 meters (6.6 feet) and conductivity at 0.0004 meters (0.0013 feet) per second." Provide specific justification for these values, including any site data which was used in their determination.
87	Appendix L	L.4.2.5	L-15	Figure L-4	Identify all layers which contain, and the corresponding position of the mountain front recharge zone. Explain if it only occurs at Earth's surface, or if it is represented in subsurface as well.
88	Appendix L	L.4.3.2	L-18		Provide the criteria used to interpret the logs, and identify geologic units. Explain the interpretation process and why previous subsurface interpretations were not used.
89	Appendix L	L.4.3.2.1	L-19		Explain why the top of basalt was remapped. A number of highly credible top of basalt maps and grid models have been generated previously. Provide well data used in the remapping process.

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other COPCs that were analyzed do not significantly contribute to drinking water risk or hazard at the FFTF barrier during the period of analysis because of low inventories, low release rates, high retardation factors (i.e., retention in the vadose zone), short half-lives (i.e., rapid radioactive decay), or a combination of these factors.

231-94 Regarding the overflow that occurred at tank T-101, in Appendix D, Section D.1.4, if the reader is interested in more information concerning leaks and overflows, the reference cited in Appendix D (*Waste Tank Summary Report for Month Ending December 31, 2002*, [Hanlon 2003]), is available upon request or at reference libraries (e.g., the Hanford Public Reading Room).

231-95 DOE believes the data evaluated in this EIS are the most-accurate and best-available data. DOE conducted an extensive evaluation of the discharges to the cribs and trenches (ditches) and determined that the best source for volume and inventory estimates was SIM, Revision 1 (Corbin et al. 2005). However, DOE acknowledges there is uncertainty in the inventory estimates because a majority of the discharges to the cribs and trenches (ditches) occurred in the 1950s and 1960s, when the standards for recordkeeping were not up to current standards. The commentor also is reminded that Appendix D, Section D.1.5, only presents the inventory for 33 cribs and trenches (ditches) that are near the B/BX/BY and T/TX/TY waste management areas. The proximity of these cribs and trenches (ditches) to the tank farms warrants their inclusion in the tank closure analysis. The remaining cribs and trenches (ditches) at Hanford are included in the cumulative impacts analysis sections of this EIS, and their inventories are provided in Appendix S.

231-96 DOE acknowledges that discharges to ponds were frequently contaminated; however, Appendix D, Section D.1.5, does not include the T Pond inventory. This section of the appendix includes only the 33 cribs and trenches (ditches) near the B/BX/BY and T/TX/TY waste management areas. The inventory for the T Pond WIDS No. 216-T-4A) is presented in Appendix S, "Waste Inventories for Cumulative Impact Analyses," Tables S–44a and S–44b (radionuclide inventory), and Tables S–70a and S–70b (chemical inventory). The inventory for this pond is evaluated as part of the cumulative impact analyses in Chapter 6 and Appendix U of this EIS.

231-97 DOE has undertaken a detailed review of the tank past leaks inventory evaluated in the draft EIS and determined that the inventories for a number of unplanned releases within the tank farm boundaries needed to be revised. These inventories

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90	Appendix L	L.4.3.2.2	L-23		Provide justification for the subsurface model provided, and the reason for not employing a more traditional method for building the geologic framework for the model such as using structure contour surface maps.	231-142
91	Appendix L	L.4.3.2.2	L-24		"Remove incongruities due to extrapolation from borehole out to edge of transect (seam)." This is an unavoidable artifact of extensive extrapolation from limited data. Provide a description of the process used to resolve these discrepancies between transects.	231-143
92	Appendix L	L.5.2	L-26		"Anthropogenic inputs are applied in 1-year stress periods beginning in 1944." Include an explanation of stress periods here.	231-144
93	Appendix L	L.5.3	L-26		"Outer iterations vary the preconditioned matrix of hydrogeologic parameters of the flow system, e.g., transmissivity, saturated thickness, in an approach toward the solution. Inner iterations continue until the user-defined maximum number of inner iterations has been executed or the final convergence criteria are met." Provide a brief explanation of the convergence criteria, and how closely they must be met with this text.	231-145
94	Appendix L	L.7.2.3	L-32	Table L-13	The model needs to be revised so that the highly conductive Hanford gravel and activated basalt are encoded within the preliminary calibration.	231-146
95	Appendix L	L.7.2.4	L-32		The hydraulic conductivity values used might generally be low, especially for the coarser units. It should be noted that most Hanford Site aquifer tests have been done in 4-inch wells, completed in approximately 8-inch borings. Given other observations made about gravelly deposits in the region, it is likely that the wells are too small to pump hard enough to adequately stress the aquifer. Please discuss the limitations of the data sources and quality used in this section.	231-147
96	Appendix L	L.10	L-63	Figures L-49 & L-82	The x-axis in these graphs are reported as observed head. If this is observed data it should be noted as such; however, this does not seem sensible since the time plotted reaches 2015.	231-148
97	Appendix L	L.10.2.3	L-93		The path line analysis appears to have generated some results that do not seem to make sense. All of the maps show particle traces that parallel water level contours, rather than traversing across them. The maps certainly suggest that either the tracks or the water table maps are incorrect. Reconcile this error and provide an explanation of the mechanics for constructing path lines.	231-149
98	Appendix M				The release models described in Appendix M include parameters that describe assumptions related to the geometry of waste sources. List and describe all parameters included in the release models and provide the values assigned to them and their associated uncertainty.	231-150

are relatively minor, but were updated in this *Final TC & WM EIS* in the inventory estimates and the groundwater analysis. However, DOE is not aware of any discharges to the "T cribs and tile fields" beyond those reported in Appendix D, Section D.1.5. The commentor is reminded that this section does not include all the cribs and trenches (ditches) within the T/TX/TY waste management areas—only those whose proximity to the tank farms warranted inclusion. A list of the remaining cribs and trenches (ditches) within the T waste management area that are evaluated in this EIS as part of the cumulative impacts analysis is included in Appendix S, Table S–19.

231-98 Trench 216-T-23 is adjacent to the TX tank farm and, therefore, is listed with the TX trenches. Crib 216-T-27 is not included in Appendix D, Table D–30, because, for analysis purposes in this EIS, this crib is not considered to be in the proximity of the T/TX/TY tank farms' waste management areas. Crib 216-T-27 is included in the cumulative impacts analysis sections of this EIS and is listed in Appendix S, Table S–18. Trench 216-T-19 is included in Table D–30 and is listed with the T trenches, although it is actually closer to the south end of the TX tank farm than it is to the T tank farm. (Note: The groupings provided in Appendix D are for information only and do not impact the analysis.) It was estimated that trench 216-T-19 received 455 million liters (119 million gallons) of liquids, including 5,120 curies of tritium, but no iodine-129. Maps providing the location of the cribs and trenches (ditches) are included in Appendix S, Section S.3.6.

231-99 The cited mass of depleted uranium, 37,694 kilograms (83,100 pounds), includes the shielding for the FFTF reactor head compartment, center island, branch arm piping, and fuel transfer ports. The removal and disposition of this shielding is not within the scope of this *TC & WM EIS*. As stated in Appendix D, Section D.1.6, this depleted uranium would remain in the facility under FFTF Decommissioning Alternatives 1 and 2 and would be removed under FFTF Decommissioning Alternative 3.

231-100 The comment refers to Appendix E, Section E.2.3.3. Under FFTF Decommissioning Alternative 3, the FFTF RCB and support facilities would be demolished to 0.91 meters (3 feet) below grade, and the lower portion of the RCB concrete shell would be backfilled and/or grouted, as described in Chapter 2, Section 2.5.3.3. The site would not be covered with a barrier, but would be contour graded and revegetated. Although postclosure care of a landfill barrier would not be required as under FFTF Decommissioning Alternative 2, some level of institutional controls would still be necessary. Under FFTF Decommissioning Alternative 3, institutional controls would include intruder control and inspection

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

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Comment ID No.	Section	Subsection	Page	Figure, Map or Table Number	Comment
99	Appendix M				The uncertainties in the distribution coefficients and their effects on uncertainties in release rates are at least as significant as the effects of the variables that were included in the sensitivity analysis. Revise the sensitivity analyses for the release models to consider the effects of uncertainties in distribution coefficients. Revise the range of values used in these sensitivity analyses to be consistent with published ranges.
100	Appendix M				The uncertainties that are identified through the release model sensitivity analyses are not carried forward into subsequent modeling or analyses. This ultimately translates into uncertainty in the vadose zone transport model and into uncertainties in the groundwater flow models. These uncertainties ultimately translate into uncertainties in risks and impacts. Revise to carry forward the uncertainties identified in the sensitivity analyses into subsequent modeling and analyses.
101	Appendix M				Five models for simulating releases from solid sources are described in Appendix M. The scenarios for which the models are used are described for four of the release models. Applications for the fifth release model (constituent solubility limited release) are not described. Describe the applications of the constituent solubility limited release model, remove the fifth model from the appendix if it is not used to describe releases.
102	Appendix M	M.2.2.5	M-12	Equation M-28	The equation presented to describe releases for the constituent solubility limited release model (Equation M-28, page M-12) appears to be in error. The listed equation gives the release rate per unit area (grams/year/square meter). Review the equation and determine if an area term on the right side of the equation is necessary to give the release rate in grams per year.
103	Appendix M	M.3	M 13 - M14	Table M-2	Please model more variable scenarios, update infiltration rates to reflect current conditions (rather than falling back on 3.5 millimeters per year, which is apparently a value arrived at for undisturbed Hanford desert). Account for global warming or climate change as needed to provide a more appropriate long-term model. Discuss uncertainty associated with model results.
104	Appendix M	M.5.2.4	M-90	Figure M-109	The label for the vertical axis in Figure M-109 (page M-90) is incorrect. The graph shows the cumulative release of Tc-99 in curies. Correct the label for the vertical axis in Figure M-109 (page M-90).
105	Appendix N				A large number of bar charts showing the mass of chemical and radiological constituents that reach the water table are included in Appendix N. Because of the logarithmic scales used on these charts, they do not provide an accurate accounting of mass. Provide mass balances in tabular form to compare the releases to the vadose zone (from Appendix M) with the releases to the aquifer (from Appendix N); discuss any discrepancies.

231-151 *231-152* *231-153* *231-154* *231-155* *231-156* *231-157*

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and maintenance of revegetation efforts. A crew would inspect the site to ensure intrusion control is effective. Site fencing and facility access points would be inspected for integrity and repairs would be performed as needed. Other controls may involve some measure of vadose zone and groundwater monitoring. Future land use plans are not known at this time, but would be evaluated upon completion of the 100-year period of institutional control.

231-101 Appendix E, Table E–15, of this *TC & WM EIS* provides the requested detailed information on how each FFTF building and its internal equipment and components would be arranged under FFTF Decommissioning Alternatives 2 and 3.

231-102 Details of material and equipment expected to be uncontaminated at the time of FFTF decommissioning are not yet available. For analysis purposes, this EIS assumed that the entire inventory (e.g., concrete, structural steel, rubble, soil, equipment) is radioactively contaminated and would be disposed of on site in an IDF. If the decision is made to decommission FFTF, DOE will conduct detailed surveys of this material to ensure that it is addressed appropriately and in compliance with Federal and state requirements.

231-103 Tables G–141 through G–144 in Appendix G of this *TC & WM EIS* provide the maximum criteria and toxic pollutant concentrations of peak Hanford activity periods for the conversion of bulk sodium at Hanford's proposed Sodium Reaction Facility.

231-104 Following is the operating information requested for the SPF at INL (Burandt 2010).

General.

The SPF, currently located at the Materials and Fuels Complex at INL, was originally constructed in the mid-1980s to convert sodium coolant from the commercial Enrico Fermi Nuclear Generating Station (Fermi) into 50 weight-percent sodium hydroxide to be used at a DOE facility in Hanford. This use was abandoned after the SPF was constructed, but before it began operations. Once the EBR-II, a sodium-cooled reactor built and operated by Argonne National Laboratory for 30 years, was shut down, defueled, and prepared for deactivation, the SPF was resurrected as a means of preparing the approximately 303,000 liters (80,000 gallons) of Fermi sodium and 379,000 liters (100,000 gallons) of EBR-II sodium for disposal in an authorized landfill. This would be accomplished by converting the sodium into a solid, greater than 70 weight-percent sodium

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106	Appendix N				The sensitivity analyses considers I-129 distribution coefficients in the range of 0 to 0.2 milliliters per gram. Sensitivities to distribution coefficients for other chemical and radiological constituents are not included. Revise the sensitivity analysis to consider the effects of uncertainties in distribution coefficients for additional radiological and chemical constituents use a range of values in these sensitivity analyses that is consistent with published ranges.	231-158
107	Appendix N				The uncertainties that are identified through the release model sensitivity analyses are not included in the vadose zone models. The uncertainties in the vadose zone transport model are carried forward into the groundwater flow models. These uncertainties ultimately translate to evaluation of risks and impacts. Revise to carry forward the uncertainties identified in the sensitivity analyses into subsequent modeling and analyses.	231-159
108	Appendix N				The vadose zone transport simulations are conducted for a subset of the radiological and chemical constituents released from the sources. The number of radiological and chemical constituents included in the vadose zone transport models is smaller than the number used in the source release models. Provide the rationale and selection criteria applied when deciding which constituents to include and which to exclude from the release models.	231-160
109	Appendix N	N.1.1.2	N-2		The parameters presented do not appear to be consistent with 3D analysis that is presumably performed by STOMP. It is additionally unclear if release and receiving areas between models are consistent. Provide additional detail regarding the parameters used and the selection of boundary conditions.	231-161
110	Appendix N	N.1.2	N 2 - 8		Revise models to utilize actual measured precipitation and infiltration rates, rather than averaging unusual large-scale events or large areas of geologic strata.	231-162
111	Appendix N	N.1.2	N-10	Figure N-8	Clarify the apparent relationship shown in the figure between BY Cribs contamination and Tc-99 contamination at the Tank Farms in 200-West. It does not seem plausible that the BY Cribs is responsible for Tc-99 contamination at the Tank Farms in 200-West.	231-163
112	Appendix N	N.1.2	N-3		"In an initial step, values of vadose zone parameters were determined for the 16 soil types by matching moisture content profiles predicted using the Van Genuchten relationship to moisture content profiles measured in 140 undisturbed vadose zone boreholes." Explain the uncertainty involved in the Van Genuchten determination of vadose material hydraulic properties (i.e., hydraulic conductivity) and how this uncertainty is carried through to the modeled result.	231-164
113	Appendix N	N.1.2	N-9	Figure N-7	Clarify the meaning of the isolated lobe on the contour map, located to the northeast and whether it is related to the BY Crib plume or contamination from Gable Mountain Pond or some other source.	231-165

hydroxide product (caustic), which had been determined to be an acceptable waste form for disposal at the Radioactive Waste Management Complex, located at the then–Idaho National Engineering and Environmental Laboratory.

A permit was granted to operate the facility and process under Federal and state RCRA regulations, and a Permit to Construct was issued by EPA for the airborne emissions. Initial testing of the process, conducted with nonradioactive sodium, was successfully completed in November 1998. Production operations with Fermi sodium began on December 20, 1998. Processing of Fermi sodium was interrupted in July 1999 to process the EBR-II secondary (nonradioactive) sodium. At this time, approximately half of the Fermi sodium had been processed. Processing of EBR-II secondary sodium was completed on August 24, 1999, and the SPF was shut down to perform maintenance and modifications necessary to increase product concentration reliability. The facility was restarted in May 2000. The approximately 326,000 liters (86,000 gallons) of EBR-II primary (low-radioactivity) sodium was processed between September 2000 and February 2001. The last 60,566 liters (16,000 gallons) of Fermi sodium was subsequently processed before placing the facility in a standby condition in May 2001. At that point, approximately 662,000 liters (175,000 gallons) of sodium had been processed in the SPF. The resultant product, a hard, rock-like material, was contained in 3,342 poly-lined, steel drums (each loaded with approximately 500 kilograms [1,000 pounds] of caustic) and was sent to the Radioactive Waste Management Complex for subsequent burial.

General Process Description.

The SPF was equipped to receive sodium in the following ways: (1) in 208-liter (55-gallon) barrels where they can be melted and then drained to a 19,000-liter (5,000-gallon) sodium storage tank in the SPF (this is how the Fermi sodium was received and initially stored) or (2) via a heated transfer pipeline from a 64,000-liter (17,000-gallon) secondary sodium drain tank located in the EBR-II Secondary Sodium Boiler Building basement. This second method was used to transfer EBR-II primary and secondary sodium.

In the SPF, sodium was transferred from the sodium storage tank to one of two day tanks, each having a working volume of 2,570 liters (680 gallons), by pressurizing the sodium storage tank with nitrogen gas. During normal operations, one day tank was filled from the sodium storage tank while the other was used to supply sodium to the reaction vessel, which was also done by pressurizing nitrogen gas. In the reaction vessel, the sodium reacted with the water in the caustic solution

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114	Appendix N	N.2.1.2	N-51	Figure N-80	The label for the vertical axis in Figure N-80 (page N-51) is incorrect. The graph shows release of chemical constituents in kilograms. Correct the label for the vertical axis in Figure N-80 (page N-51).	*231-166*
115	Appendix N	N.3.2	N-91		"The case evaluated in this section, discharge of a volume of liquid to the vadose zone, is comparable to a past leak at a tank farm, with aqueous discharge ranging from 4 cubic meters (1,057 gallons) to 400 cubic meters (105,700 gallons). This range corresponds to current estimates of volumes of past leaks (Hanlon 2003) and reflects the degree of uncertainty in estimates of leak volumes that is related to difficulty in measurement of volume of material in large underground tanks." The Hanlon (2003) document does not adequately describe how the tank leakage estimates were determined. Provide additional information on how the leaked volumes and total activities were estimated. Include in this information the uncertainty associated with the estimate.	*231-167*
116	Appendix O	O.2.3	O-6		"The dispersivity increases linearly with distance from the source location up to a specified threshold." Explain how the threshold was determined or selected.	*231-168*
117	Appendix O	O.3.1	O-33	Table O-6 & O-9	Review and reconcile the results of the fate and transport modeling, since they do not seem to make sense. For example, COPC concentrations related to releases from cribs and trenches are shown for Alternative 1 (Table O-6) and Alternative 2A (Table O-9). The model output results are different for events that happen in the past. This suggest the model is not stable enough to reliably replicate past events. It is implausible that analysis for future closure scenarios will therefore be appropriately representative.	*231-169*
118	Appendix O	O.6.1.2	O-18		"These results suggest that regional-scale contaminant plumes (i.e., areas of groundwater contaminated above benchmark values) from the EIS cumulative analysis sources in the 200-East Area are somewhat different for the Base and Alternate Case flow fields." Explain the reason for the discrepancy between the Base and Alternate cases, include information on the plume's sensitivity to parameters which were changed.	*231-170*
119	Appendix O	O.6.3	O-19		"These values resulted in retardation factors (R) of approximately 1 and 3 for the bulk density (2.6 grams per cubic centimeter) and porosity (0.25) assumed for the unconfined aquifer." Provide the uncertainty associated with the assumed bulk density and porosity when used in calculating the retardation factors. Provide a comparison with measured values for these parameters and describe the uncertainty introduced by using assumed values.	*231-171*
120	Appendix O	O.6.4	O-104		"It is uncertain whether peak concentrations of U-238 were captured during this standard analysis period of 10,000 years." Provide an explanation as to why it cannot be determined whether peak concentrations have passed. Include discussion of why the U-238 concentration does not appear to diminish significantly over time at the core zone boundary.	*231-172*

used to initially charge the vessel. This reaction releases heat, which increased the temperature of the bulk caustic solution in the reaction vessel until it reached the control set point. As part of a saturated boiling system, the end caustic product concentration (weight-percent) is determined by this temperature set point. Water is injected into the reaction vessel intermittently to maintain the control set point within +/– 0.5 degrees Fahrenheit.

For the EBR-II and Fermi sodium, a solution of greater than 70 weight-percent sodium hydroxide was transferred from the reaction vessel to the drum fill station, where the solution was packaged in 269-liter (71-gallon) drums (approximately 500 kilograms [1,000 pounds]). Once the drums were filled, sampled, capped, and surveyed, they were placed on spill pallets in RCRA-regulated storage. While in storage, the greater than 70 weight-percent hydroxide solution cooled and became a very hard solid. Once the hydroxide became solid, the drums were disposed of as RCRA LLW.

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121	Appendix O	O.6.4	O-105		Indicate whether the modified STOMP analysis results listed on this page are from Base or Alternate case scenarios.	231-173
122	Appendix Q				The dose guidelines for the evaluation of groundwater, surface water, and intruder scenarios should be summarized in a single location for ease of interpretation of results.	231-174
123	Appendix Q				To allow for comparison, revise the graphs in this chapter to be consistent or comparable in type (logarithmic versus linear) and range for each alternative.	231-175
124	Appendix Q	Q.2	Q-2	Table Q-1	Americium is listed as one of the radionuclides selected for detailed analysis in Table Q-1. Pu-241 is not listed as one of the plutonium isotopes in the table. Contributions from the decay of Pu-241 will increase the Am-241 concentration over time. Clarify whether the increase in Am-241 from the decay of Pu-241 is considered in the analysis.	231-176
125	Appendix Q	Q.2.2.2	Q-15		Include all exposure pathways that are applicable to each individual. Do not assume exposure pathways are mutually exclusive (e.g., the American Indian hunter-gatherer and the resident farmer are each potentially exposed to radiological and chemical contamination via both groundwater and surface water, etc.).	231-177
126	Appendix Q	Q.2.3	Q-18		Include both radiologic and chemical exposure (short- and long-term).	231-178
127	Appendix Q	Q.2.3.2.3	Q-18 & Q-22		It is stated that the drinking water pathway is not assessed because it involves transport through the vadose zone to groundwater, which would occur in the future after short-lived radionuclides have decayed. This fails to address extensive contamination with long-lived radionuclides that continue to decay for thousands to millions of years. Revise to address short-term exposures to high concentrations via the drinking water pathway in the intruder scenario, where well water is used immediately after the well is drilled and provide a short-term impact analysis.	231-179
128	Appendix Q	Q.2.4.2	Q-26	Table Q-9	Include the parameter inputs provided in the Yakama Nation Exposure Scenario to adequately reflect time spent outdoors on site by a traditional tribal member. (Ridolfi 2007)	231-180
129	Appendix Q	Q.2.4.2	Q-28		Revise the section to include the fish consumption rate, that is representative of a tribal diet, as shown in the Yakama Nation Exposure Scenario. (Ridolfi 2007)	231-181

Key Processing and Performance Data Achieved at the Sodium Processing Facility

Timeframe[a]	Number of Hours of Processing	Plant Factor Percent[b]	Total Sodium Processed[c]	Caustic Drums Filled[d]	Note
Dec. 20, 1998–Mar. 24, 1999	249	11	5,793	180	Part of initial startup and checkout period.
Mar. 25, 1999–Aug. 24, 1999	861	23	36,731	762	Processed 40 percent of Fermi and all secondary sodium. Facility shut down to improve product quality.
June 15, 2000–Aug. 31, 2000	747	40	33,356	552	Resumed processing Fermi sodium.
Sept. 2000	465	65	16,855	313	Began EBR-II primary sodium processing.
Oct. 2000	578	78	20,630	383	EBR-II primary sodium processing.
Nov. 2000	374	52	13,945	264	EBR-II primary sodium processing.
Dec. 2000	462	62	16,625	318	EBR-II primary sodium processing.
Jan. 2001	462	62	13,827	258	EBR-II primary sodium processing.
Feb. 2001	335	50	12,350	238	EBR-II primary sodium processing completed; resumed processing Fermi sodium.
Mar. 2001	108	N/A	3,960	74	Completed sodium processing on Mar. 5, 2001.
Totals	4,641		174,072	3,342	

[a] Period of time considered.
[b] Defined here as the number of hours processing/total hours available during this timeframe.
[c] Number of gallons of sodium processed during the timeframe, as per the sodium injection flowmeter.
[d] Number of 269-liter (71-gallon) drums filled during the timeframe with >70 weight-percent caustic.
Note: To convert gallons to liters, multiply by 3.7854.
Key: EBR-II=Experimental Breeder Reactor II; Fermi=Enrico Fermi Nuclear Generating Station; N/A=not available.
Source: Burandt 2010.

231-105 The text in Appendix D, Section D.2.4.4, reads, "…waste would be handled in the same manner under both FFTF Decommissioning action alternatives; only the disposition of the volume of waste would change." The impact analysis and conclusions in the draft EIS took the differences in the volume of waste under the two FFTF Decommissioning action alternatives into account. The intent of the

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130	Appendix Q	Q.3	Q-32	Tables Q-16 & Q-17	Table Q-16, *Summary of Radiological Dose at Year of Peak Dose for Drinking-Water Well User (millirem per year)* , provides the dose for the year of peak dose and the calendar year of the peak dose. Table Q-17, *Summary of Radiological Risk at Year of Peak Radiological Risk for Drinking-Water Well User (unitless)* , provides the radiological risk for the year of peak radiological risk and the calendar year of the peak radiological risk. The year of peak radiological risk should not precede the year of the peak dose or peak concentration. For example, for U Barrier, Scenario 2A, the year of peak dose is calendar year 11,763 while the year of peak radiological risk is calendar year 2096. This discrepancy should be addressed in the text of the EIS.	*231-182*
131	Appendix Q	Q.3	Q-32	Table Q-16	All tank closure alternatives for B Barrier, T Barrier, and the Core Zone Boundary for the Drinking-Water Well User exceed the 10 millirem per year criteria. There is no acceptable Alternative proposed. A revised EIS should provide at least one Alternative which meets the stated criteria.	*231-183*
132	Appendix Q	Q.3.1.1	Q-33	Table Q-17	Every Alternative proposed shows a radiological risk above the maximum acceptable increased lifetime cancer risk level (3×10^{-4} per EPA) in at least one location (core zone boundary, river near shore, and at barriers); the core zone boundary, in particular, shows unacceptable cancer risks from every alternative and should be reconsidered. Provide an Alternative that is adequately protective of human health and against cancer risk in the long term and meets legal requirements.	*231-184*
133	Appendix Q	Q.3.1.1.8	Q-236	Table Q-209	Table Q-209, Doses to an American Indian Engaged in Residential Agriculture Following Well Drilling at the Tank Farms, indicates multiple situations in which the USDOE Intruder dose guideline of 500 millirem is exceeded. The text mentions that some of these situations exceed the guideline, but it does not discuss how this issue might influence decision-making. This discussion should be included in a revised EIS.	*231-185*
134	Appendix U				Revise the estimates for dose and risk for the "American Indian Resident Farmer" to include all the pathways relevant to the Yakama lifestyle.	*231-186*
135	Appendix U	U.1.3	U-5	Figure U-1	Appendix U does not explain the incidental increases in tritium concentration after calendar year 2240. The concentration of tritium is expected to decrease over time as a result of radioactive decay. Provide an explanation for this discrepancy.	*231-187*
136	Appendix U	U.1.3	U-6	Figure U-3	Appendix U should explain the increases in Sr-90 after calendar year 2690. The concentration of Sr-90 is expected to decrease over time as a result of radioactive decay.	*231-188*
137	Summary				Clarify how risks under the Alternatives presented can address cumulative impact analyses accurately without an overall Hanford Site Baseline Risk Assessment.	*231-189*

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statement is to say that the volume of waste would be different between the two alternatives, but the waste streams would be managed in the same manner. No further clarification is considered necessary.

231-106 Under the Hanford Option, disposal of the decontaminated RH-SCs was assumed to occur at Hanford. Disposal at NNSS was considered but, because the RH-SCs' remaining radioactivity is estimated to be very low, shipping them off site to NNSS was deemed unnecessary, as well as cost prohibitive.

231-107 Appendix E, Section E.2.4.4.2.8, describes the induction melter. As discussed in this section, the induction melter is used to consolidate irradiated and contaminated metal components, including zircaloy and stainless steel, and would improve volumetric packaging in waste containers without creating particulate contamination created by other mechanical-size-reduction techniques. There is operating experience at INL with such induction melters and waste streams, and the Hanford induction melter design would follow that of INL's Hot Fuel Examination Facility Metal Waste Melter. In addition, as noted in Section E.2.4.4.2.7, a waste-sorting station would be used to segregate the waste before it entered the melter into items into that can be charged to the melter and those that cannot, based on characterization data.

231-108 Appendix E, Figure E–52, provides a sketch of a typical induction melter. DOE does not consider detailed dimensions of equipment necessary to support the NEPA analysis in this EIS. Specific details of equipment and facility design would be prepared apart from this EIS if FFTF Decommissioning Alternative 3, Removal, were chosen.

231-109 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 continually conducted to preserve the integrity of the disposal system and prevent or control 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. Section E.1.2.5.4.1 provides a detailed description of surface barriers; postclosure care is detailed in Section E.1.2.5.4.2. As discussed in these sections, it is recognized that, although these monitoring activities would not be performed

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Comment ID No.	Section	Subsection	Page	Figure, Map or Table Number	Comment
138	Summary				Please identify the six sets of cribs and trenches (ditches) that are contiguous to the SST. Indicate whether any of these would be permitted treatment, storage, and disposal units or RCRA past practice units.
139	Summary				WAC 173-303-610 dangerous waste regulations require clean closure first be attempted before a decision is made to close as a landfill. Washington State regulations also require corrective action be performed for leaks and spills. Revise the EIS to provide at least one Alternative that meets this requirement.
140	Summary				Clarify the impacts to effluent treatment facility as a result of WTP operation in terms of additional waste and ability to treat the waste delivered appropriately.
141	Summary	S.1.2.1	S-5		It is stated on S-5 that the disposal pathway for both failed and spent melters will require further evaluation than presented in this document. If a separate EIS is expected to be required this should be stated. Provide additional detail regarding how the failed and spend melters will be addressed.
142	Summary	S.2.1.3	S-23		Please provide an easily understood comparison of the WTP configuration changes between Alternatives as well as the design elements common to all Alternatives.
143	Summary	S.2.1.5	S-27	Table S-1	Clarify whether or not an additional facility would be constructed and if it was included in the cumulative impacts assessment.
144	Summary	S.2.3.3	S-31	Table S-4	Please provide rationale for choosing only 100 years of post closure care.
145	Summary	S.3.1.3	S-36		Regarding tank waste transfers, recirculation of sluicing liquids back to the tanks could create characterization problems for WTP waste streams. This issue should be addressed in detail.
146	Summary	S.4.1.2	S-50		Regarding the statement, "Although the following technologies were ultimately not considered reasonable for detailed analysis in this EIS, that does not preclude their future consideration as potentially viable approaches for retrieving waste from the SSTs," please clarify under what circumstances these technologies would be considered, and whether another EIS would be performed to address their impacts.
147	Summary	S.5.1	S-53		Please clarify whether combined impact analyses were performed for noise or facility accidents to meet NEPA requirements.
148	Summary	S.5.4.1	S-93		USDOE's preferred Alternative for tank closure includes landfill closure which does not address past leaks. USDOE acknowledges that past leaks are major contributors to long-term groundwater impacts. These impacts should be addressed.

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231-190 *231-191* *231-192* *231-193* *231-194* *231-195* *231-196* *231-197* *231-198* *231-199* *231-200*

for many years, it is important that general information regarding 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 administrative control details (e.g., access restrictions) will be developed in the future. Identification of funding for this program is not within the scope of this *TC & WM EIS*.

231-110 The text has been revised in this final EIS as suggested by the commentor by specifying that the uranium isotope at the start of the example decay chain is uranium-238.

231-111 A reference to the basis for doubling the risk for higher doses has been added at the end of the sentence in this final EIS. The reference is the National Council on Radiation Protection and Measurements Report Number 115, *Risk Estimates for Radiation Protection*.

231-112 As DOE and its contractors implement any of the alternatives, they will comply with applicable OSHA permissible exposure limits. Reference to the American Conference of Governmental Industrial Hygienists threshold limit values is included in Appendix K because they cover a broader range of chemicals than the OSHA limits and can provide more-protective levels. Therefore, in practice, employers comply with OSHA permissible exposure limits, but may impose more-protective criteria from other sources, such as the American Conference of Governmental Industrial Hygienists threshold limit values.

231-113 Appendix K, Section K.1.2.6, describes the approach for evaluating the potential impacts of accidental chemical releases. At distances of more than a few meters from the point of release or spill, the air (inhalation) pathway has much greater potential to cause human health impacts than any other pathway. This is because the sites of hypothesized accidents are remote from the public, bodies of water, and agricultural lands. The section was revised to more clearly explain why the air pathway is the most appropriate for evaluating impacts of accidents involving chemicals. The consequences of dermal contact or ingestion may be severe, even fatal, for persons very near the release point. However, the degree of exposure and the resulting health impacts would depend on circumstances that cannot be predicted with any confidence (e.g., the number of workers, their proximity to the spill or leak, the effectiveness of protective equipment). Because any modeling of such workplace exposures would be based almost entirely on assumptions, the results would not be particularly useful for distinguishing between alternatives.

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

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Comment ID No.	Section	Subsection	Page	Figure, Map or Table Number	Comment
149	Summary	S.5.4.3	S-100	Table S-8, S-9	EIS Tables S-8 and S-9 demonstrate that the Alternatives presented are not expected to meet drinking water standards if waste from other USDOE sites is disposed at Hanford. In both Alternatives 2 and 3 shown in Table S-8, the calculations assume that imported waste would be disposed in an IDF. Table S-9 indicates that almost the entire impact on groundwater in the IDF would come from imported waste. This is reiterated when Alternative 2 is compared with Alternative 3 in Table S-9, which assumes no imported waste is disposed in an IDF. In the no imported waste case, the drinking water standard is met for Tc-99 and exceeded for I-129. In the case of imported waste, the drinking water standard for Tc-99 is exceeded by more than 20 times for and more than 170 times for I-129. Please address this issue in greater detail and revise the EIS to include at least one alternative which is expected to meet drinking water standards. Disposal of imported waste in an IDF should be excluded from all Alternatives.

231-201

Burke, T.M. 2007. *Hanford Site Sodium Disposition Evaluation Report* (HNF-33211). Prepared for the U.S. Department of Energy Assistant Secretary for Environmental Management by Flour Hanford Inc, May.

National Research Council (NRC). Board of Radioactive Waste Management, Commission on Geosciences, Environment, and Resources, 2000. *Long-Term Institutional Management of U.S. Department of Energy Legacy Waste Sites.* Washington, DC: National Academy Press, pages 3-5.

RIDOLFI Inc. (Ridolfi), 2007. *Yakama Nation Exposure Scenario for Hanford Site Risk Assessment, Richland, Washington* . Prepared for the Yakama Nation ERWM Program. September.

U.S. Department of Energy (USDOE). 2006. *Environmental Assessment, Sodium Residuals Reaction/Removal and Other Deactivation Work Activities, Fast Flux Test Facility Project, Hanford Site, Richland, Washington* . March.

Hanlon, B.M. 2003. *Waste Tank Summary Report for Month Ending December 31, 2002* (HNF-EP-0182). Rev. 177, CH2M HILL Hanford Group, Inc., Richland, Washington. February.

Health impacts resulting from accidents in occupational settings are assessed in the industrial safety sections of Chapter 4. In addition to the direct, short-term human health impacts resulting from releases, Appendix K, Section K.3.9, also assesses the secondary impacts, including impacts on vegetation, soil, and water.

231-114 See response to comment 231-40 regarding consideration of American Indian exposure scenarios. This EIS considers a number of different public and occupational receptors. As explained in Appendix K, Section K.2.1.1.1.1, the onsite MEI is a member of the public (as opposed to a DOE or DOE contractor worker). A worker at US Ecology was added to the analysis of doses to onsite members of the public because such a worker is not employed by DOE or a DOE contractor. Workers at the ERDF or other DOE operations areas are not considered members of the public. However, Appendix K evaluates potential doses to noninvolved workers. The noninvolved worker is assumed to be at a facility near the operating facilities evaluated in this EIS. Because of the direction and proximity of the ERDF from the 200-West Area Supplemental Treatment Technology Site, the ERDF is one of the locations at which doses to a noninvolved worker were evaluated. The potential doses to a noninvolved worker at the ERDF are presented in Appendix K, Section K.2.1.2.2.

231-115 The discussion explaining how the location of the MEI was determined is included in Appendix K, Section K.2.1.1.1.1, following the figure referred to by the commentor.

231-116 DOE appreciates the suggestion that the location of the onsite MEI be shown on the figure in Appendix K. The locations specifically evaluated for an onsite MEI, as discussed in the appendix, have been added to the figure.

231-117 Please see response to comment 231-40 regarding consideration of American Indian exposure scenarios.

231-118 The two heights mentioned in Appendix K, Section K.2.1.1.3, 30 feet and 200 feet, are set elevations at which meteorological data are collected at the Hanford Meteorological Station. As discussed in Section K.2.1.1.3.1, the stack height at the WTP is known since the plant is designed and under construction. Consequently, meteorological data collected at that same height were used in the modeling. Other possible sources of radiation emissions in the 200-East and 200-West Areas are tank farm operations, waste retrieval, and supplemental treatment technologies. Tank farm emissions are generally near ground level. Designs of the supplemental treatment technology facilities are not currently known, but it was assumed that their emissions too would be at or near ground

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Attachment 3

Detailed Comments on *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington* (*TC & WM EIS*) (DOE/EIS-0391), EIS October 2009

Arjun Makhijani, Ph.D.

prepared by the Institute for Energy and Environmental Research

March 18, 2010

The following comments on the *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*[1] were prepared by the Institute for Energy and Environmental Research to feed into overall comments being submitted by the Environmental Restoration and Waste Management program of the Yakama Nation.

A. Institutional Controls

The DOE appears to assume institutional control for 10,000 years – the entire period of assessment of impacts in the TC&WM EIS. Indeed, it states explicitly that consequences of its onsite impact calculations are "hypothetical" because it does not expect to lose control of it:

> Consistent with DOE guidance (DOE Guide 453.1-1), the potential consequences of loss of administrative or institutional control are considered by estimation of impacts on onsite receptors. Because DOE does not anticipate loss of control of the site, these onsite receptors are considered hypothetical and are applied to develop estimates for past and future periods of time. [2]

231-202

[1] United States Department of Energy. *Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington* (*TC & WM EIS*) (DOE/EIS-0391), October 2009. Hereafter TC&WM EIS 2009.
[2] TC&WM EIS 2009, Vol. 2, p. Q-31.

level. One of the inputs to the GENII [Hanford Environmental Radiation Dosimetry Software System, Generation II] program used to model potential impacts of normal operations is the height at which the meteorological data are collected. The GENII program accounts for the difference between the height of the emissions and the height at which the data were collected.

231-119 The portion or quantity of different food groups was not calculated per se, but was based on accepted and recognized sources; these sources are included in the right-hand column of Table K–6 in Appendix K. The MEI is assumed to be exposed at a higher rate than members of the general public, and to have consumed more food grown in a family garden. Appendix J includes an analysis of the potential dose to a subsistence consumer during the operational period of the proposed actions. As shown in Table J–25, this EIS includes a scenario wherein an individual subsists on a diet from local sources. Although not focused specifically on an American Indian living a traditional tribal lifestyle, this scenario does reflect someone who derives essentially all of his/her food, including fish, from potentially contaminated sources.

231-120 Please see response to comment 231-40 regarding consideration of American Indian exposure scenarios. The assumption referred to by the commentor reflects time spent outdoors versus time spent indoors. The MEI is assumed to be exposed to the plume of contaminated air all of the time, but to be exposed to radionuclides deposited on the ground only half of the time. It is not assumed that the individual spends half of his/her time elsewhere, as stated in the comment.

231-121 As shown in Table J–25 of Appendix J, this EIS includes a scenario wherein an individual subsists on a diet from local sources. Although not focused specifically on an American Indian living a traditional tribal lifestyle, the scenario does reflect someone who derives essentially all his/her food from potentially contaminated sources. This individual is assumed to consume local game at a much higher rate than the typical MEI, and to consume local fish, drink additional milk from locally raised cows, and consume surface water that may have been contaminated. Appendix Q, Section Q.3, also evaluates the long-term doses to an American Indian resident farmer and to a person living a traditional tribal lifestyle, an American Indian hunter-gatherer.

231-122 The commentor is referred to Appendix D for a discussion of the BBI, and to the *Inventory and Source Term Data Package* (DOE 2003b), cited in Appendix D, Section D.1.1.2, for full details on the BBI. Following mention of the BBI in Appendix K, a reference to Appendix D was added. Appendix K, Section K.2.1.1.3.4, Source Terms, discusses the method used to select

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

There are a number of problems with the DOE assumption that the onsite exposure cases are just hypothetical because it will retain institutional control for 10,000 years. No government, not to speak of a government department has lasted anything close to that time. The DOE assumption does not even take into account the history of the site for the last 1,000 years let alone a period ten times that. Various Indian tribes have used the site freely, including for subsistence hunting, fishing, and gathering for both food and medicines; wars have taken place at or near the site; and subsequent to those wars, a complex and evolving pattern of use prevailed until the site was taken over for plutonium production during World War II.

Compliance with treaty requirements, historical facts, as well as technical reality demand that the baseline assumption in evaluating and comparing alternatives and compliance with laws and regulations should be that institutional controls will not last a few decades beyond the time that the site is declared cleaned up. The National Research Council, in reviewing DOE cleanup plans, has explicitly advised the DOE on this point in the past. Specifically, in a report on long-term management it stated:

> The Committee on Remediation of Buried and Tank Wastes finds that much regarding DOE's intended reliance on long-term stewardship is at this point problematic….
>
> […]
>
> Other things being equal, **contaminant reduction is preferred to contaminant isolation and imposition of stewardship measures whose risk of failure is high.**
>
> […]
>
> *The committee believes that the working assumption of DOE planners must be that many contamination isolation barriers and stewardship measures at sites where wastes are left in place will eventually fail, and that much of our current knowledge of the long-term behavior of wastes in environmental media may eventually be proven wrong. Planning and implementation at these sites must proceed in ways that are cognizant of this potential fallibility and uncertainty.*[3]

Given that so many of the major geologic features of the area are on the order of 10,000 years old, the baseline assumption for contamination isolation measures, such as caps and barriers, should also be that their risk of failure is high. And, as noted above, the assumption of long-term institutional control is not compatible with either local or global historical reality. In view of that, the DOE should discard the assumption of institutional controls significantly beyond the cleanup period for its analysis of the alternatives, and for its choice of the preferred alternatives.

A reasonable plan would be to assume institutional control for the duration of cleanup required by the alternative under consideration, with a free release after that. Such an approach would be consonant with the advice of the National Research Council and with historical and technical

[3] National Research Council, Board on Radioactive Waste Management, Commission on Geosciences, Environment, and Resources, *Long-Term Institutional Management of U.S. Department of Energy Legacy Waste Sites,* Washington, DC: National Academy Press, 2000, on the Web at http://www.nap.edu/catalog.php?record_id=9949, pp. 3-5. Original italics; bold added.

231-202 cont'd

radionuclides from the BBI for detailed consideration in the short-term impacts analysis.

Exposure during the operational phase of the project would be from radioactive air emissions, the dominant exposure mode being inhalation of radionuclides. The airborne inventory was estimated assuming that 1-millionth of the BBI becomes airborne and that the air treatment systems are effective in removing 99.95 percent of the particulates from the air; gaseous radionuclides were assumed to be unaffected by the air treatment systems. The potential dose from inhalation of the radionuclide mixture was calculated by multiplying the amount of each radionuclide released to the air by the radionuclide-specific dose conversion factor for inhalation. The radionuclides that accounted for the largest doses were included in the detailed analysis; together they account for more than 99 percent of the potential dose from inhalation of the mixture.

For the long-term impacts analysis discussed in Appendix Q, Section Q.2, screening was also performed to identify the radionuclides to include for detailed analysis. The exposure scenarios considered were for radionuclides released to groundwater and for those attributable to direct human intrusion. Screening for radionuclides released to groundwater was based on a drinking water pathway and used ingestion dose conversion factors. For the intrusion scenario, inadvertent soil ingestion and inhalation pathways were used for screening. Neptunium-237 and thorium-232 were identified as important dose contributors for the pathways considered in the long-term impacts analysis, but not for those considered in the short-term impacts analysis.

231-123 The commentor is referred to Appendix D, Section D.1.1, for a detailed discussion of the BBI. Please see response to comment 231-122 regarding the screening of radionuclides for inclusion in the analysis of short-term impacts.

231-124 As indicated by the commentor, radioactive decay would decrease the quantities of most radionuclides over time. In the case of plutonium-241, decay could increase the amount of americium-241. The decrease over time would not be significant because the air pathway dose evaluated for short-term impacts is dominated by long-lived radionuclides. Regarding the ingrowth of americium-241, it is noted that the waste in the tanks is already aged. The effects of ingrowth of americium-241 were evaluated considering the relative amounts of plutonium-241 and americium-241 in the tank waste inventory; it was determined that there would be less than a 3 percent change in impacts as a result of ingrowth over the duration of the alternatives.

realities. With the proviso of thorough cleanup (see below), it is also the only assumption that is consonant with the unrestricted exercise of treaty rights by the Yakama Nation.

We note here that in the past, the DOE had included such an alternative in the tank waste EIS Notice of Intent of 2003:

> *Closure*: Clean closure reflects minimal residual waste in tanks and ancillary equipment, and contaminated soils remediated in place and/or removed from the tank system to be treated and disposed of in accordance with RCRA requirements. As operations are completed, all SST system storage, treatment, and disposal facilities at the Hanford Site would be closed. ***Waste storage and disposal facilities would be closed in a manner that supported future use on an unrestricted basis and that did not require post-closure care***.[4]

Recommendations: The DOE should discard the assumption of institutional controls significantly beyond the cleanup period for its analysis of the alternatives, and for its choice of the preferred alternatives. A reasonable plan would be to assume institutional control for the duration of cleanup required by the alternative under consideration, with a free release after that. Such an approach would be consonant with the advice of the National Research Council, with historical and technical realities. With the proviso of thorough cleanup (see below), it is also the only assumption that is consonant with the unrestricted exercise of treaty rights by the Yakama Nation.

231-202 cont'd

B. Range of alternatives considered

The TC&WM EIS does not present overall alternatives whose environmental and health impacts could be compared in a straightforward way. Instead, the DOE has used a confusing approach in which a number of alternatives, with impacts that could differ widely, are grouped together as "preferred." The DOE has summarized its preferences as follows:

> Eleven alternatives for potential tank closure actions are evaluated in this draft EIS. These alternatives cover tank waste retrieval and treatment, as well as closure of the SSTs. DOE does not have specific preferred alternatives for retrieval or treatment of the tank waste, but has identified a range of preferred retrieval and treatment options. For retrieval, DOE prefers Tank Closure alternatives that would retrieve at least 99 percent of the tank waste. All Tank Closure alternatives would do this, with the exception of Alternative 1 (No Action) and Alternative 5. For treatment, DOE prefers Tank Closure Alternatives 2A, 2B, 3A, 3B, 3C, 4, and 5 because they would allow separation and segregation of the tank waste for management and disposition as LLW and HLW, according to the risks posed. In contrast, DOE does not prefer Tank Closure Alternatives 6A, 6B, or 6C because they would treat all tank waste as HLW. For closure of the SSTs, DOE prefers landfill closure, as provided under Tank Closure Alternatives 2B, 3A, 3B, 3C, 5, and 6C, for the reasons described in Section S.5.4.1. The Tank Closure alternatives that capture each of DOE's preferred retrieval, treatment, and closure options

231-203

[4] TC&WM EIS 2009, Vol. 2, p. A-18, which is part of the 2003 "Notice of Intent to Prepare and Environmental Impact Statement for Retrieval, Treatment, and Disposal of Tank Waste and Closure of Single-Shell Tanks at the Hanford Site, Richland, WA." The NOI starts on p. A-14. Emphasis added.

231-125 The calculation of potential doses to noninvolved workers has been revised to reflect a 2,080-hour worker year.

231-126 Please see response to comment 231-48.

231-127 For the analysis of radiological impacts, the impacted population is defined as the population within 50 miles of the release location. Therefore, a more dispersed plume would not impact a larger population, but it would change the distribution of dose in the population. Whereas the height of release may result in a difference in population dose, it would change the relative impacts among the alternatives being considered.

231-128 DOE revised Appendix K to delete the statement about FFTF Decommissioning Alternative 1 impacts only being accounted for as part of the baseline. Appendix K, Section K.2.2.1.4, was revised to include an estimate of the dose for FFTF Decommissioning Alternative 1 based on recent operational emissions data. The results of this analysis, showing very low doses to the public, were also incorporated into Chapter 4, Section 4.2.10.1.1, of this EIS.

231-129 DOE acknowledges that there are chemicals in the WTP process streams and process byproducts that may be toxic. However, because the process streams and byproducts would be extremely radioactive, the radiological effects of potential accidents involving them would outweigh the chemical effects. Analyses of the radiological effects of representative accidents can be found in Appendix K, Section K.3.7. Potential accidents involving the process chemicals were analyzed because these chemicals present an additional risk that would not be accounted for by evaluating accidents involving only the radioactive waste.

231-130 The criteria used to reduce the original list of 400 chemicals to the 24 listed in Appendix K in Table K–108 were as follows:

- Estimates of the likelihood or prevalence of a specific component in the waste based on interviews with past and present personnel at the generating facility
- The hazard posed by the substance to the health and safety of onsite or offsite individuals
- The likelihood that the hazardous material remains in a dangerous form

As indicated below the table, the information in Table K–108 is taken from the current safety analysis document for Hanford solid-waste operations, which cites the *Solid Waste Stream Hazardous and Dangerous Components Study* (WHC-SD-WM-RPT-056) as the original source. The use of the criteria to perform the screening evaluations is described in the study. The section has

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

are Alternatives 2B, 3A, 3B, and 3C. For storage, DOE prefers Alternatives 2A, 2B, 3A, 3B, 3C, 4, and 5. These alternatives assume shipment of IHLW [Immobilized High-Level Waste] canisters for disposal off site.[5]

231-203 cont'd

However, it is not technically appropriate, for instance, to lump Alternatives 2B and 3B together for treatment, even though they are similar in many respects. This is because Alternative 2B would vitrify all low-activity waste, which allows for the possibility of offsite disposal, while Alternative 3B has a stone-casting of some radioactive waste as part of its treatment process. Further, even the onsite disposal impacts of the stone casting and vitrified low-activity waste would be different, so that they are not equivalent from a health and environmental point of view. Indeed, Alternative 2B, which the DOE "prefers," is closest with respect to waste management and environmental impacts to Alternative 6B, which the DOE explicitly rejects. The DOE's rejection of Alternative 6B (as well as Alternatives 6A and 6C) in the passage quoted above is not based on process or environmental or health considerations. Rather, it appears to be based on a policy aversion to treating all tank waste as high-level waste, even though it is currently defined as such under the Nuclear Waste Policy Act of 1982.

231-204

Further, none of the alternatives come close to meeting drinking water standards for groundwater, even for single radionuclides, even when institutional control is assumed to be in effect inside the core zone. The overall problem, when all radionuclides are taken into account, as they are required to be under the EPA regulations, is even worse. For instance, groundwater concentrations of either technetium-99 or iodine-129 or both exceed the drinking water limits individually at the core zone boundary in all cases. When the restriction that the sum of the ratios of estimated concentrations to maximum contaminant levels (MCLs) is applied, the problem is even worse. These are very severe in many cases, as is evident from the estimates of future contamination in Appendix U.

231-205

Further, even though this is a tank closure EIS, the closure of the double shell tanks (DSTs) is not even considered. Only Single Shell Tank (SST) closure alternatives are presented. It is reasonable to assume, as the DOE has done, that the DSTs will be closed after the SSTs, since the former are needed for retrieval of SST waste and transfer operations to the Waste Treatment Plant (WTP). However, this does not provide a sufficient rationale to defer the problem of considering DST closure to a later date. This balkanized approach prevents an integrated assessment of health and environmental impacts related to decommissioning of the high-level waste tank farms, which should be the central objective of this EIS.

231-206

The DOE should present each alternative as a comprehensive and comprehensible set of actions from tank waste management for tank waste storage, retrieval, treatment, and closure, plus the associated impacts of low-level waste and mixed waste streams generated in the process. In this context, it is important to note that the peak year concentrations, doses, and risks presented in Appendix U for the three alternatives combined with non-tank-farm 200 Areas source terms are essentially useless for the purpose of estimating the overall impact of cleanup or even to allow a determination of what actions the DOE might be planning for the non-tank-farm 200 Areas vadose zone clean up. This is because most of the peak year radiological impacts are in the past – even though there were no resident farmers drinking groundwater and using it for irrigation on

[5] TC&WM EIS 2009, p. S-118.

4

been revised to include a citation to this document, and a reference has been added to the reference list.

231-131 The industrial safety impact rates between 2001 and 2006 represent the general level and type of work to be performed under the alternatives identified in this EIS. Also considered were the safety programs, practices, and procedures developed and implemented up to and during the sample period. Additionally, it was assumed that these safety programs, practices, and procedures would continue in force into the future. They include the use of safety surveillance and lessons-learned programs, as well as oversight conducted by DOE. The calculations represent the annual risks to workers; the values identify possible occurrences of injury, illness, and death each year the work activities are conducted. Finally, the estimations of injury, illness, and death are for the discrete elements of the work performed in the four phases of construction, operations, deactivation, and closure and do not include other impacts outside of those activities.

231-132 DOE believes that it has used consistent geologic terminology as appropriate to the level of analysis performed. The purpose of Chapter 3, Section 3.2, of this *TC & WM EIS* is to provide a succinct discussion of the Hanford affected environment, both as a whole and as it is relevant to the entire scope of proposed actions and alternatives considered in this EIS. Such is the case with the level of detail presented in Chapter 3, Section 3.2.5, Geology and Soils.

In Chapter 9, "Glossary," of the draft EIS, the technical terms "silt" and "clay" are defined (but not "mud"), as they are widely used throughout this *TC & WM EIS*. The term "mud" is a general field term for sedimentary strata or rock composed predominantly of clay-sized particles. Specific lithofacies (rock or sediment characteristics) of geologic members within the Ringold Formation at Hanford have been named "mud" units by members of the geologic community and are formally recognized as such. Therefore, the use of the term "mud" has appropriately been adopted for use in this EIS. A definition for this term has been added to Chapter 9 of this *Final TC & WM EIS*. Specific to the needs of developing the *TC & WM EIS* groundwater flow model, detailed hydrogeologic data were compiled in part from a review of approximately 5,000 Hanford boring logs, as described in Appendix L, Section L.4, of this EIS. This review was conducted to discern textural differences between layers of mud (clay), silt, sand, and gravel, and associated differences in hydraulic characteristics, for development of the geologic layers for the groundwater model flow field. Within this scheme, grain size and other information pertinent to the development of the

the site in the years of estimated peak impact (for the most part during the 1950s to the 1990s). Even so, the portion of Appendix U that shows the non-tank-farm impacts and other parts of the TC&WM EIS where various tank farm impacts are estimated make it clear that even after DOE has completed what it calls "reasonably foreseeable" actions, Hanford will remain contaminated far beyond drinking water standards outside of the core zone for thousands of years.

There should be at least one alternative in the Final EIS in which all applicable drinking water standards are met for groundwater within the core zone without institutional controls at the completion of foreseeable cleanup actions. Since the DOE does not appear to include a set of actions that would lead to such a result, it seems clear that the list of actions would need to be expanded, especially to clean up the contamination from past practices in the non-tank-farm 200 Areas, or contracted, as for instance, in the case of the plan to import waste.

Further, for all alternatives, future post-remediation impacts should be clearly presented in tables and graphs showing the future variation over time concentrations of all major contaminants, as well as the individual future peak for each contaminant beyond the completion of cleanup activities at the site. This is important, since a part of what makes the TC&WM EIS difficult or impossible to interpret in terms of Applicable or Relevant and Appropriate Requirements (ARARs) is that peak concentrations are shown in the past or within the cleanup period, when the scenarios such as the one for a resident farmer (whether native American or not) are not meaningful.[6]

231-206 cont'd

Recommendations: The DOE should present each alternative as a comprehensible set of actions from tank waste management for tank waste storage, retrieval, treatment, and closure, plus the associated impacts of low-level waste and mixed waste streams generated in the process. There should be at least one alternative in the Final EIS in which all applicable drinking water standards are met for groundwater within the core zone without institutional controls at the completion of cleanup actions both for tank farm and non-tank farm 200 Areas. For all alternatives, future post-remediation impacts should be clearly presented in tables and graphs showing the future variation over time concentrations of all major contaminants and the evolution of compliance with ARARs.

C. Radiation Protection Standards and ARARs

The DOE has used a reference value of 100 millirem (mrem) per year whole body total effective dose equivalent (TEDE) as the reference value to its health protection dose calculations. For population dose the DOE uses a so-called "background" exposure value:

> The significance of dose impacts is evaluated by comparison against the 100-millirem-per-year all-exposure-modes standard specified for protection of the public and the environment in DOE Order 5400.5. Population doses are compared with total effective dose equivalents from background sources of 365 millirem per year for a member of the population of the United States (NCRP 1987).[7]

231-207

[6] TC&WM EIS 2009, Vol. 2, Appendix U. See for instance, Table U-2 and Figures U-1 to U-48.
[7] TC&WM EIS 2009, Vol. 2, p. Q-238.

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model are presented. The commentor is referred to Appendix L, Table L–15, of the draft EIS.

231-133 In response to this and similar comments, references to compilations of data and original data sources have been added to Appendix L of this *Final TC & WM EIS*. The sensitivity of the model to basalt elevation and the propagation of this uncertainty into the base and alternate flow fields are fully discussed in Sections L.4.3.2.1, L.10.1, and L.10.2 of the *Draft TC & WM EIS*.

231-134 A simplifying assumption was made in the *Draft TC & WM EIS* that there is no ongoing Hanford pumping, although it is known that pump-and-treat activities are occurring. This assumption is believed not to bias the alternatives impacts analysis within the context of the cumulative impacts analysis. This assumption was reevaluated and is further discussed in this *Final TC & WM EIS*.

231-135 Appendix L, Figure L–18, provides a cross-section view of the MODFLOW vertical grid. Top and bottom elevations for each of the 31 model layers are shown in this figure. As described in Section L.4.1.2, each model layer is a uniform (constant) thickness across the entire model domain in the horizontal directions.

231-136 Appendix L of this *Final TC & WM EIS* was revised to expand the groundwater flow model gridding discussion to include factors that were considered in selecting model cell size.

231-137 A simplifying assumption was made that there is no hydraulic connectivity between the unconfined aquifer and any existing confined aquifers. It is likely that some interaction between unconfined and confined aquifers exists. However, the availability of data that describe the locations, sizes, and water flux amounts between the aquifers is not sufficient to encode these features into the model. This simplifying assumption should not bias the EIS analysis and is, therefore, believed to be reasonable in light of the uncertainty related to this feature.

231-138 The adjustable parameters on the river boundary condition cells are hydraulic head and river bed conductance. Hydraulic head is encoded as reaches along the river trace based on data provided in the *Groundwater Data Package for Hanford Assessments*, Rev. 1 (Thorne et al. 2006), and data collected for this *TC & WM EIS* using a global positioning system (GPS). River conductance values were set in the range of 1×10^7, essentially making the river boundary condition a specified, or prescribed, head boundary. Setting the river conductance values in this range stabilized the model's convergence behavior. In general, lower river conductance values resulted in greater model instability. In addition, the model's head

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This approach is problematic for a number of reasons. To take the issue of "background sources" first. The amount includes about 200 millirem per year of radon dose, almost all of which is due to indoor radon. While radon occurs naturally, its outdoor concentrations are, on average, considerably lower than indoor ones. This is because indoor radon concentrations are mainly an artifact of building construction. Radon concentrations indoors can be lowered to close to outdoor levels with appropriate construction and control technology. Indoor radon should not be considered a part of natural background radiation. This position has ample scientific justification, as is evident in the positions of various scientific advisory bodies. An extensive discussion with references is provided in a 2005 IEER publication, a part of which is quoted below:

> As noted by the National Research Council in 1999
>
> > Many human activities – such as mining and milling of ores, extraction of petroleum products, use of groundwater for domestic purposes, and **living in houses** – alter the natural background of radiation either by moving naturally occurring radionuclides from inaccessible locations to locations where humans are present or by concentrating the radionuclides in the exposure environment.
>
> The National Research Council considered indoor radon to be a "technologically enhanced naturally occurring radionuclide [TENORM]." The treatment of other TENORM from a radiation protection standpoint is thus illustrative in the present context. For example, playground equipment and fences contaminated with TENORM waste from the oil industry containing radium has been found at a number of locations in Mississippi and Louisiana.[8]

A background level at sea level of 100 mrem per year is a reasonable reference value to use for background, when such a reference is appropriate, as for instance when comparing radiation to other natural hazards. Such a comparison is neither relevant nor appropriate in the present case, even though 100 millirem per year is the same as the annual exposure limit for the public in DOE Order 5400.5.

231-207 cont'd

Clean up of a site is subject not only to DOE Order 5400.5 but to a complex set of standards, especially when both radionuclides and hazardous chemicals are present and the site has been put on the National Priorities List (a "CERCLA site") by the EPA, as is the case with Hanford. It is simply inappropriate for the DOE to take a posture that CERCLA strictures, which include compliance with ARARs, such as drinking water limits, are not relevant to overall health impact assessment. One of the most important relevant requirements is the set of maximum contaminant levels in EPA's drinking water standards for radionuclides and chemicals. Technetium-99 and iodine-129 are fission products that are important long-lived radionuclides with half-lives of 213,000 years and 15.7 million years, respectively. A drinking-water dose

231-208

[8] Arjun Makhijani and Brice Smith, *Comments on the U.S. Environmental Protection Agency's Proposed Rule for the Public Health and Environmental Radiation Protection Standards for Yucca Mountain, Nevada*, Institute for Energy and Environmental Research, Takoma Park, Maryland, November 21, 2005, Section Two. On the web at http://www.ieer.org/comments/waste/yuccaepa.pdf. References may be found in this publication. The emphasis in the National Research Council quote was added by the authors of the IEER paper.

calibration was not highly sensitive to changes in river conductance. Therefore, the river conductance values were set in the 1×10^7 range to aid the model's convergence behavior.

231-139 The source of the mountain-front recharge is the result of surface runoff from mountains along the western and southwestern boundaries of the flow model. The GHB boundary condition cells, which represent the mountain-front recharge, are encoded into the *TC & WM EIS* MODFLOW model below the water table and, therefore, below the ground surface. Appendix L, Section L.4.2.3, in this *Final TC & WM EIS*, has been updated to include additional information regarding the locations (X, Y, and Z) of the mountain-front recharge boundary condition cells encoded in the MODFLOW model. This also includes graphics correlating the ground surface topography with the X and Y locations of the model-encoded GHB boundary condition cells.

231-140 The process and criteria used to interpret the borehole logs are included in a calculation and analysis package. Due to the difficulties associated with independently verifying the past work of others, coupled with the possibility that independent identification and interpretation of the data may still be required, it was decided to focus efforts on building the lithology data from source well borings instead of attempting to confirm earlier interpretation efforts.

231-141 The groundwater team used the results of preceding analyses only in the cases where these results could be independently verified. The top-of-basalt surface was completed according to this requirement. The traceability of the top-of-basalt surface used in the MODFLOW model back to original records is contained in the project files (calculation and analysis packages) and has been examined in a variety of independent quality assurance audits.

231-142 DOE believes that the methods and procedures used to model the suprabasalt sedimentary layers are reasonable and consistent with other methods that could have been used. The *Draft TC & WM EIS* method, like other reasonable methods, included examining the available data; interpreting the data to assign geologic formations and textural types; interpreting the point data, where available, to create two-dimensional cross sections across the model domain; and knitting together the two-dimensional cross sections to create the fully three-dimensional subsurface model. Other methods of creating the fully three-dimensional subsurface model could also be used. The approach used in this *Final TC & WM EIS* is fully discussed in Appendix O, together with an estimate of the uncertainty in the surface, and the potential effects of that uncertainty on the estimate of the long-term groundwater impacts of the alternatives.

limit of 4 millirem per year Total Effective Dose Equivalent (TEDE) or to any internal organ applies to these two radionuclides and all other beta-particle emitting man-made radionuclides, except strontium-90 and tritium, for which MCLs are specified. If more than one such radionuclide is present the sum of the doses must not exceed 4 millirem.[9] Yet, though the appropriate dose limit corresponding to drinking water standards is 4 millirem per year (TEDE or internal organ dose), DOE uses 100 mrem per year TEDE in Appendix Q to measure impacts from these two radionuclides. In fact, the TC&WM EIS only calculates TEDE[10] and does not calculate organ doses as required by drinking water regulations. In this context it is important to note that the iodine-129 dose to the thyroid, which is not calculated in the TC&WM EIS, is about 20 times larger than the internal committed effective dose equivalent.

Even more important, the 100 millirem per year TEDE in DOE Order 5400.5 is entirely inappropriate in a CERCLA context. CERCLA cleanup requires that the lifetime cancer incidence risk from residual radioactive and chemical contaminants be in the range 10^{-4} to 10^{-6}. The CERCLA regulation states:

> (*2*) For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess **upper bound lifetime cancer risk** to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response. **The 10^{-6} risk level shall be used as the point of departure** for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure…[11]

Using the DOE's selected value of fatal cancer risk of 6 deaths per 10,000 person rem,[12] a 100 millirem per year dose over 70 years creates a lifetime risk of dying from cancer of 1 in 238. This is 42 times higher than the highest allowable risk under CERCLA and 4,200 times higher than the lowest CERCLA risk level of 10^{-6}. If one uses cancer incidence risk (rather than fatal cancer risk) the disparities are even greater.

Hanford has vast quantities of radionuclides and hazardous chemicals whose interactions are not well understood; their combined effect on the human body and ecosystems is largely unknown. Indeed, the importance of such interactions is only now beginning to be appreciated. And until recently, it was normal to assume that a radiation protection framework that limited cancer among human beings would also be satisfactory for protection of other species, and by extension, of ecosystems. Given these realities, if there is any site to which the 10^{-6} risk level "shall be used

[9] Drinking water standards for photon and beta-emitters, except strontium-90 and tritium, are not specified as MCLs but as a dose limit of 4 millirem per year TEDE or 4 millirem to the most exposed organ. See 40 CFR 141.66(d)(1).
[10] Appendix H states: "***All*** radiological impacts are calculated in terms of the committed dose received by the exposed populations and its associated health effects. The calculated radiation dose is the total effective dose equivalent (10 CFR 20), the sum of the effective dose equivalent from external radiation exposure and the 50-year committed effective dose equivalent from internal radiation exposure." (TC&WM EIS 2009, Vol. 2, p. H-2) Emphasis added. The ratio of iodine-129 doses is for adults. It was calculated from EPA's Federal Guidance Report 13, CD, published in 2002.
[11] 40 CFR 300.430(e)(2)(i)(A)(*2*), which is a part of the Remedial Investigation and Feasibility Study portion of the National Oil and Hazardous Substances Pollution Contingency Plan, specified at 40 CFR 300. Emphasis added.
[12] TC&WM EIS 2009, Vol. 2, p. K-7.

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231-208 cont'd

231-143 DOE believes that the methods and procedures used to model the suprabasalt sedimentary layers are reasonable and consistent with other methods that could have been used. The *Draft TC & WM EIS* method, like other reasonable methods, included examining the available data; interpreting the data to assign geologic formations and textural types; interpreting the point data, where available, to create two-dimensional cross sections across the model domain; and knitting together the two-dimensional cross sections to create the fully three-dimensional subsurface model. Due to the physical size of this *TC & WM EIS*, many of the details associated with the analysis could not be included in the published document. Additional process details like those requested here are included in calculation and analysis packages.

231-144 Appendix L, Section L.5.2, of this *Final TC & WM EIS*, has been updated with a footnote that defines a stress period as a period of time within the model simulation when all boundary conditions are static or unchanging. By design, the *TC & WM EIS* MODFLOW model stress periods are no less than 1 year in duration and cannot include partial years. Stress periods may be greater than 1 year in duration if boundary conditions are static for longer than 1 year.

231-145 The MODFLOW 2000 numerical solution settings are included in Appendix L, Table L–8, of this EIS. This table includes the convergence requirements for the head change criterion, residual criterion, and damping factor. A description of how these settings are used by the solver to determine when convergence has been achieved is included in Section L.5.3 and re-stated as follows: "Both the head change and residual criteria determine convergence of the solver. The head change criterion is used to judge the overall solver convergence; the residual criterion is used to judge the convergence of the inner iteration of the solver. The damping factor allows the user to reduce the head change calculated during each successive outer iteration."

231-146 In the process of producing the groundwater flow model for this *Final TC & WM EIS*, changes were made to the boundary conditions, hydraulic conductivity zonation, and the head observation data. As a result, the modeling team recalibrated the flow model. This process is presented in the revised Appendix L and includes all material types used in the calibration, per the commentor's suggestion.

231-147 All section and table references in this response are to the *Draft TC & WM EIS*. The hydraulic conductivity values described in Appendix L, Section L.7.2.4 and Table L–14, were derived from preliminary model calibration. For comparison

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as the point of departure," it should be Hanford. A 10^{-6} lifetime fatal cancer risk would mean an average exposure of about 0.024 millirem per year – about 4,200 times lower than the DOE's reference value of 100 millirem per year. For a lifetime cancer incidence risk for women, this value would be reduced to about 0.014 millirem per year.

DOE's analysis in Appendix Q is geared to the inappropriate reference value of 100 millirem per year that is two to four orders of magnitude than the CERCLA risk range of 10^{-4} to 10^{-6}. DOE Order 5400.5 has very little real relevance for a CERCLA site. A Record of Decision that is based on this limit would allow serious violations of the CERCLA risk limits as well as drinking water ARARs for radionuclides and chemicals. The CERCLA risk range and the drinking water standards should be central considerations.

DOE has stated in the Draft EIS that the remediation of the "non-tank-farm 200 Areas is being addressed under CERCLA, which will also satisfy substantive RCRA and Hazardous Waste Management Act corrective action requirements."[13] But the document provides no clue as to how an EIS Record of Decision that is based on risk levels that are at least two orders of magnitude higher for radionuclides alone would be made compatible with a CERCLA cleanup for the non-tank-farm 200 Areas. It would be completely unacceptable if an ROD under the EIS that had lax cleanup criteria, resulting in part from an inappropriate radiation dose limit, were to be used later as a rationale for failing to make a major effort to remediate the non-tank-farm part of the 200 Areas vadose zone. DOE's use of 100 millirem per year as the reference value for assessing the health impacts of alternatives also appears to be at odds with the requirements of DOE Order 5400.1, which is its order for general environmental protection at its facilities, which states in part:

> SPECIAL PROGRAM PLANNING REQUIREMENTS. In addition to other program requirements and documentation required in this Order, each Head of Field Organization shall prepare a separate plan of sufficient scope and detail to reflect program significance, as appropriate, for each of the following activities.
>
> a. A Groundwater Protection Management Program that includes for each site, the following: (1) documentation of the groundwater regime with respect to quantity and quality; (2) design and implementation of a groundwater monitoring program to support resource management and comply with applicable environmental laws and regulations; (3) **a management program for groundwater protection and remediation, including specific Safe Drinking Water Act (SDWA), Resource Conservation and Recovery Act (RCRA) and CERCLA actions**; (4) a summary and identification of areas that may be contaminated with hazardous substances; (5) strategies for controlling sources of these contaminants; (6) a remedial action program that is part of the site CERCLA program required by DOE 5400.4; (7) decontamination and decommissioning and other remedial programs contained in DOE directives. Plans, permits, and other technical documents such as those associated with compliance with the SDWA, RCRA, and CERCLA may be used in whole or in part to satisfy this requirement. This plan shall be completed no later

[13] TC&WM EIS 2009, Vol. 1, pp. 1-13 and 1-14.

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231-208 cont'd

purposes, Table L–15 includes field and laboratory hydraulic conductivity ranges from a limited data survey completed by the *TC & WM EIS* modeling team. As noted in this comment and as shown in Table L–15, no hydraulic conductivity data sources are available for some material types. Additionally, when data sources are available for a material type, hydraulic conductivity values from those sources can vary over a range of several orders of magnitude. The hydraulic conductivity values shown in Tables L–14 and L–15 were used only as starting points for the gradient-based calibration described in Section L.8 and the Monte Carlo optimization and uncertainty analysis described in Section L.9. The set of hydraulic conductivity values selected and used in the Base Case groundwater flow model are listed in Table L–20 and were derived during model calibration, as opposed to being from a particular data source.

231-148 The figure captions referred to by the commentor were in error in the *Draft TC & WM EIS*. The time for which these graphs were prepared was calendar year 2005, not calendar year 2015. This *Final TC & WM EIS* was revised accordingly.

231-149 Although not mentioned in the comment, it is assumed that comment refers to pathlines and contours shown in Appendix L, Figures L–93, L–94, L–95, and L–96 of the *Draft TC & WM EIS*. Based on a review of these figures, the particle pathlines are indeed perpendicular to the groundwater equipotential lines, as required by theory. Therefore, no error exists that requires reconciliation. As stated in Sections L.10.2.3.1 and L.10.2.3.2 of the draft EIS, the pathlines analysis was run using MODPATH (MODFLOW particle-tracking postprocessing package). This *Final TC & WM EIS* was updated with additional text in Section L.8.1.4 to describe MODPATH as a computer program developed by USGS to calculate three-dimensional particle tracking pathlines from steady-state and transient flow simulation output obtained using MODFLOW.

231-150 Due to the size limitations of the *TC & WM EIS* document, many of the details and parameters associated with the release models could not be included. Additional process details like those requested here are included in calculation and analysis packages. However, DOE believes that the relevant information on the release models is provided in Appendix M. In addition, Appendix M has been revised in this final EIS to provide more detail than was previously provided in the draft EIS.

231-151 DOE has included in this *Final TC & WM EIS* additional sensitivity analyses that address varying distribution coefficients for waste-form performance. The commentor is referred to Chapter 7, Section 7.5, for more information.

than 18 months after the effective date of this Order. The plan shall be reviewed annually and updated every 3 years.[14]

The matter is further complicated by the well-known presence at Hanford of vast amounts of hazardous chemicals, ranging from heavy metals, such as chromium, to organic pollutants, such as carbon tetrachloride and TCE. These substances are covered by the RCRA as well as the counterpart Washington State law known as the Model Toxics Control Act (MTCA). The latter specifies lifetime cancer risk limits of 10^{-6} for individual carcinogens and 10^{-5} for all hazardous substances combined. MTCA includes radionuclides in its definition of hazardous materials.[15]

In view of the fact that Hanford has a large number of chemical and radioactive contaminants the CERCLA framework quoted above indicates that the DOE should use a 10^{-6} lifetime cancer incidence risk for individual chemicals and radionuclides as required by law. This will mean the maximum contaminant levels for evaluating TC&WM EIS alternatives for groundwater and surface water that are much more stringent than drinking water standards. Under this approach the limits for some of the prominent radionuclides are shown in Table 1.

Table 1: Drinking Water Limits Corresponding to a 10^{-6} Lifetime Cancer Incidence Risk Level for Some Man-Made Radionuclides

Radionuclide	picocuries per/liter
Americium-241	0.19
Cesium-137	0.64
Iodine-129	0.13
Plutonium239/240	0.15
Strontium-90	0.35
Technetium-99	7.1
Tritium	400

Notes: 1. Values have been calculated using the lifetime morbidity risk coefficients in Federal Guidance Report 13, published by the Environmental Protection Agency in 1999; the CD containing the risk and dose coefficients was published in 2002.
2. All values are rounded as indicated.

Similarly, carcinogenic chemicals may be assessed by MCLs that use a 10^{-6} risk factor for individual contaminants.

Overall, the above restrictions mean that individual radionuclide and chemical concentrations should be such that they not exceed 10^{-6} lifetime risk levels after clean up is completed.

There is also the question of restrictions relating to multiple contaminants. In this case, the sum of ratios of the concentrations of all radionuclides and carcinogenic chemicals present to their

[14] DOE Order 5400.1, *General Environmental Protection Program*, p. III-2, changed on 6-29-1990, on the web at https://www.directives.doe.gov/directives/archive-directives/5400.01-BOrder-c1, viewed on February 14, 2010, emphasis added.
[15] . The risk level for individual carcinogens could be increased to 10^{-5} under Modified Method C for cleanup, but the overall risk level in case of multiple carcinogens also has to be maintained at 10^{-5}. *Washington Administrative Code*, "Model Toxics Control Act--Cleanup," Chapter 173-340 WAC, Update of 10/12/07, on the web at http://www.ecy.wa.gov/pubs/wac173340.pdf, p. 18 and pp. 94-96

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231-208 cont'd

231-152 DOE disagrees that there was no concerted or documented effort to address the propagation of uncertainties along the modeling chain in the *Draft TC & WM EIS*. As described in Appendices L, M, N, and O, an integrated test of the entire groundwater modeling system was performed on the complex series of sources that produced extensive, regional-scale groundwater plumes. In this analysis, uncertainties regarding inventory, vadose zone flow and transport, and groundwater flow and transport were described, and the effect of those uncertainties on specific metrics was discussed.

231-153 As noted by the commentor, application of the constituent solubility limited-release model is not described in this *TC & WM EIS*. Therefore, as suggested by the commentor, the discussion of this model has been removed from Appendix M for this *Final TC & WM EIS*.

231-154 To avoid confusion and in response to other comments to the effect that the constituent solubility limited-release model was not used for this *TC & WM EIS*, the discussion on the constituent solubility limited-release model in Appendix M has been removed from this final EIS.

231-155 The primary justification for this assumption is the *Technical Guidance Document* (DOE 2005). This document codifies modeling assumptions and agreements between ORP, DOE-RL, DOE Headquarters, and Ecology. The value of 3.5 millimeters per year was agreed upon after extensive discussions and technical input from the Local Users' Group. Additionally, the Black Rock Reservoir sensitivity analysis documented in the *Draft TC & WM EIS*, Appendix V, considers increased water flux into the model due to the construction of a reservoir just west of Hanford. This analysis serves as a model for increases in water flux that could occur over the period of analysis, including those attributable to global warming or climate changes.

231-156 The label for the vertical axis for this figure has been corrected to identify it as the cumulative release of technetium-99 (curies).

231-157 Due to the range of the scale for the COPCs, logarithmic scales are necessary. However, to provide clarity, tables were added to Appendix M, Section M.4, and Appendix N, Section N.4, to provide numeric values for the height of each bar.

231-158 Focused sensitivity analyses for key IDF radionuclides have been included in this *Final TC & WM EIS*. One component of these analyses was an examination of variations in grout waste-form performance. Calculations performed as part of those analyses revealed that changes in grout performance were brought

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MCLs derived from a 10^{-5} cancer incidence risk level should be less than one. This would make the result compliant with MTCA and the combined chemical risk would be in the middle of the CERCLA risk range.

This risk value should be evaluated over time, since the peaks of individual chemical and radionuclide concentrations can be expected to differ due to a variety of factors such as varying K_d's and different half-lives.[16] The peak value of the risk should be less than 10^{-5} for unrestricted use of the site after cleanup is completed.

231-208 cont'd

Recommendations: In view of the fact that Hanford has a large number of chemical and radioactive contaminants the CERCLA framework quoted above indicates that the DOE should use a 10^{-6} lifetime cancer incidence risk for individual chemicals and radionuclides as required by law. For all carcinogens, the cancer incidence risk level should not exceed 10^{-5}, an upper bound value required by MTCA when there is more than one carcinogen.

D. Tank Storage and Waste Retrieval Alternatives

231-209

The alternatives that require building new double shell tanks are unrealistic and could cause a variety of problems and delays. They should be ruled out. DOE's Alternative 2B for waste storage appears to be the best one available. No new DSTs would be built, but four new below-grade storage and waste conditioning facilities, called Waste Receiver Facilities, would be built.

231-210

The technologies for retrieval of waste from the tanks in order to deliver it to the Waste Treatment Plant are complex and pose a variety of technological risks. For instance, sluicing of waste requires the addition of vast amounts of water under pressure – it is projected to increase the volume of the retrieved solid waste by a factor of four.[17] Sluicing and use of chemicals could also cause corrosion and cracking. This is noted in the TC&WM EIS:

> Stress-corrosion cracking and pitting/crevice corrosion are the failure mechanisms most applicable to the SSTs that have leaked in the past. The rate at which these modes of corrosion may have progressed in nonleaking SSTs is unknown. However, the general condition and age of the SSTs suggest that new SST leaks could occur during retrieval actions that involve additions of liquid to the tanks (DOE 2003c).[18]

231-211

As another example, chemical removal to achieve a 99.9 percent volume removal level could create more hazardous wastes and potentially aggravate residual contamination on the site. Corrosive chemicals could also increase the risk of new tank leaks. The TC&WM EIS identifies this as the only approach to achieving a retrieval of 99.9 percent of the waste volume.

231-212

In view of the risks of adding chemicals and of sluicing in the SSTs, it appears to us that the use of vacuum-based retrieval, complemented by the in-tank vehicle, which is a mobile retrieval

[16] K_d is the ratio of the concentration of a contaminant in the soil to that in the water. A low K_d means a higher water contamination for a given soil concentration and vice versa.
[17] TC&WM EIS 2009, Vol. 2, p. D-28, where the DOE states: "Current analysis projects that three volumes of sluicing liquid would remove one volume of SST solids".
[18] TC&WM EIS 2009, Vol. 2, p. E-28.

about by modifying contaminant diffusivities in the waste form, and that this is accomplished by adjusting the distribution coefficients of the radionuclides. DOE notes that, where available, the parameter values (including those for distribution coefficients) used in the analyses are representative of site conditions. Sources include both site literature and, in some key instances, values from the *Technical Guidance Document* (DOE 2005), which was signed by DOE and Ecology. In those cases where site-specific information was not available, estimates were taken from the literature.

231-159 Please see response to comment 231-152 regarding the integrated test to address uncertainties throughout the groundwater modeling system.

231-160 The difference between the number of chemical constituents addressed in the source release model results (Appendix M, Section M.4) and the number addressed in the vadose zone transport model results (Appendix N, Section N.4) has been clarified in this *Final TC & WM EIS* to ensure consistency in the constituents addressed in the two appendices.

231-161 In response to this comment and others, further explanation and description have been provided in Appendix N of this *Final TC & WM EIS*.

231-162 The primary justification for this assumption is the *Technical Guidance Document* (DOE 2005). This document codifies modeling assumptions and agreements between ORP, DOE-RL, DOE Headquarters, and Ecology. The value of 3.5 millimeters per year was agreed upon after extensive discussions and technical input from the Local Users' Group. Additionally, the Black Rock Reservoir sensitivity analysis documented in the *Draft TC & WM EIS*, Appendix V, considers increased water flux into the model due to the construction of a reservoir just west of Hanford. This analysis serves as a paradigm for increases in water flux that could occur over the period of analysis, including those attributable to increased precipitation.

231-163 The figure shows all sources of technetium-99 in calendar year 2005. The label indicates the location of the plume that originated from BY Cribs. The figures and text in Appendix N have been revised for clarification.

231-164 Additional discussion on the determination of the Van Genuchten parameters has been added to this *Final TC & WM EIS*.

231-165 This figure was taken from the 2007 Hanford sitewide monitoring report. The interpretation of this plume is that the BY Cribs are the primary source of the technetium-99. It should be noted that the BY Cribs delivered a nonuniform flux

system, should be the preferred options to retrieve 99 percent of the waste in the tanks. These methods should especially be preferred in tanks that have leaked or are suspected of having leaked. Further development of these methods to achieve greater than 99 percent retrieval is desirable. Sluicing (or modified sluicing) can be used to increase the proportion of recovered waste beyond 99 percent or as necessary to achieve the 99 percent target if it cannot be achieved with a combination of vacuum-based and in-tank vehicle mobile system retrieval.

231-212 cont'd

We are in agreement with the TC&WM EIS approach that the SST waste transfer infrastructure not be used for tank waste transfer. Rather, as noted below, this SST infrastructure, which contains residual high-level waste, should be removed and stored as HLW (see below).

The goal should be to retrieve at least 99 percent of the waste volume and as much beyond that as possible without further compromising the integrity of the SSTs or inducing leaks in the inner shell of the DSTs. This is because the remaining one percent of the waste volume would still likely contain a huge amount of residual radioactivity.

231-213

The characterization of residual radioactivity in the TC&WM EIS ignores the technical history of the tanks and the non-uniform nature of distribution of radionuclides in the waste. While a highly accurate estimate of residual radioactivity by radionuclide would not be possible at the present time and will depend to some extent on retrieval technology, a much better set of estimates based on the history of the tank farm should be possible.

Appendix D shows DOE assumptions regarding residuals in the tanks. The simple, but highly unrealistic, assumption used is that the proportion of radioactivity of each radionuclide removed will be the same as the proportion of the volume removed. The assumption is applied to every volume removal option considered – 90 percent, 99 percent, and 99.9 percent. So for instance, residual strontium-90 at 99 percent retrieval is assumed to be 505,000 curies, since the source term in the tanks is estimated at 50.5 million curies.[19] Similarly, the cesium source term in the tanks is estimated at 45.9 million curies; the residual source term after 99 percent removal is estimated at 459,000 curies – and so on for all radionuclides listed in the tables.

231-214

This is not a reasonable way to estimate residual radioactivity or the impacts of various options of tank closure. For instance, we know that the acidic wastes from the reprocessing canyons were neutralized prior to storage in the SSTs and DSTs. This process tends to separate out various radionuclides into different parts of the waste. Specifically, the actinides, including plutonium and uranium, would tend to go to the bottom sludge layer, while strontium-90 also tends to go to the sludge layer with the actinides. In contrast, the cesium remains preferentially in solution after neutralization. Evaporation of the solution and the crystallization process subsequent to evaporation would tend to concentrate cesium-137 in the salts.

Other chemical processes at Hanford, such as addition of ferrocyanides, addition of solvents and organic complexants, inter-tank waste transfers, and processing of some wastes in the 1950s to extract uranium, have further complicated the picture. While this makes it difficult to estimate

[19] SST and DST residuals are separately estimated. They have been added here. The data cited here are from Tables D-4 and D-5 for the SST and DST source terms and Tables D-16 and D-17 for the residuals. See TC&WM EIS 2009, Vol. 2, Appendix D.

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to the vadose zone, and that the site in question is near the groundwater divide across the Central Plateau of Hanford, where groundwater flow directions vary widely over time. Under these conditions, multilobed plumes can be expected to develop.

231-166 The label of Figure N–80 in the *Draft TC & WM EIS* has been revised to reflect kilograms released to the aquifer in Figure N–97 in this *Final TC & WM EIS*.

231-167 Appendix D, Section D.1.4, Historical Leaks and Other Releases, provides a discussion on the use of the Hanlon (2003) document and explains the uncertainties of this information on past leaks.

231-168 The dispersivity threshold was determined through a series of calibration tests. In these tests, the dispersivity parameters were varied and the resulting spatial distributions of the tritium plumes from the PUREX and REDOX waste sites were qualitatively compared with associated plume maps provided in the *Hanford Site Groundwater Monitoring for Fiscal Year 2003* (Hartman, Morasch, and Webber 2004). A more detailed discussion of these calibration tests is provided in Appendix O, Section O.2.6 and Tables O–3 and O–4, of this *TC & WM EIS*.

231-169 DOE agrees that the modeling results for past conditions are different under Tank Closure Alternative 1 (see Appendix O, Table O–10) and Tank Closure Alternative 2A (Table O–16). For example, the predicted peak concentration of tritium in Table O–10 occurs during 1956 at 2,855,631 picocuries per liter, while the corresponding entry for Table O–16 occurs during 1956 at 2,955,633 picocuries per liter. These numbers are different by about 1 part in 30, roughly 3 percent. DOE disagrees with the commentor's suggestion that this difference is an indication of model instability. As stated in this *TC & WM EIS*, the results under each individual alternative for each constituent are obtained by aggregating all of the individual runs for the sources composing that alternative (typically on the order of 30 to 40 individual runs). Also, as stated in this *TC & WM EIS*, each transport run contains a stochastic component (to model hydrodynamic dispersion). The result of adding 30 to 40 runs, each of which contains small random perturbations, and selecting the maximum year and concentration from the resulting sum is not expected to yield identical results under every alternative. In fact, differences of several percent in the peak concentrations are exactly what are expected and are an indication of stability in the model, rather than instability. Finally, Appendix O discusses the precision, and Appendix U, the accuracy, of the groundwater modeling, and both strive to suggest that, for the purpose of comparing impacts among the alternatives,

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

the effect of removal of a certain waste volume on residual radioactivity, a best estimate would start with the well known effects of waste neutralization, which has occurred in all cases. The sludge layer that forms at the bottom of the tanks after waste neutralization is a small proportion of the volume and contains almost all the actinides as well as strontium-90. It is also reasonable to assume that sluicing and vacuum removal technologies would tend to mobilize the more easily removed liquids and salts, while the encrusted portions of the sludges would be preferentially retained in the tanks as residuals.

These considerations indicate that the residual plutonium, uranium, neptunium, and strontium-90 in the tanks could well be an order of magnitude higher than estimated in Appendix D of the TC&WM EIS. At the same time, the residual cesium-137 and tritium would be far lower than estimated. This means that residual strontium-90 could be in the millions of curies even with 99 percent waste volume removal. As for plutonium, residuals could be well over 100 kilograms, while residual uranium could be well over 100 metric tons.[20]

These considerations point to the need for two items in a preferred option for tank closure:

a. Waste residues must be carefully characterized by radionuclide and hazardous chemical, especially in the final stages of tank waste removal. The use of the in-tank mobile unit could be particularly useful in this regard. Appropriate research and development to enhance the capabilities of this or some other in-tank mobile vehicle should be initiated so that residual tank wastes can be accurately characterized.
b. No actions should be planned or taken that would make waste retrieval beyond 99 percent impossible. This rules out alternatives for closing tanks in place that would make clean closure by tank removal (which is part of Alternative 6B, for instance) impossible.

231-214 cont'd

Recommendations: At least 99 percent of the waste volume should be removed. Approaches that risk creating more hazardous wastes and increase the risk of new tank leaks and tank corrosion should be de-emphasized or not used. Residual radionuclide amounts should be carefully characterized. No actions should be planned or taken that would make waste retrieval beyond 99 percent impossible. This rules out alternatives, such as grouting, for closing tanks in place that would make clean closure by tank removal (which is part of Alternative 6B, for instance) impossible. No new DSTs should be built.

E. Waste treatment

231-215

The success of the Waste Treatment Plant is the most critical element to the ability to remove waste from the SSTs and prepare it for long-term management. Certain core elements of the WTP – pretreatment of the waste, at least two high-level waste melters, at least two low activity waste melters, are common to all alternatives except the no-action alternative and Alternative 6A. The robust and reliable functioning of the WTP is central to the success of the purposes of

[20] Natural uranium isotopic composition has been assumed in this calculation, since natural uranium or uranium of very low enrichment were the main types of uranium fuel used at Hanford.

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differences of about an order of magnitude are probably significant. DOE agrees with similar comments that the number of significant figures presented in maximum concentration tables needs reexamination. The entries in these tables were generated directly from computer output and the formatting remained unchanged to facilitate traceability and quality assurance. DOE is of the view that these results are probably better represented with fewer significant figures, and the data presentation in this *Final TC & WM EIS* has been revised accordingly.

231-170 The difference referred to by the commentor is not a discrepancy. The Base Case and Alternate Case flow fields were independently calibrated to water table elevation. In general, calibration to water table elevation is a useful method and, in the absence of specific groundwater flux measurements, probably the best method to develop a reasonable flow field. However, calibration to head alone does not guarantee that transport predictions will agree with field observations. This is the reason that the transport predictions were checked against field observations. It was determined that two independent models calibrated to head data yield qualitatively different results for transport, and that the Base Case calibrated model is in better agreement than the Alternate Case calibrated model with field data.

231-171 The text in this *Final TC & WM EIS* has been revised to say "particle density," instead of "bulk density."

231-172 The purpose of the analysis presented in Appendix O, Section O.6.4, was to clarify whether peak concentrations for uranium-238 were captured during the 10,000-year period of analysis. The results in Section O.6.4 suggest that the peak concentrations for uranium-238 definitely do occur after the 10,000-year period of analysis, probably in the 20,000- to 30,000-year timeframe. This *Final TC & WM EIS* was revised to explicitly state this finding.

231-173 The results presented in Appendix O, Section O.6.4, are for the Base Case flow scenario. This *Final TC & WM EIS* was revised accordingly.

231-174 Material on how concepts such as dose, risk, and Hazard Index are applied in environmental actions is provided in Appendix Q, Section Q.2, of this final EIS. In addition, Chapter 3, Section 3.2.10.1, and Appendix K have discussions of dose and risk concepts, including established standards and guidelines.

231-175 Graph formats for each alternative were chosen to display the data for maximum readability. Presentation of the results was revisited as a matter of course in the preparation of this final EIS.

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the TC&WM EIS. The WTP is under construction and, according to the TC&WM EIS, is 40 percent complete.[21]

Alternative 6A would treat all tank waste as high-level waste and require five high-level waste melters. It is also unclear whether the very diverse waste types that would constitute the melter feed could be successfully processed as borosilicate glass. Further, under this alternative, high-level waste processing would continue for 145 years. The WTP would have to be replaced. New DSTs would have to be built. The technical uncertainties would be compounded by the logistical and budgetary uncertainties. Risks of SST leaks and tank failures over such a long period would increase. For these reasons, we support pretreatment of the waste and completion of treatment expeditiously.

231-215 cont'd

1. Safety

However, the course towards successful pretreatment is unclear at present. In a November report (issued just a few weeks after the TC&WM EIS), the Defense Nuclear Facilities Safety Board raised serious performance and safety concerns about the pulse jet mixers that are a critical part of the pretreatment process in the WTP.[22]

The three safety issues identified were:

a. Inadvertent criticality due to preferential separation and settling of particles with "high concentrations of fissile materials (e.g. uranium or plutonium)" creating a sediment layer at the bottom of the pretreatment vessel due in part to "underpowered pulse jet mixers";
b. Release of flammable gas generated in bottom sediments by radiolysis under certain conditions;
c. Lack of demonstration of a sufficient level of reliability of the pulse jet mixer for the one million to ten million cycles and the problem that "insufficient reliability can ultimately lead to failure of structural components in process vessels…."[23]

231-216

The report noted that the DOE contactor, Bechtel National, Incorporated (BNI) "has not conducted nor does it plan to conduct any long-term test to demonstrate the reliability of a fully prototypic mixing system…."[24]

The problem is further complicated by the reality that the solution to the problems identified by the DOE would, according to the Vice-Chairman of the DNFSB, require the "deployment of new mixing, sampling, and separation systems. The result would be new design basis requirements

[21] TC&WM EIS 2009, Summary, p. S-36.
[22] Memorandum from A. Poloski to T.J. Dwyer, *Subject: Inadequate Mixing, Waste Treatment and Immobilization Plant*, Defense Nuclear Facilities Safety Board Staff Issue Report, November 11, 2009, with a cover letter dated January 10, 2010 from Vice-Chairman of the DNFSB, John E. Mansfield, to Inés Triay, Assistant Secretary of Environmental Management, Department of Energy. On the Web at http://www.dnfsb.gov/pub_docs/staff_issue_reports/hanford/sir_20100106_hd.pdf. Memorandum cited hereafter as DNFSB 2009; cover letter cited hereafter as DNFSB 2010.
[23] DNFSB 2009, p. 2.
[24] DNFSB 2009, p. 2.

231-176 The list of constituents included in the detailed analysis for the *Draft TC & WM EIS* was developed using a screening analysis based on constituents and inventories present in the BBI for the HLW tanks. The screening analysis considered decay and ingrowth both at the source and during transport. In particular, for plutonium-241, complete conversion of the BBI plutonium-241 inventory to americium-241 would increase the BBI americium-241 inventory by approximately 3 percent and would contribute less than 1 percent of dose impact for the intrusion screening scenarios.

231-177 DOE believes that a representative set of scenarios was selected for analysis in this EIS in accordance with standard practice. The primary use of that set was to produce estimates of the human health impacts, thus informing the comparison of alternatives. The scenarios were chosen both to accommodate lifestyles representative of the region and to include—in addition to direct groundwater consumption—indirect exposure by way of other environmental media. Because the scenarios analyzed were constructed assuming significant exposures to contaminated materials via multiple media and exposure pathways, DOE believes that additional variations would not lead to outcomes qualitatively different from those already presented in the *Draft TC & WM EIS*.

231-178 Appendix Q includes long-term radiological and chemical human health impacts. Please see Appendix K for short-term radiological and chemical human health impacts.

231-179 The discussion in Appendix Q on page Q–22 of the *Draft TC & WM EIS* states that doses due to the ingestion of drinking water are reported in the long-term impacts analysis. This analysis includes those long-lived radionuclides of concern.

231-180 Regarding the exposure parameters used in the American Indian scenarios, the intent of those scenarios was to collectively reflect American Indian lifestyles for the purpose of comparison. Both the activities and parameters used in those scenarios are based on existing reports and compilations. It was never the intent to analyze all possible American Indian scenarios. However, in Appendix W, Section W.3, data provided by the tribes are now used to estimate peak impacts on Yakama and CTUIR hunter-gatherers for a representative alternative, Alternative Combination 2, without non–*TC & WM EIS* sources.

231-181 In response to this comment, DOE has reviewed regulatory guidance and tribal recommendations regarding this scenario and has increased the fish intake and sweat lodge use for the American Indian hunter-gatherer. Also in Appendix W,

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for particle size and density for WTP that must be consistent with the actual performance of the newly deployed systems."[25]

This is a rather alarming state of affairs when so much construction of the WTP has already been completed. Addressing the problems identified by the DNFSB, redesign as necessary, and full testing are essential, since pretreatment is central to the separation of high-level tank waste into high activity and low activity waste streams that would then be vitrified in separate melters into Immobilized High-Level Waste (IHLW) and Immobilized Low Activity Waste (ILAW). The present course – no long-term reliability test – is very risky, especially as the DOE does not appear to have a viable back up plan.

The Final EIS should include provisions for the full implementation of the DNFSB's recommendations. It should also include urgent development of backup technologies for pretreatment that are compatible with vitrification either as IHLW and ILAW of the all the waste in the waste steams created from such pretreatment. As noted below, we are opposed to onsite disposal of ILAW and to any treatment option, such as bulk vitrification or stone casting, that would result in any tank waste being disposed of onsite. A back up approach could be explored would be to expand Alternative 6A to include more high-level waste melters, some possibly with phosphate glass, so that additional DSTs and replacement of the WTP would not be required and processing would be completed within about 25 years of the start of the WTP, as now envisioned for Alternatives 2B, 6B, and others. Any option that extends the emptying of the tanks and vitrifying those wastes beyond 2043 would be unacceptable. There have already been far too many delays.

231-216 cont'd

2. Technetium-99 removal

As presently designed, the WTP does not include removal of technetium-99 so that it can be vitrified in the HLW waste stream. The TC&WM EIS makes contradictory statements about Tc-99 removal and its environmental impacts. In the summary it states:

> Tank Closure Alternative 2B includes technetium-99 removal in the WTP, a pretreatment activity that separates technetium-99 and sends it for immobilization into IHLW glass. By contrast, Tank Closure Alterative 2A assumes no technetium-99 removal in the WTP; therefore, most of the technetium-99 is immobilized in ILAW glass and disposed of onsite in an IDF. **The analysis indicates that ILAW glass with or without technetium-99 has similar potential short-term and long-term impacts. The analysis further indicates that removal of technetium-99 and disposal of it offsite as IHLW glass provides little reduction in the concentrations of technetium-99 at either the Core Zone Boundary or the Columbia River nearshore.** This is because the rate of release of technetium-99 from ILAW glass is small when compared to the rate of release of technetium-99 from other sources such as ETF [Effluent Treatment Facility]-generated secondary wastes and tank closure secondary wastes.[26]

231-217

However, Volume 1 of the TC&WM EIS states:

[25] DNFSB 2010.
[26] TC&WM EIS 2009, Summary, p. S-91. Emphasis added.

Section W.3, data provided by the tribes are used to estimate peak impacts for both a Yakama and a CTUIR hunter-gatherer for a representative alternative, Alternative Combination 2, without non–*TC & WM EIS* sources.

231-182 The peak total risk during the year of peak total risk is calculated by summing the total risk for all constituents for each year and then determining the maximum risk and year over the time period. The peak total dose during the year of peak total dose is calculated in the same manner. When dealing with a mixture of radionuclides, it is possible for the peak total risk and peak total dose to occur in different years.

231-183 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. To this end, this *TC & WM EIS* evaluates the long-term impacts of different potential approaches to closing the SST farms ranging from no closure to complete clean closure. As discussed in this *TC & WM EIS*, the modeled responses of the groundwater system (as indicated by concentration of contaminants as a function of time at the Core Zone Boundary) support the finding that past leaks from SSTs are an important factor in determining future outcomes.

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.

231-184 There are two aspects that have bearing on predicted risk in the *Draft TC & WM EIS*. First, there is some conservatism in the predicted concentrations presented in the draft EIS, which resulted in predicted modeled exceedances of benchmark standards. This is why the second aspect—the regulatory context—remains important. This EIS addresses those laws and requirements that would apply to the proposed actions, depending on the alternative. Issues concerning the ability to meet legal standards or requirements are also discussed, along with the potential mitigation measures that may be needed and that are feasible for DOE

> Another assumption detailed in Appendix D of this *TC & WM EIS* is partitioning of technetium-99 in IHLW, ILAW, and supplemental treatment primary waste forms. Without technetium-99 removal as a pretreatment step in WTP, the analysis assumes that roughly 97 to 98 percent of the technetium-99 from treated tank waste would be captured in ILAW or supplemental treatment waste products, 1 to 2 percent would be captured in secondary waste forms, and less than 1 percent would be captured in IHLW.… However, under Tank Closure Alternative 2B, where technetium-99 removal would be incorporated as a pretreatment step in WTP, 97.5 percent of technetium-99 is expected to be captured in IHLW and only 1 percent in ILAW.… Similar to iodine-129 above, **technetium-99 is a conservative tracer with a long half-life (211,000 years) and is projected to exceed benchmark concentrations. Potential mitigation measures that could be considered include technetium-99 removal as a pretreatment option in the WTP.** Also, the development of more robust, longer-performing waste forms, particularly for supplemental treatment technologies and grouted secondary waste, could be pursued.[27]

231-217 cont'd

The analysis in the TC&WM EIS indicates that while other sources of Tc-99 contribute most of the contamination, Tc-99 from the tanks themselves would constitute a sufficient source term to cause an exceedance of the reference drinking water limit of 900 picocuries per liter that DOE has used. Specifically, the difference in peak groundwater concentration of Tc-99 at the boundary of the core zone between Alternative 2A, which does not include Tc-99 removal, and in Alternative 2B, which does, is 1,900 picocuries per liter.[28] Hence, while the total concentrations in both cases are over 25,000 picocuries per liter, the situation calls for reducing other sources rather than adding a source that by itself would cause a violation of the drinking water limit. As we shall see the main other source of Tc-99 within the actions specified in the TC&WM EIS is offsite waste, which is easily controlled by not bringing it to Hanford.

Tc-99 removal technology exists. Some alternatives included in the TC&WM EIS include its incorporation. It should be incorporated into the WTP design and construction as specified in Alternative 2B.

3. Iodine-129 capture

231-218

The TC&WM EIS does not include any alternative for incorporating iodine-129 in the HLW waste stream. Iodine is volatile and would have to be captured by secondary recovery. According to the TC&WM EIS:

> One of the assumptions of the *TC & WM EIS* analysis is that approximately 20 percent of iodine-129 would be captured in primary waste forms (e.g., ILAW, bulk vitrification, or steam reforming waste forms), with the balance due to volatization recovered in secondary waste forms. The only exception would be under Tank Closure Alternatives 3B, 4, and 5, where cast stone would capture a higher percentage of iodine-129 due to the nonthermal nature of this treatment technology**. Iodine-129,** as mentioned above, is one of the conservative tracers with a half-life of approximately 17 million years and **is**

[27] TC&WM EIS 2009, Vol. 1, p. 7-16. Emphasis added. Grouting or any onsite disposal of Tc-99 from the tanks is inappropriate, since the half-life of Tc-99 is much longer than the timeframe of major geologic disruption in the region, making shallow land burial of such radionuclides inappropriate (see below).
[28] This difference is calculated from Tables Q-59 and Q-80.

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to implement. In particular, additional mitigation measures could be required in future permits issued by the State of Washington or addressed under the scope of the TPA as part of future remedial actions that are subject to CERCLA. In the ROD, DOE will identify and discuss the factors considered in reaching its decisions, such as economic, technical, and national policy considerations, along with mitigation and monitoring measures that will be implemented. In all cases, DOE will select activities designed to protect public health and safety.

231-185 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.

231-186 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 Section Q.2.2.2, the American Indian resident farmer scenario involves 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 that 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, and consumption of domestic livestock, by consumption of game animals, specifically deer. An important difference between the hunter-gatherer and resident farmer scenarios is that the hunter-gatherer is exposed to contamination from both surface water and groundwater. These scenarios, presented in Appendix Q, were developed in consultation with American Indian representatives, and DOE believes they adequately represent the range of exposure scenarios for American Indian peoples. Sensitivity analyses using the specific American Indian parameters provided by the Yakama Nation and the Umatilla Tribes were completed for Alternative Combination 2; the results are included in Appendix W, Section W.3, of this *TC & WM EIS*.

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projected to exceed benchmark concentrations. As such, reasonable mitigation measures could be considered that would recycle secondary waste streams into the primary waste stream feeds within the WTP to increase iodine-129 capture in ILAW and bulk vitrification, which are considered more stable waste forms than those associated with secondary waste. The current WTP design supports the ability to recycle. For example, one method would involve the recycling of iodine within the WTP by capturing it in the submerged bed scrubber and returning it to pretreatment. This recycling could theoretically concentrate the iodine in the feed stream, which, in turn, could put more iodine in a specific volume of glass product. Also, the development of more robust, longer-performing waste forms, particularly with regard to cast stone, steam reforming, and grouted secondary waste, could be pursued.[29]

The current plan to dispose of iodine-129 in a secondary waste stream in the Effluent Treatment Facility (ETF) is clearly unsatisfactory. The TC&WM EIS analysis shows that the annual flux of iodine-129 at the water table is orders of magnitude greater in case of ETF disposal compared to incorporation in ILAW glass that is disposed of on site. The figure below, reproduced from Appendix N of the EIS, shows that iodine-129 contamination of the groundwater would exceed that from ILAW by two orders of magnitude even when the majority of the iodine-129 (70 percent) is incorporated in the ILAW.

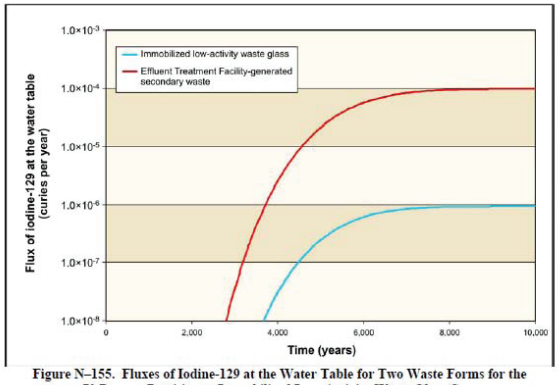

Figure N–155. Fluxes of Iodine-129 at the Water Table for Two Waste Forms for the 70 Percent Partition to Immobilized Low-Activity Waste Glass Case

Source: TC&WM EIS, Vol. 2, p. N-108.

[29] TC&WM EIS 2009, Vol. 1, p. 7-16. Emphasis added.

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231-218 cont'd

231-187 Appendix U, Figure U–1, discusses future tritium concentrations. These increases result from multiple sources contributing to the plume. The strength of contribution from each source varies with time. Appendix U of this *Final TC & WM EIS* has been revised to include an explanation of this behavior.

231-188 Appendix U, Figure U–3, discusses future strontium-90 concentrations. These increases result from multiple overlapping sources, each with a different flux to the aquifer as a function of time. Appendix U of this *Final TC & WM EIS* has been revised to include an explanation of this behavior.

231-189 As described in Appendix R, and summarized in Chapter 6, Section 6.1, cumulative impacts were estimated by the addition of impact values for the alternative combinations (Chapters 4 and 5); the baseline (Chapter 3); and past, present, and reasonably foreseeable future actions (Appendices R, T, and U). Because the cumulative impacts analysis involves the consideration of past, present, and reasonably foreseeable future contamination, it includes much of the same information as a baseline risk assessment. As described in Section S.3.5 of Appendix S, 403 waste sites are included as part of the other past, present, and reasonably foreseeable future actions considered in the cumulative impacts analysis for groundwater.

231-190 As described in the Summary, Section S.1.3.2, and Chapter 1, 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. These six sets of cribs and trenches (ditches) are noted in Chapter 2, Sections 2.5.2 and 2.9.1, and are described in detail in Appendix D, Section D.1.5.

231-191 The scope of this *TC & WM EIS* includes decisions on storage, retrieval, treatment, and disposal of tank waste and closure of the SST system, including the tank system and the vadose zone impacted by the tank farms (i.e., past leaks). 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). The State of Washington has agreed that the alternative descriptions identify the information needs necessary 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. When Ecology provides approval

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Appendix E notes that submerged bed scrubbers will be part of the offgas treatment of both the HLW and LAW melters. It is unclear why the iodine-129 rich scrubber solution cannot be recycled to the HLW waste stream for incorporation into IHLW rather than into ILAW. This is important since under most options, the DOE plans to dispose of ILAW on site. Under Option 6B, the DOE states that ILAW would be managed as HLW and stored on site, but no disposal path is specified. This option should logically include disposal of ILAW glass in a deep geologic repository since it treats ILAW as high-level waste for storage purposes.

231-218 cont'd

The bottom line is that iodine-129 should be recovered an incorporated into glass that will be disposed of in a deep geologic repository. It would be preferable to incorporate this into IHLW and the Final EIS should contain at least one such alternative.

4. Internal inconsistencies in I-129 and Tc-99 contamination estimates

Appendix Q provides details of the results of DOE's calculations regarding the impacts of various alternative actions taken under the TC&WM EIS at various points in the Hanford Site. It also provides the year of peak impact. Appendix U does the same for the combined impacts of actions taken under the TC&WM EIS and other sources of contamination not covered under the TC&WM EIS. Specifically, Appendix U includes the contamination due to the non-tank-farm 200 Areas contamination.

The results in Appendix Q and Appendix U are inconsistent and the inconsistency indicates that at least one set of calculations is incorrect; it may be that both are incorrect.

231-219

Specifically, the concentration from TC&WM EIS and non-TC&WM EIS actions should be equal to or greater than that attributable to TC&WM EIS actions alone. This is not the case. For instance, Appendix Q, Table Q-80 states that the technetium-99 contamination at the core zone boundary in the year of peak dose under Alternative 2B (and other comparable alternatives) would be 25,900 picocuries per liter in the year 2050. Appendix U states that under Alternative Combination 2 (of which Alternative 2B is a part) the Tc-99 concentration at the core zone boundary at the time of peak dose would be 1,780 picocuries per liter, or more than an order of magnitude lower. Further, it states that the year of peak impact was in the past – 1997.[30]

How can the impact from all sources be less than the impact from some sources? How can there be a greater concentration on Tc-99 from some activities in the future when Appendix U states that a smaller concentration from all activities has already occurred in the past?

[30] The Tc-99 concentrations are from Table Q-80 and Table U-9. The values in these tables are given in curies per cubic meter. These have been converted here to picocuries per liter (by multiplying curies per cubic meter by a factor of 10^9) for consistency and comparability with the usual method of stating drinking water MCLs. See TC&WM EIS 2009, Vol. 2, p. Q-98 and p. U-62.

of DOE's proposed actions by issuing a permit, the applicable WAC regulations will be applied and enforced. The state closure standards for the owners and operators of all dangerous waste facilities are defined (WAC 173-303-610(2)); references to the tank systems (WAC 173-303-640) and corrective action requirements (WAC 173-303-645) are included. The regulations describe specific requirements for closure of the tank system (WAC 173-303-640(8)(a) and (b)), including a requirement for DOE to "remove or decontaminate all wastes residues, contaminated soils, and structures and equipment contaminated with waste" from the tank system. If DOE "demonstrates that no contaminated soils can be practically removed or decontaminated," then the corrective action regulations (WAC 173-303-645) will apply.

231-192 The conveyance of WTP-generated wastewater effluent to, and its treatment in, the ETF and other facilities are discussed in the surface water sections of Chapter 4, Section 4.1.6, of this EIS. Baseline operational characteristics of the ETF and related facilities in the ETF system, including the Liquid Effluent Retention Facility impoundments and State-Approved Land Disposal Site, are discussed in Chapter 3, Sections 3.2.6.3.1 and 3.2.12.1.5. Appendix E, Section E.1.2.3.3.3, presents DOE's enabling assumptions and associated uncertainties regarding future ETF operations and those of the related Hanford facilities in support of Hanford WTP activities. Specifically, DOE assumed that the ETF main building (2025) and the ETF support building (2025-EA) would require replacement, while associated facilities in the ETF system, including the Liquid Effluent Retention Facility impoundments and State-Approved Land Disposal Site, would be suitable for life extensions. DOE also assumed that the current design capacity of the ETF would be sufficient to support all current Hanford activities, as well as the tank closure activities analyzed in this EIS. While DOE has not further quantified or characterized potential influent streams to the ETF system, DOE has accounted for the impacts of constructing, operating, and deactivating facility replacements for the ETF and other facilities throughout this *TC & WM EIS* to provide a conservative analysis of future waste treatment infrastructure needs based on the enabling assumptions and given uncertainties.

231-193 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), all of which are analyzed in this *TC & WM EIS*. Appendix E, Section E.1.2.4.4, of this *TC & WM EIS* describes the WTP melters and the assumptions and uncertainties regarding disposition of the melters after use. It is

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The same problem is found in these two tables in regard to iodine-129. The respective concentrations at the core zone boundary are 30 picocuries per liter in Table Q-80 (in 2050) and only 8.79 picocuries per liter in Table U-9 (in 1997).

A careful consistency check as well a check on the validity of the source terms and models that underlie these calculations is needed, quite apart from issues associated with the validity and accuracy of the models.

Recommendations: The Final EIS should include provisions for the full implementation of the DNFSB's recommendations. There should be no onsite disposal of ILAW and or resort to any treatment option such as bulk vitrification or stone casting that would result in any tank waste being disposed of onsite. All tank waste should be immobilized either as ILHLW or ILAW. The approach in Option 2B for two HLW and six ILAW melters would meet this goal. Treatment should include alternatives for incorporating almost all Tc-99 (as in Alternative 2B) and iodine-129 (not presently in any alternative) in IHLW. The calculations for Tc-99 and I-129 need to be carefully checked for consistency, quite apart from issues associated with the validity and accuracy of the models.

231-219 cont'd

F. **Treatment of the Cesium and Strontium Capsules**

While the DOE is formally deferring the question of the final disposition of the cesium and strontium capsules, which constitute the most concentrated large source of radioactivity in the DOE complex, the TC&WM EIS discussed the treatment of these capsules. However, only one alternative to the no action alternative is presented. This is unacceptable for the two largest source terms and by far the most concentrated source terms of radioactivity on site.

The course of action that is common to all alternatives other than "no action" is that DOE would "[r]etrieve cesium and strontium capsules from the WESF [Waste Encapsulation and Storage Facility] for de-encapsulation at the Cesium and Strontium Capsule Processing Facility and treatment in the WTP."[31]

It would be safer to remove the cesium and strontium capsules into dry storage and consider a wider range of alternatives to treatment in the WTP. Mixing tens of millions of curies of strontium-90 and cesium-137 into IHLW would greatly increase the heat load and external radiation associated with IHLW. This may be problematic for repository disposal, since heat loading is a primary determinant of space requirements. The number of containers of IHLW will be very large. Increasing the heat loading in these containers could increase the costs of disposal considerably. It would be prudent, especially in a context when no repository site has yet been selected and Yucca Mountain is off the table, to consider a variety of immobilization options for the cesium and strontium now in the capsules. The immobilization of the cesium and strontium in the capsules presents an opportunity to develop more durable waste forms and this should be pursued in parallel to treatment of tank waste in the WTP.

231-220

[31] TC&WM EIS 2009, Summary, p. S-23.

assumed for analysis purposes that the HLW melters would be placed in interim onsite storage until disposition decisions are made and implemented, and that the LAW melters would contain residual ILAW and would be disposed of as MLLW on site in an IDF. If DOE makes decisions regarding their disposition that are not within the bounds of this *TC & WM EIS*, additional analysis may be required.

231-194 The Summary is intended to provide a brief overview of the material contained in this *TC & WM EIS*. For a description of the general WTP configuration, the reader is directed to Chapter 2, Section 2.2.2.2.1, of this *TC & WM EIS*. Chapter 2, Section 2.5.2, provides a more detailed description of the various WTP configurations under the alternatives, along with graphics that depict the differences.

231-195 The purpose of Table S–1 in the *TC & WM EIS* Summary is to provide an overview of comparison of the Tank Closure alternatives. Whether or not a new or additional facility is included under any of the Tank Closure alternatives is indicated by the terms used in the first column. For example, the use of the terms "New WRFs" or "New DSTs" indicates that additional or new facilities would be constructed under that specific alternative. Another example is the use of the terms "Expanded LAW vitrification" or "Replacement of WTP," both of which mean additional or new facilities. DOE does not believe additional clarification is warranted.

231-196 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 low-level waste 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.

231-197 As described in Appendix E, Section E.1.1.1, and, specifically, Section E.1.1.1.2.1, DOE has established and operated under stringent requirements and procedures that ensure the compatibility of waste streams prior to their transfer and mixing. Such requirements and procedures have been in place for many years at Hanford, and DOE is confident that safe waste operations involving compatible waste streams will continue within the tank farms.

231-198 The waste retrieval technologies analyzed in this EIS represent the best-available waste retrieval technologies at the time of this EIS's preparation and the analyses

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Finally, a timeline is needed for completion of cesium and strontium immobilization. It should be completed no later than the immobilization of tank waste.

Recommendations: It would be safer to remove the cesium and strontium capsules into dry storage and consider a wider range of alternatives to treatment in the WTP.

G. Tank and Tank Farm Closure

As discussed above, tanks are likely to have very large residual source terms for radionuclides like strontium-90 and plutonium-239/240 even in the case of 99 percent volume retrieval. Grouting the tanks or simply abandoning the tanks after a certain period of surveillance (the year 2193 is suggested in Alternative 2A) would be inappropriate. Alternatives 6A and 6B propose clean closure, including removal of tanks, and removal of ancillary equipment and some contaminated soil as follows:

> **Alternatives 6A and 6B.** Clean-close all 200-East and 200-West Area SST farms following deactivation by removing all tanks, associated ancillary equipment, and contaminated soil to a depth of 3 meters (10 feet) directly beneath the tank base. Package these materials as HLW for storage on site. Excavate deep soils, where necessary, to remove contamination within the soil column, and treat these soils in the PPF [Preprocessing Facility] to make them acceptable for disposal on site. Process the resulting liquid waste stream in the PPF and dispose of it on site in an IDF [Integrated Disposal Facility]. Dispose of the washed soils in the RPPDF [River Protection Project Disposal Facility]. Cover the cribs and trenches (ditches) associated with the tank farms with a landfill barrier (Base Cases) or clean-close them (Option Cases).[32]

This is broadly acceptable with some provisos. Treating soil as high-level waste and storing it as such is technically and legally sound. But making soils "acceptable for disposal on site" after treatment needs to be defined. As noted above, this acceptability must be in the framework of an overall risk criterion from all residual radioactivity and carcinogenic chemicals not exceeding 10^{-5}. None of the existing plans for cleanup of the Hanford Site meet this criterion. A second proviso is that excavation of the soil may need to be carried out around the tanks and the depth of excavation below them beneath may need to be more or less than 3 meters, depending on the tank and the extent and type of leaks. Rather than a fixed depth, the excavation extent and depth should be determined by sampling and characterization as the tanks and ancillary pipes and other equipment are decommissioned and dismantled. Third, clean closure of the DSTs and associated ancillary equipment should be made part of the TC&WM EIS.

The "Option Case" for Alternative 6B includes clean closure of six cribs and trenches. While this would increase short-term impacts, such as demand for workforce and resources, it would greatly decrease long-term impacts, as noted in the TC&WM EIS:

> Cribs and trenches are major contributors to potential long-term groundwater impacts for all Tank Closure alternatives due to their early discharges in the 1950s and 1960s. As shown in Figure 2–127, for Tank Closure Alternative 1 (no landfill closure of the cribs and trenches), Tank Closure Alternatives 2B, 3A, 3B, 3C, and 6C (landfill closure of the

[32] TC&WM EIS 2009, Summary, p. S-26.

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231-220 cont'd

231-221

are likewise based on the best-available tank, tank waste, and waste retrieval information. However, as additional, relevant information becomes available that is not bounded by the analysis of the representative technologies in this EIS, DOE would re-evaluate this as appropriate.

231-199 "Combined impacts," as used in the referenced section, means the impacts of the tank closure, radioactive waste management, and FFTF decommissioning activities. Tank closure activities would occur in the 200-East and 200-West Areas, which are about 3.2 kilometers (2 miles) from each other, with most activities occurring near the WTP in the 200-East Area. Other tank closure activities would occur in the tank farms and the supplemental treatment technology sites that spread across the 200-East and 200-West Areas. The primary waste management activities would occur at the 200-West Area waste disposal facilities or IDF-East or -West. FFTF is about 16.1 kilometers (10 miles) from the 200 Areas. Because of the distances between the primary locations where activities would occur, there would not be any reasonable combined noise impacts, so no noise impact analyses were performed for these alternative combinations.

231-200 The preferred alternative discussion in Chapter 2, Section 2.12, of this EIS describes how landfill closure addresses past soil contamination. Chapter 7, Section 7.1, describes the closure process in more detail for a waste management area.

231-201 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. 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.

231-202 This EIS assumes several different types of end-state management, as described in the Summary, Chapter 2, and Chapter 9 ("Glossary"), including administrative controls, active institutional controls, and postclosure care, as appropriate. Each of these end-state management options would take place at the completion of an action and is assumed to occur for 100 years following the end of the action (e.g., active institutional controls would be maintained for 100 years following final placement of waste in a storage facility). The 10,000-year time period described in this *TC & WM EIS* represents the period of analysis used for the long-term impact analyses for groundwater, human health, and ecological risk. It

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cribs and trenches), and Tank Closure 6B, Option Case (clean closure of the cribs and trenches), estimates of human health impacts (radiological risk to the drinking-water well user) correlate with the closure options. For example, Tank Closure Alternative 1 and Tank Closure Alternatives 2B, 3A, 3B, 3C, and 6C have similar radiological risk to the drinking-water well user at the Core Zone Boundary throughout the period of analysis, because the contaminants have already reached the vadose zone or groundwater and, therefore, there is minimal benefit to the addition of a landfill closure barrier. By contrast, results for Tank Closure Alternative 6B, Option Case, indicate that clean closure of the cribs and trenches significantly reduces radiological risk to the drinking-water well user at the Core Zone Boundary after calendar year 7000. The variability in lifetime radiological risk represented in Figure 2–127 is attributable primarily to the release of multiple constituents at differing times and rates from 35 sources comprising these sets of cribs and trenches and secondarily from variability in prediction of concentration inherent in the method applied (i.e., particle tracking) for simulation of transport of contaminants in the unconfined aquifer.[33]

231-221 cont'd

For the issue of unrestricted access and of treaty rights, it is clear that clean closure of cribs and trenches would be preferable.

Recommendations: Alternative 6B is broadly acceptable for tank closure, including removal of soil and ancillary equipment, with some proviso, including ensuring that onsite secondary waste disposal meets the overall risk criterion of 10^{-5} as an upper limit in the context of all other wastes to be disposed of onsite. Clean closure of the DSTs and associated ancillary equipment should be made part of the TC&WM EIS. The "Option Case" for Alternative 6B includes clean closure of six cribs and trenches. This should be pursued. While this would increase short-term impacts, such as demand for workforce and resources, it would greatly decrease long-term impacts, as noted in the TC&WM EIS.

H. Waste Disposal

The TC&WM EIS is even more complex in its consideration of waste management approaches and has a bewildering array of possibilities (a fact that is recognized within the document). Apart from the various wastes generated as part of the tanks closure process, there are wastes from other areas of Hanford, offsite wastes, and a variety of waste disposal sites discussed in the TC&WM EIS. We will take up the question of IHLW, ILAW, and Greater than Class C waste first and then discuss low-level wastes and mixed low level waste issues.

231-222

1. Immobilized High-Level Waste and Immobilized Low-Activity Waste

In the absence of a high-level waste repository or even an active program to find and develop one, Hanford must make provision for storage of all the high-level waste. Further, ILAW waste should be managed as high-level waste when stored on site. This is provided for in Alternative 6B. The Final EIS should specify the options. One suitable option to examine would be to dispose of the vitrified ILAW as Greater than Class C waste along with any Greater than Class C waste generated during Hanford remediation. We are opposed to shallow land disposal of

[33] TC&WM EIS 2009, Vol. 1, p. 2-290.

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does not represent the assumed timeframe for period of institutional controls. For clarity, the definition of "10,000-year period of analysis" is included in this final EIS in the Summary, Chapter 2, and the Glossary, as appropriate.

231-203 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 commentor's concerns regarding DOE's Preferred Alternatives are noted. Chapter 2, Section 2.12, of the *Draft TC & WM EIS* discusses DOE's Preferred Alternatives for FFTF decommissioning (Alternative 2) and waste management (Alternative 2). It further explains that, at the time the *Draft TC & WM EIS* was being prepared, DOE did not have a specific preferred alternative for tank closure, but could identify a range of preferred storage, retrieval, treatment, and closure options that met DOE's purpose and need. 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 Chapter 2, Section 2.12, of this *Final TC & WM EIS*, for a comprehensive discussion of preferred alternatives. DOE's Preferred Alternatives in this *Final TC & WM EIS* may not necessarily represent the most environmentally preferred alternatives, but this is not required by NEPA or CEQ regulations.

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GTCC waste at any site, including Hanford. Construction of a GTCC disposal site at Hanford is one of the alternatives being considered in the GTCC EIS being prepared by DOE.[34] Besides being inappropriate for GTCC, such a site would add to the burdens of contamination on the site instead of reducing it.

In view of the lack of an active program for a deep geologic repository, considerable storage will be needed for IHLW and also for ILAW (the latter under Alternative 6B). The TC&WM EIS anticipates this:

> The IHLW Shipping/Transfer Facility would be constructed concurrently to support IHLW glass canister shipments. Construction of additional storage modules is included under each of the *TC & WM EIS* alternatives to provide storage capacity for IHLW glass produced in the WTP. In the case of Tank Closure Alternatives 6A, 6B, and 6C, all of the waste would be managed as IHLW glass, and appropriate storage facilities are considered for IHLW glass, ILAW glass, and waste from closure of the tank farms.
>
> **E.1.2.1.3.1 Assumptions and Uncertainties**
>
> Due to uncertainties regarding the timing for shipment of IHLW glass canisters off site and the capacity for receiving all waste managed as HLW (Tank Closure Alternatives 6A, 6B, and 6C), it was assumed that onsite storage facilities would be required for all IHLW glass.[35]

This is a sound approach. Additional waste storage buildings should be part of the Final EIS preferred alternative consistent with 6B streams from IHLW and ILAW.

We are also in agreement that HLW melters taken out of service should be treated as high-level waste and that disposal onsite should be ruled out.[36]

231-222 cont'd

2. Low-Level Waste and Mixed Low-Level Waste

It is useful to enunciate a principle for onsite disposal of waste. In general radionuclides disposed of on site should be short-lived, defined as those with half-lives of less than ten years. We understand that sharp segregation of waste into short and long-lived components is often impossible. Given this problem, the general principle should be that the total source terms for residual long-lived radionuclides should be such that the restrictions discussed in Section C (above) are maintained in the post-remediation phase.

We have already discussed the need for immobilizing technetium-99 and iodine-129 retrieved from the tanks into wastes that will not be disposed of at Hanford, though small fractions may wind up mixed with rubble and very dilute low-level wastes. These should be minimized. Even one percent of the tank source term for Tc-99 would be about 300 curies. One percent of the iodine-129 source term would be about half a curie, which is a larger source term than the Tc-99

231-223

[34] TC&WM EIS 2009, Vol. 2, p. S-15.
[35] TC&WM EIS 2009, Vol. 2, p. E-14.
[36] TC&WM EIS 2009, Vol. 2, p. E-172.

See response to comment 231-185 regarding future DOE decisions.

231-204 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 the cleanup of past leaks.

231-205 Because DSTs may be located in an area of the SST system being closed under these Tank Closure alternatives, the impacts associated with closure of all of the DSTs (such as the impacts of filling the tanks and covering the tanks with a closure barrier) were evaluated. Chapter 1, Section 1.4.2, addresses decisions not to be made in this *TC & WM EIS* and states a decision that closure of DSTs is not within the scope of the proposed actions because the DSTs are active components needed to complete waste treatment. Closure of the DSTs would be addressed at a later date, subject to appropriate NEPA review.

231-206 As described in Chapter 5, Section 5.4, several hundred impact scenarios could result from the potential combinations of the 11 Tank Closure, 3 FFTF Decommissioning, and 3 Waste Management alternatives when factored with their associated option cases and waste disposal groups. For analysis purposes, three combinations of alternatives were chosen to represent key points within the range of actions and associated overall impacts that could result from full implementation of the three sets of proposed actions. DOE believes that these three combinations adequately represent the range of impacts presented by the possible impacts scenarios.

This EIS is not being prepared under CERCLA; therefore, the ARARs process does not apply. The scope of the proposed actions evaluated in this *TC & WM EIS* does not include CERCLA remedial actions. Chapter 6 addresses cumulative impacts, including reasonably foreseeable CERCLA activities. All environmental restoration actions conducted at Hanford under CERCLA must evaluate the "legally applicable, relevant and appropriate requirements of Federal and State laws and regulations" to establish the appropriate cleanup level that must be achieved at an individual cleanup site.

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one given that the drinking water MCL for iodine-129 is almost three orders of magnitude lower than that of Tc-99.

Remediation of other parts of the Hanford Site, such as the 100 and 300 Areas, which are along the Columbia River, is proceeding with the wastes being disposed of in the Environmental Restoration Disposal Facility (ERDF). ERDF is a lined disposal facility with provision for leachate collection. We recognize that waste disposal in ERDF is a concomitant of the way cleanup of the 100 and 300 Areas has been organized. But we also note that the DOE itself has projected a very substantial exceedance of the drinking water limits under EDRF, and by extension at the core zone boundary, since ERDF abuts the southern end of the core zone. Table 2 below is taken from a DOE publication related to ERDF.

Table 2. Potential Groundwater Contaminants at the ERDF

Constituents	Maximum detected soil concentration	Predicted groundwater concentration	Travel time to ERDF boundary
Radionuclides	**picocuries per gram**	**picocuries per liter**	**Years**
Carbon-14	640	1.3×10^{6}	520
Technetium-99	1.1	2.3×10^{3}	520
Total uranium	20034	1.1×10^{3}	520
Uranium-233/234	2100	5.3×10^{2}	520
Uranium-235	638.4	2.3×10^{1}	520
Uranium-238	9143	4.9×10^{2}	520

Source: United States Department of Energy. *Remedial Investigation and Feasibility Study Report for the Environmental Restoration Disposal Facility*. DOE/RL 93-99 rev.1. Richland, WA: DOE Richland Operations Office, October 1994. On the Web at http://www5.hanford.gov/pdw/fsd/AR/FSD0001/FSD0047/D196061256/D196061256_58632036_76907_802.pdf. Table 4-10 (pp. 4T-10c to 4T-10d)

The estimated future peak concentration of carbon-14 is more than two orders of magnitude greater than the drinking water MCL (calculated from the 4 millirem per year dose limit). The technetium-99 concentration would be more than a factor of two greater than the MCL. Total uranium would be about 50 times more than the drinking water limit.

We are not commenting here on the use of ERDF for ongoing remediation efforts, notably in the River Corridor. However, we note that it will be impossible to meet cleanup criteria if EDRF is just capped. It will be essential to clean close ERDF as part of the series of steps to fully remediate Hanford. Plans for doing so should be part of the CERCLA process for the Central Plateau.

The low-level wastes that will be generated as part of the tank waste remediation process are proposed to be disposed on in various ways on site. Aside from the no action alternative, the TC&WM EIS proposes the use of one or two integrated disposal facilities (IDF East and IDF West). IDF West would have a small capacity relative to IDF East and there appears to be no real purpose to building both of them. The DOE has noted this. IDF West should be eliminated from the set of alternatives, since it needlessly complicates an already complex picture in terms

231-223 cont'd

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. This is not the same as an "ARARs analysis" under CERCLA, and it serves a different purpose. The identification of legal requirements in a NEPA document assists an agency in its planning, funding, and decisionmaking process. It also provides full disclosure to members of the public, stakeholders, and other agencies regarding the potential scope of an agency's effort to implement a proposed action (or an alternative) in terms of the subsequent permitting, other approvals, consultations, and coordination requirements.

231-207 As noted in the comment, background exposure comprises contributions from different sources whose magnitudes vary with location and behavior of the receptor. This *TC & WM EIS* recognizes this fact but will continue to follow the approach of the International Commission on Radiological Protection and the National Council on Radiation Protection and Measurement in including estimates of exposure to radon in estimates of background radiation. Please see Chapter 3, Section 3.2.10.1, for a detailed discussion on radiation exposure and risk.

231-208 See response to comment 231-206 for a discussion of ARARs and CERCLA with regard to this EIS.

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 (which include cribs, trenches [ditches], and tile fields) is being addressed under CERCLA, 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 during the SST closure process. The cumulative impacts analysis for this *TC & WM EIS* (see Appendix U and Chapter 6) includes the vadose zone of the 200 Areas in addition to other areas of Hanford.

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.

of potential alternatives. Besides, the analysis in the TC&WM EIS indicates that groundwater pollution would be greater under IDF West compared to IDF East for the same source term.[37]

231-223 cont'd

However, the main source term at the IDF is not Hanford origin waste, but offsite waste:

> For iodine-129 and technetium-99, release to the vadose zone is dominated by waste management sources, in particular by offsite waste disposed of in IDF-East. Offsite waste accounts for over 93 percent of the total release to the vadose zone for iodine-129 and over 83 percent of the total release to the vadose zone for technetium-99.[38]

It defeats the purpose of remediation if offsite wastes contribute to the majority of the contamination for thousands of years and drinking water standards are violated for thousands of years as a result of offsite wastes. Import of wastes into Hanford can be controlled by the DOE in that it can manage the wastes otherwise. We recommend that the Final EIS have an alternative that does not include offsite wastes containing long-lived radionuclides. This alternative should also limit the Hanford long-lived radionuclide source term so that it complies with the restrictions in Section C above.

The DOE has estimated impacts of offsite wastes based only on the source terms that DOE could somehow calculate. However, these estimates contain large and unquantified uncertainties. The TC&WM EIS notes:

> Estimates of potential, future offsite generated LLW and MLLW volumes requiring disposal in DOE regional disposal facilities are comprised primarily of waste generated in **cleanup and decommissioning projects, rather than legacy waste. Much of this work is yet to be planned. Therefore, there 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, particularly from cleanup programs, because the waste does not exist until the cleanup work progresses. Forecasts are based on best available characterization of the site or facility, the technology selected for cleanup, and the work plans. For this reason, the forecast waste characteristics data in most instances relies on representative information from similar waste streams recently sent to disposal. Actual LLW and MLLW disposal profiles were requested from waste managers and several

231-224

[37] TC&WM EIS 2009, Summary. See Tables S-8 and S-9 on pages 100 and 101, respectively.
[38] TC&WM EIS 2009, Vol. 1, p. 5-1197.

231-209 DOE disagrees that building new DSTs is unrealistic or that they would necessarily lead to a variety of problems and delays. It should be noted that Tank Closure Alternatives 3A, 3B, 3C, 4, 6B, and 6C also do not involve DSTs, but do discuss the construction of waste receiver facilities (WRFs).

See response to comment 231-185 regarding future DOE decisions.

231-210 As discussed in Appendix E, Section E.1.2.2.1, modified sluicing could potentially be used to retrieve 99 percent of the waste from the DSTs and nonleaking 100-series SSTs. DOE has developed and implemented a very advanced system for detecting and monitoring leaks and spills from the waste tanks. As discussed in Appendix D, Section D.1.6, Tank Waste Retrieval Leaks, this EIS conservatively assumed 4,000 gallons of tank waste, on average, would leak from each of the SSTs. This volume is considered conservative because of the advanced leak detection and monitoring systems DOE has in place now at the tank farms.

231-211 As discussed in Appendix E, Section E.1.2.2.4, this *TC & WM EIS* assumes a chemical wash system would be required to supplement the MRS and vacuum-based retrieval (VBR) retrieval systems to achieve 99.9 percent retrieval. In addition, as stated in Section E.1.2.2.4.4, this EIS assumes that the chosen chemicals would be compatible with safety requirements (e.g., worker health and safety and nuclear safety requirements), as well as the construction materials, wastes to be treated, and waste-feed-composition requirements for the WTP or supplemental treatment technologies. However, as further discussed in Section E.1.2.2.4.4, although the chemical-wash-system process has been demonstrated at Hanford, there are uncertainties; thus, the acid wash analyzed (oxalic acid) is considered representative of the wash fluids that could be used. As noted in Section E.1.2.2.4.2, chemical washing is identified for use in conjunction with MRS and VBR system retrieval of 99.9 percent of the waste, and the specific chemicals to be used for this process would be selected to minimize potential environmental, health, and safety impacts, while maximizing the effectiveness of residual waste retrieval.

231-212 As discussed in Chapter 2, Section 2.2.2.1.1.5, DOE's strategy includes the use of the MRS to retrieve waste from 100-series SSTs that are classified as known or suspected leakers, and use of a VBR system to retrieve waste from the smaller 200-series tanks, miscellaneous underground storage tanks, and WRFs. Both the VBR and MRS technologies are expected to be capable of retrieving up to 99 percent of the waste in the tanks. To achieve 99.9 percent retrieval, DOE

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

were judged to have the necessary data for modeling and be suitable for projected waste streams.[39]

Many of the source terms are inappropriately estimated. Some do not appear to be "similar waste streams" as claimed. For instance, the Rocky Flats waste composition has been used for estimation at Savannah River Site and West Valley source terms. However, the latter sites have reprocessing plants; SRS also has reactors. Rocky Flats was a facility whose main purpose was to produce plutonium pits and it did not have reprocessing facilities with large amounts of fission products and did not have reactors. As another example, in several cases – Oak Ridge, Savannah River Site, and Idaho National Laboratory– exactly the same volume of mixed low-level waste was estimated. This is completely unrealistic. If the DOE does not have even moderately reliable information, the resultant environmental impact analysis will be meaningless. *231-224 cont'd*

One conclusion from the above is that the offsite source term radiological impacts could be much larger than estimated in the TC&WM EIS. The DOE has made no effort to bound these impacts.

The problem with chemicals is even worse, since the large majority of source terms is not reported. And the unreported source terms are ignored in the impact analysis. [40]

One must conclude that the offsite impacts may be seriously underestimated both in regard to chemicals and radionuclides, including long-lived radionuclides. This reinforces our conclusion that offsite wastes should continue to be banned from the Hanford Site.

3. Other issues relating to waste

The TC&WM EIS discusses the possibility of using phosphate glass as follows:

It has been proposed that the use of a phosphate glass formula for Hanford waste vitrification would have some advantages over the current baseline borosilicate glass. Hanford tank waste has some chemical constituents that are troublesome to incorporate into the base program ILAW and IHLW borosilicate glasses. The low solubility of sulfate in silicate glasses limits the concentration of sodium oxide in the ILAW glass. Without the sulfate problem, an increase in waste loading would be possible for ILAW glass. **Sulfate incorporation and chemical durability have been demonstrated in the laboratory for phosphate glasses formulated for Hanford ILAW. Similarly, for IHLW glass, the chromium solubility limits the waste loading in the baseline borosilicate glass. High chromium content may be incorporated by adding phosphate to the waste feed and operating at 1,200 to 1,250 °C (2,190 to 2,280 °F).** Increased waste loading can be accommodated, and the lower viscosity of the resulting melt allows a shorter residence time in the melter. These factors offer the potential for improved IHLW glass throughput at the WTP. This option was not considered for evaluation in this *TC & WM EIS* because the phosphate glass formula has not been proven to be compatible with production-scale melters, and the resulting product glass *231-225*

[39] TC&WM EIS 2009, Vol. 2, pp. D-127 and D-128.
[40] TC&WM EIS 2009, Vol. 2, table D-82.

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would couple the MRS and VBR system, as appropriate, with a chemical wash process.

DOE would not use the existing SST transfer system due to its age, design limitations, and structural integrity. Rather, the VBR and MRS would make extensive use of hose-in-hose transfer lines, and where necessary, new underground transfer lines, as discussed in Appendix E, Section E.1.2.2.7. The existing SST infrastructure would be removed or remediated in place, depending on the closure approach selected.

See response to comment 231-185 regarding future DOE decisions.

231-213 As explained in Chapter 2, Section 2.12, 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 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. Appendix D of this EIS discusses 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 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 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.

231-214 As noted by the commentor and discussed in Appendix D of this EIS, there are uncertainties regarding the residual waste inventories. See response to comment 231-213 regarding tank waste composition and the tank closure process.

231-215 Comment noted.

231-216 See response to comment 231-23 for a discussion of DNFSB recommendations.

As stated in this EIS, these are two representative supplemental treatment technologies that are analyzed in this EIS and are being considered by DOE. Regarding the use of phosphate glass melters, Appendix E, Section E.1.3.3.3.3,

has not been shown to meet the waste acceptance technical requirements for DOE's Civilian Radioactive Waste Management System (DOE 2007). [41]

Given that Yucca Mountain is no longer being considered as a repository, the phosphate glass melter approach should be seriously reevaluated as a complement to the borosilicate glass.

Recommendations: There should be no import of offsite wastes into Hanford. It will eventually be essential to clean close ERDF as part of the series of steps to fully remediate Hanford. Plans for doing so should be part of the CERCLA process for the Central Plateau.

I. Central Plateau Cleanup

The data and analyses in Appendix U of the TC&WM EIS show that an intensive cleanup of the non-tank-farm 200 Areas will be needed if the Central Plateau, and hence the Hanford Site, are to be restored to anywhere near environmentally acceptable conditions. For instance, the TC&WM EIS estimates that the Columbia River nearshore concentration of plutonium-239/240 will be 4250 picocuries per liter – 283 times the drinking water limit were only plutonium present – in the year 2953, more than 800 years from the present. The charts and maps in Section U-1 of Appendix U show several radioactive and hazardous chemical pollutants that are estimated to exceed ARARs for hundreds or even thousands of years.

A plan that addresses the removal of the contamination in the non-tank 200 Areas is an essential complement to a preferred alternative for the TC&WM EIS that will allow the use of the Hanford Site without institutional controls after remediation is complete. At present none of the tank farm closure options meet CERCLA and MTCA requirements. The final TC&WM EIS should contain an option in which the tank farm cleanup activities are set in an overall context of meeting CERCLA requirements for all parts of the Central Plateau and the rest of the Hanford Site.

Recommendations: A plan that addresses the removal of the contamination in the non-tank 200 Areas is an essential complement to a preferred alternative for the TC&WM EIS that will meet all ARARs, including drinking water standards for groundwater and allow the use of the Hanford Site without institutional controls after remediation is complete is essential. The final TC&WM EIS should contain an option in which the tank farm cleanup activities are set in an overall context of meeting CERCLA requirements, including drinking water MCLs, for all parts of the Central Plateau and the rest of the Hanford Site.

[41] TC&WM EIS 2009, Vol. 2, p. E-171.

231-225 cont'd

231-224 cont'd

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describes DOE's current position. In summary, use of a phosphate glass formula for waste vitrification would have some advantages over the current baseline borosilicate glass. However, this option was not considered for evaluation in this *TC & WM EIS* because the phosphate glass formula has not been proven to be compatible with production-scale melters, and the resulting product glass has not been shown to meet the waste acceptance technical requirements for DOE's Civilian Radioactive Waste Management System. Additionally, DOE reviewed the available technical data since publication of the *Draft TC & WM EIS* and concluded there are no referenceable data that address the issues that need to be addressed, such as the impacts on the current WTP flowsheet, waste throughput, offgas system requirements, and physical space requirements for phosphate melters.

231-217 As recognized by the commentor, there are tradeoffs with regard to technetium-99 removal in the WTP. These tradeoffs are discussed in the Summary, Section S.5.5, and Chapter 2, Section 2.10, Key Environmental Findings.

231-218 As stated in Appendix E, Section E.1.2.3.1.7, the behavior of iodine-129 in thermal processes and the fraction that would be captured in the final waste form are difficult to predict. Therefore, for analysis purposes in this EIS, it was conservatively assumed that there would be no retention of iodine-129 in the IHLW glass and 20 percent retention in the ILAW glass. Further demonstration and testing of the iodine recovery technology should provide the necessary performance data to confirm these assumptions and possibly support some fraction of iodine-129 retention in the IHLW. However, such retention information was not available at the time of this EIS's preparation. As discussed in Chapter 7, Section 7.1.6, 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 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.

Regarding Tank Closure Alternative 6B, this EIS assumes that ILAW would be managed as IHLW and, therefore, would be disposed of as IHLW. 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

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

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.

231-219 In Appendix Q, human health impacts are presented in three tables for each Tank Closure alternative. There is a table presenting human health impacts related to cribs and trenches (ditches) after year 1940, another table related to past leaks after year 1940, and a third table related to the combination of cribs and trenches (ditches), past leaks, and other sources (i.e., tank farms) after the year 2050. Table Q–80 presents human health impacts related to the combination of cribs and trenches (ditches), past leaks, and other sources after year 2050.

In Appendix U, the alternative combination tables present human health impacts with and without the past, present, and reasonably foreseeable future (non–*TC & WM EIS*) actions after year 1940. The peak dose during the year of peak dose is calculated by summing the total dose for each year and then determining the maximum dose and year over the time period. The peak dose and year are driven by the impacts associated with the alternatives; therefore, the concentrations of individual constituents and the year of peak dose can be different (lower or higher) when comparing between tables. In Appendix U, the alternative combination tables that include non–*TC & WM EIS* sources are dominated by the impacts of these sources. Under Alternative Combination 2, the past impacts dominate the dose at year 1997. Table Q–80 does not analyze impacts before year 2050 and cannot be used to compare impacts.

231-220 The *Draft TC & WM EIS* included disposition of the capsules: preparation of the capsules for treatment in the WTP and disposal of the inventory as IHLW. Based on production rates, it was calculated that the WTP would need to operate for an additional year to treat the capsule inventory in a separate campaign and would produce approximately 340 IHLW canisters. In response to comments received on the *Draft TC & WM EIS*, DOE evaluated dry storage of the capsules at a new facility in the 200-East Area; this final EIS compares potential impacts of this option with those associated with vitrifying and disposing of the capsules as IHLW. The short- and long-term environmental impacts of storing the capsules were analyzed and are summarized in Appendix E, Section E.1.2.3.4.5, of this final EIS. As stated in the Summary, Section S.1.3.2, and Chapter 1, Section 1.4.2, of this *Final TC & WM EIS*, DOE is not making a final decision regarding disposition of the capsules at this time; their ultimate disposition will be determined at a later date and will be subject to appropriate NEPA review.

Commentor No. 231 (cont'd): Harry Smiskin, Chairman, Yakama Tribal Council, Confederated Tribes and Bands of the Yakama Nation

231-221 Soil washing is discussed in Appendix E, Section E.1.2.5.3.2, Preprocessing/ Packaging Contaminated Soil and Debris. As noted in this section, the soil-washing process within the Preprocessing Facility is based on an immature design, and very little data are available to further define the allowable contaminant levels to support a determination that the processed, but still contaminated, soil would be "acceptable for disposal on site." The proposed process is comparable to similar processes used in the hydrometallurgy industry, but would use a weaker solution of nitric acid. As the design matures and samples of the contaminated soil become available, risk analyses would be prepared to support a comparison with the established risk criterion for radioactive and chemical contaminants. Likewise, the disposal of secondary waste on site would depend on the final risk analyses and a comparison with the established risk criterion.

Closure of the disposal facilities would require detailed examinations of the disposed waste to support preparation of site-specific radiological performance assessments and closure plans. These examinations would require detailed waste sampling and sample analyses, assessments of the structural stability of the tanks, and assessments of the risks to human health and the environment. These documents would provide the information and analysis necessary for DOE and regulators to make decisions on what levels of waste are acceptable in terms of short- and long-term risks.

See response to comment 231-185 regarding future DOE decisions.

Regarding the depth of contaminated soil excavation below the tanks that would be required for disposal of the soil as HLW, DOE estimated a depth of 3 meters (10 feet), but agrees with the commentor that soil sampling and characterization would determine this final depth. Regarding closure of the DSTs and disposal of the ancillary equipment that supports the DST waste system, Section S.1.3.2 of the Summary and Chapter 1, Section 1.4.2, of this *TC & WM EIS* define the facilities and operations at Hanford that are not within the scope of this EIS, including closure of the DSTs and the WTP. Decisions regarding closure of these facilities therefore will not be issued in the ROD for this EIS, but will be made at a later date, after appropriate NEPA review.

231-222 This *TC & WM EIS* assumed that the IHLW canisters would not be shipped immediately after generation. Storage capacity for all the IHLW canisters was analyzed under the short-term impacts analysis for onsite IHLW interim storage. Also, as mentioned in the comment, the management of all the tank waste as HLW

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is analyzed under Tank Closure Alternatives 6A, 6B, and 6C, which assumed the DOE Manual 435.1–1 waste incidental to reprocessing evaluation determination process could not be implemented, which supports the separation of the tank waste into two fractions, HLW and LLW. Separation and treatment of tank waste is one of the decisions to be made by DOE.

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.

231-223 Decisions to be made concerning operation and closure of the ERDF are not within the scope of this EIS under NEPA. However, impacts on groundwater resulting from ERDF activities are analyzed in this EIS as part of the cumulative impacts analysis. In addition, DOE has reviewed the estimated inventory for the ERDF presented in the draft EIS and revised it in this final EIS. This revised estimate is based on the inventory disposed of at the ERDF through March 2010, as reported in Hanford's Waste Management Information System. This estimate does not take into account inventory that may be disposed of in ERDF from future cleanup in sites at Hanford, but this EIS does evaluate waste remaining in place.

231-224 DOE disagrees that the main source term at the IDF is offsite waste and not Hanford waste if the source term is identified as radioactive and chemical inventory. Performance at the IDF depends on both inventory and waste form. 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.

With regard to the offsite waste inventory estimates, DOE believes that they represent the best-available data to support this EIS. As noted in Appendix D, for analysis purposes, DOE used assumptions in developing the offsite waste inventories that tend to overestimate the potential impacts, because of the uncertainties in the characteristics of the waste types. Concerning the contention

that the offsite waste may cause violations of drinking water standards for thousands of years, this *TC & WM EIS* provides information on the results of DOE's analysis and compares those results to existing standards. For example, regarding the long-term impacts analysis for groundwater, the risk driver's contaminant concentration results from the groundwater modeling run are compared with the benchmark value, which in most cases is the MCL (the standard for drinking water). Much of the groundwater at Hanford is not currently used for drinking water. However, under the TPA, DOE is taking actions to protect groundwater and prevent or minimize impacts on the Columbia River.

231-225 Appendix E, Section E.1.3.3.3.3, as recognized in the comment, discusses the use of a phosphate glass formula for Hanford waste. Since the issuance of the draft EIS, DOE reviewed the most recent technical data in 2010 and concluded that there are no referenceable data that address issues that need to be addressed, such as the potential impacts on the current WTP flowsheet, waste throughput, offgas system requirements, and physical space requirements for phosphate melters. This discussion and a reference for the review is included in Section E.1.3.3.3.3.

231-226 Appendix U has been updated to provide more-detailed information related to cleanup plans for CERCLA sites at Hanford, including the existing contamination, decisions, and existing milestones and discussion of response actions that have been taken or are being planned.

See response to comment 231-206 for a discussion of ARARs and CERCLA with regard to this EIS.

Commentor No. 232: Susan Burke, INL Coordinator, Idaho Department of Environmental Quality

From: Susan.Burke@deq.idaho.gov
Sent: Friday, March 19, 2010 2:47 PM
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Cc: Toni.Hardesty@deq.idaho.gov; Curt.Fransen@deq.idaho.gov; provenrb@id.doe.gov
Subject: TC & WM EIS comments
Attachments: hanford eis comments 3-19-10.pdf

Please find attached the Idaho Department of Environmental Quality's comments on the Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.

Susan Burke
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xxx/xxx-xxxx

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