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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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September 17, 2002

Mr. Delmar L. Noyes
Office of River Protection
United States Department of Energy
2440 Stevens, MSIN: H6-60
Richland, Washington 99352

Mr. James E. Rasmussen
Environmental Management Division
United States Department of Energy
P.O. Box 550, MSIN: A5-15
Richland, Washington 99352

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EDMC

Dear Messrs. Noyes and Rasmussen:

Re: Final comments for Single Shell Tank (SST) System Closure Work Plan Document, DOE/ORP-2001-18, Rev 0, Hanford Federal Facility Agreement and Consent Order (HFFACO) Milestone M-45-06-T-05.

The Washington State Department of Ecology (Ecology) has completed the comment/review process for the Single Shell Tank (SST) System Closure Work Plan Document, United States Department of Energy/Office of River Protection (USDOE/ORP)-2001-18, Rev. 0 (see attached comments). As stated in the August 22, 2002 letter from Ecology to DOE, comments will not be submitted in formal review comment record (RCR) format due to parallel closure work in progress. Ecology looks forward to satisfactory resolution of comments, to the extent possible, in the SST Closure Plan and Tank Farm Closure/Post Closure Implementation Plan. In order to track progress on specific closure issues, Ecology expects that a table, cross referencing the attached comments and comment resolution, will be developed and included with the submittal of the above referenced documents (M-45-06A and M-45-06-T20).

Ecology acknowledges the effort that went into development of the 2002 update of the SST System Closure Work Plan. The plan covered a wide range of basis in support of closure and provided a significant amount of detail.

Ecology remains concerned that USDOE documented the possibility of skipping steps in the Hanford Federal Facility Agreement and Consent Order (HFFACO) M-45 retrieval/closure milestone process (including Appendix H) by proposing that a number of tanks need not be

retrieved. In this Closure Work Plan, Ecology is extremely discouraged and concerned to find the discussion of closing 9.6 million gallons of waste in 44 tanks without any retrieval. This goes directly against requirements and agreements made in the HFFACO to retrieve as much waste as technically possible with a maximum residual of 360 cubic feet (100 series tanks) or 30 cubic feet (200 series tanks). To not retrieve these tanks would violate Resource Conservation and Recovery Act (RCRA) and Hazardous Waste Management Act (HWMA) regulations. Ecology is aware that such scenarios have been discussed in DOE Project Management Plans and has voiced concerns regarding this approach in comments. These 44 tanks contain close to 50% of the risk to groundwater from the SSTs and include some of the highest individual groundwater risk tanks. This document and other documents indicate such plans are without merit, yet they continue to be discussed. It is inappropriate to include such assertions in this or any other baseline document.

If you have any questions, please call Richard Heggen at (509) 736-5716.

Sincerely,

Suzanne Dahl
Tank Waste Disposal Project Manager
Nuclear Waste Program

Jeffery Lyon
Tank Waste Storage Project Manager
Nuclear Waste Program

SD:DH:nc
Attachment

cc: Robert Lober, DOE
Rex Thompson, DOE
Dale Allen, CHG
Janet Badden, CHG
William T. Dixon, CHG
Moses Jaraysi, CHG
Mark Riess, CHG
Todd M. Martin HAB
Rick Gay, CTUIR
Pat Sobotta, NPT
Donna Powaukee, NPT
Russell Jim, YN
Ken Niles, OOE
Administrative Record: M-45 Correspondence

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS

GENERAL COMMENTS

1. In this Tri-Party Agreement (TPA) required Single-shell Tank (SST) System Closure Work Plan, the Washington State Department of Ecology (Ecology) is extremely discouraged and concerned to find the discussion of closing 9.6 million gallons of waste in 44 tanks without any retrieval. This goes directly against requirements and agreements made in the Hanford Federal Facility Agreement and Consent Order (HFFACO) TPA to retrieve as much waste as technically possible with a maximum residual of 360 cu. ft. (100 series tanks) or 30 cu. ft. (200 series tanks). To not retrieve these tanks would violate the Resource Conservation and Recovery Act (RCRA) and Hazardous Waste Management Act (HWMA) regulations. Ecology is aware that such scenarios have been discussed in United States Department of Energy (USDOE) Project Management Plans and has voiced concerns regarding this approach in comments. These 44 tanks contain about 50% of the risk to groundwater from the SSTs and include some of the highest individual groundwater risk tanks. This document and other documents show the folly of such plans yet they continue to be discussed. It is inappropriate to include such assertions in this or any other regulatory baseline document. SD
2. Ecology understands the closure work plan will now be divided into two documents: (1) the SST closure plan and (2) the SST implementation plan. Ecology expects resolution to the SST Closure Work Plan comments will be incorporated into these documents. SH, DH
3. SST systems include tanks, waste in the tanks and in the soil and groundwater contaminated by tank waste releases. JC
4. This document contains certain assumptions related to the Constraints and Challenges to Cleanup Team (C3T) negotiations. Since the C3T process was still in progress at the time of document submittal, all text related to this process must be considered draft and subject to change. JC, DH
5. Appendix A did not incorporate Ecology concerns regarding Retrieval Performance Evaluations as documented in the C-104 and S-112 review comment record (RCR) comments. This entire section should be modified to reflect that waste retrieval is to be technology driven, not risk driven. JC, DH
6. LERF is the Liquid Effluent Retention Facility. Please correct throughout the document. JC
7. Per the TPA, the SST system will be closed as a RCRA treatment, storage, and disposal (TSD) facility under Washington Administrative Code (WAC) 173-303-610 which references WAC 173-640. All other closure options discussed in this report are not available. JC, DH
8. Comments on routine typographical errors will be excluded except in those cases where the error would change the context of the text. DH

EXECUTIVE SUMMARY

Page, Lines	Comment
Page iii Lines 10-13	SST systems include contaminated soils and groundwater contaminated by tank releases and spills. Please correct. JC
Page iii Line 18-20	State Environmental Policy Act (SEPA) requirements must be met and incorporated into future SST closure documentation. A SEPA Checklist must be submitted in the very near future. Assuming the checklist is adequate, a SEPA determination of significance or non-significance would then be made based on the information supplied in the checklist or other analysis as requested. If a significant determination is made, then an Environmental Impact Statement (EIS) is required prior to closure plan completion.

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
	At that time Ecology and USDOE would determine how to move forward to satisfy further requirements under both National Environmental Policy Act (NEPA) and SEPA. Since only NEPA is mentioned with a 2006-2009 timeframe, state regulatory requirements were not addressed. DH
Page iv, Bullet 1	Spills and leaks from the SX Tank Farm have already impacted groundwater and this groundwater has moved beyond the boundary of this Waste Management Area (WMA). Correct this error. JC
Page iv, Bullet 4	What is the relevance of this comment? An evaluation of a clean closure option is required for any RCRA tank system planning to close under WAC 173-303. JC, DH
Page iv, Bullet 5	The most comprehensive analysis of tank releases to the vadose zone is occurring through the RCRA facility investigation/Corrective Measures Study (RFI/CMS) vadose zone investigations. These have been completed for WMAs S-SX, B-BX-BY and are underway for WMAs T and TX-TY. As they have as yet to be completed for WMAs A-AX, C, and U, this statement is premature. Furthermore, releases from ancillary equipment (such as underground transfer and cascade lines etc.) need to be included. Please correct. JC
Page iv, Bullet 7 Lines 25-26	A performance assessment covering all Hanford waste (composite analysis) is described; however, there is no reference to the document or discussion regarding any conclusions. In addition it is not stated if the analysis is incorporated in this closure work plan. Please provide a copy and/or electronic link to this document for future reference. DH
Page iv, Bullet 8	As tank farms are all located in the 200 areas, what is the relevance of this statement? Delete. JC
Page iv, Bullet 9	The environmental remediation program baseline planning is for past-practice disposal sites. The SSTs are active RCRA TSD facilities that will be closed according to WAC 173-303-610. Targets for SST waste retrieval are not risk-based and are established in the TPA as retrieval to the limits of technology with a waste residual not greater than 360 cubic feet (for 100 series tanks). JC, DH
Page v Lines 3-5	Correct a portion of the sentence to read "...implemented a risk-based retrieval sequence..." DH
Page v Lines 10-12	SST TSD units include groundwater contaminated with releases from the SSTs. JC
Page v Lines 22-25	Missing from this sentence are the regulatory requirements such as performance standards against which the closure action will be compared. In addition the text omits potential exposure to non-radioactive waste constituents. Include this information in future SST closure documentation. DH
Page vi Lines 1-2	This paragraph indicates that the information presented in this document forms the basis for establishing landfill closure as the planning baseline. This statement is premature. If landfill closure is ultimately selected, the process must meet requirements in WAC 173-303-610, WAC 173-303-640, etc. NU, DH
Page vi Lines 5-7	This section of the Executive Summary should mention that SEPA must also be satisfied. (see previous SEPA comment for page iii) DH
Page vi, Bullet 2 Line 10	Risk-based retrieval, as presented in the C-104 and S-112 F&R documents, is not acceptable. See related F&R comments and comment page iv, bullet 9. JC, DH

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page vi Line 12	Typo: correct the Sentence to read "...and the limited ability to..." DH
Page vi Line 16	Define "interim closure" demonstration. Is this equivalent to individual tank closure demonstrations? DH, JC
Page vii Figure ES.1	There needs to be further explanation as to how the 200 Area Closure Plan will be coordinated with SST system closure. It seems premature to be discussing closure of the 200 areas before closure of the major components and facilities within the 200 Areas. Closure of the 200 areas is contingent on future uses of the land about which there is a lack of agreement among all stakeholders. Also, Box 2 of this figure should indicate that closure will be according to WAC 173-303-610. JC, DH
Page vii Lines 3-6	The Retrieval Performance Evaluation (RPE) methodology has only been agreed to in general. Many RPE/risk specific comments were generated during the recent C-104 and S-112 F&R TPA primary document review process. As stated in the conditional F&R approval letter, these comments shall be resolved and incorporated into all future SST retrieval/closure documentation. Some of the major concerns over the RPE process as it currently exists include lack of site-specific characterization and model validation, scaling of information from different tank farms, omission of waste inventory in ancillary equipment, and lack of an uncertainty analysis. DH
Page viii Lines 1-3	Following two recent functions and requirements (F&R) document reviews, Ecology emphasized during discussions with USDOE and contractors, that a staged review and approval process is needed. This is basically due to the fact that F&R documents contain very limited detail related to retrieval system design. The approval process should involve at least one additional approval stage at a point where sufficient detail is available in order to better determine compliance with regulations and TPA goals. DH
Page viii Lines 10-13	There has been a basic philosophical disagreement as to how the RPE was applied to the first two F&Rs for SST retrievals. The RPE should not pre-determine the extent of retrieval or leak loss. Extent of retrieval is already defined in the TPA as retrieval of as much waste as technically feasible with a maximum residual of 360 cubic feet for the large SST tanks. In addition the RPE should not be used to determine the need for leak detection based on establishing a volume of waste leakage that theoretically would not exceed certain risk numbers. See the RCR comments and the conditional approval letter related to the C-104 and S-112 F&R documents. Following recent discussions, Ecology understands that USDOE will no longer use the RPE information as stated above. DH

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page viii Lines 13-16 and Page ix Figure ES.3	The text and figure ES.3 indicate that an evaluation process will be conducted to determine if SSTs meet "closure performance measures" prior to retrieval. Figure ES.3 shows a decision box that asks if retrieval is even required. This is not acceptable since it does not reflect the agreed to processes in the TPA or Appendix H. Closure shall follow retrieval and, to date, none of the 149 SSTs at Hanford meet the TPA M-45 milestone requirement for maximum residuals. M-45 requires each tank to be retrieved to the maximum extent possible before considering whether or not each tank meets retrieval goals. The original Appendix H calculation of 360 cu. Ft. was based on average amount of existing waste in all SSTs. It was assumed that each tank would be retrieved at least once since Appendix H was written in 1993. Delete the "Is Retrieval Required" box and related "N" decision line. Replace with a box titled "TPA Retrieval Goal" Revise the text and figure to show that retrieval will occur prior to making any determination regarding waste residuals or individual tank closure. Also add the following to the text: "Figure ES.2 and TPA Appendix H indicate that for the initial SST retrievals, the goal of 360 and 30 cu. ft. has been set. After the initial retrieval, this goal may be adjusted." DH, JC, SD
Page viii Line 20	What is meant by an "interim retrieved" tank? As this is not a regulatory status, please clarify. JC
Page ix Figure ES.3	Where in this chart is leak detection monitoring and mitigation (LDMM)? It should be here. Correct this figure. JC
Page x Lines 1-3	Use of an RPE needs clarification. It may be appropriate to run an RPE before retrieval of waste from a tank in any tank farm, but rerunning an entire RPE after retrieval of waste from one of many tanks in a farm is clearly not warranted. A minor rerun with a new source term may be appropriate for consideration, but not the entire process. This concept needs to be clarified. JC
Page x Lines 19-20	Waste from WMA S-SX has already impacted groundwater. Please correct. JC
Page x Line 22	Missing is a discussion of residential exposure for this location. Provide this information. SD
Page x	Describe the M-45 negotiation update. SD
Page xi Figure ES.4	LDMM is not listed or identified anywhere in this figure. Please include and correct this figure. JC
Page xi Figure ES.4	Update this figure with the recent M-45 negotiated information. Under 2002, "Updated Risk Based Retrieval", add sequence for risk-based retrieval sequence. Under 2002, add the SST System Framework Closure Plan. Also add SEPA to NEPA. SD
Page xi Figure ES.4.	Although C Farm SSTs are scheduled for retrieval and closure activities during the next six years, tank farm field characterization efforts to support these activities appear not be scheduled. Lack of farm specific characterization data would add uncertainty to any closure decision and undermine any risk analysis. A delay in decisions related to the closure process would likely result until the field data is obtained. DH

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
CHAPTER 1	
Page 1-1 Lines 6-7	The test states SST farms will be closed under the HFFACO. That statement is misleading. Revise the text to indicate that the HFFACO requires SSTs to be closed under WAC 173-303-610 (Washington State Dangerous Waste regulations). In addition, the tank farms are RCRA TSD units and, as such, closure of these units will be incorporated in the Hanford Sitewide RCRA Permit as future modifications to the closure and post-closure sections of the permit (Part V and Part VI). DH
Page 1-1 Line 17	Add the following: The new TPA M-45 negotiated milestones divided the closure work plan into an implementation plan and SST Framework Closure Plan with a schedule for individual tank closures over the next several years as tanks are retrieved. SD
Page 1-1 Lines 18-23	Describe the SST Waste Management Area groupings (i.e., combined adjacent tank farms for purposes of closure). DH
Page 1-3 Line 22	Landfill closure as a planning basis needs a better regulatory pedigree. WAC 173-303-610 (and subsequently 640) requires tanks/ancillary equipment and soil to be decontaminated/removed. Then if an owner can demonstrate that not all contaminated soil can be practicably removed or decontaminated, remaining contaminated soil would be dealt with as a landfill. SD
Page 1-4 Line 4	Add a statement to the effect that risk reduction includes recent risk driven retrieval sequencing. SD
Page 1-4 Lines 8-9	Include lessons learned from the C-106 waste retrieval operation and the recent F&R documents for waste retrieval demonstrations at the C-104 and S-112 tanks? JC
Page 1-5 Lines 10-15	Describe current plans to follow through with the stated need for an EIS or Supplemental Environmental Impact Statement (SEIS). In addition, Describe how SEPA requirements will be met. DH
Page 1-5 Line 20	Add SEPA to this sentence. The timeframe provided for NEPA/SEPA will not support accelerated SST closure. SD
Page 1-5 Line 22	If this Closure Work Plan (CWP) is an update of the CWP issued in 1996 wouldn't this work plan be considered a revision of the prior (DOE/RL-89-16)? This CWP was last revised in 1996 (DOE/RL-89-16, Rev.1). DS
Page 1-5 Line 40	Delete references to retrieval/closure of low volume tanks. SD
Page 1-6 Lines 9-10	Landfill closure is mentioned out of context. The path to landfill closure is through WAC 173-303-610 and WAC 173-303-640. Include this in all future SST closure documentation. DH
Page 1-6 Lines 31-37	Although there has been general agreement to use the F&R and RPE documents as a mechanism on which to provide information to base tank retrieval decisions, significant formal comments have been submitted regarding the adequacy of information provided in these documents. Refer to the C-104 and S-112 F&R risk related and RPE RCR comments required to be resolved and incorporated in future retrieval and closure documents. DH
Page 1-6 Lines 23-24	The TPA is fairly clear on waste retrieval and allowable residuals; retrieve waste to the maximum extent possible with a maximum residual of 360 cu. ft. for 100 series tanks. Waste retrieval is to be initially technology driven. Following retrieval to the maximum extent possible, risk analysis will also be used in closure documentation. JC, SD

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page 1-7 Lines 6-8	No leakage is permissible. Realistically, the best technology currently available may not be able to demonstrate that waste did not leak, but leakage cannot be assigned a predetermined permissible limit. Please correct. JC, DH
Page 1-7 Lines 9-21	See comment: Executive Summary, page xi, Figure ES.4. DH
Page 1-7 Line 30	While it is acceptable to acknowledge that the C3T discussions are proceeding, there has been no agreement signed. Until that is true, it is premature to include presumptions in planning for tank closure. JC
Page 1-8 Lines 8-11	The statement that the Office of River Protection (ORP) can "...make progress toward tank farm closure for tanks ...that pose nominal risk based on waste inventory." is unacceptable. This implies that USDOE is not planning to retrieve some SSTs. No SST currently meets the TPA M-45 retrieval or residual waste requirements. In C3T discussions and M-45 negotiations, it has been agreed to close C-106 and 6 tanks with high risk waste. No agreement has been made to look at low risk tanks for closure at this time. It is the position of the State of Washington that closure must follow retrieval. DH, SD
Page 1-8 Lines 23-24	Waste retrieval is to be technology driven, not risk driven. Please correct here and everywhere else that this concept appears in this closure/work plan. JC
Page 1-8 Lines 34-37	"...strategy is based on assumption that waste retrieval will remove sufficient waste from the SSTs such that the waste residuals in the tanks... can be disposed of in place in accordance with applicable regulations and agreements..." The TPA says remove the waste to the maximum extent technically possible (with maximum residual waste limits); this is the goal. It is inappropriate to pre-determine that some tanks may not need to be retrieved. NU
Page 1-8 Lines 37-38	Ecology does not agree on the wording related to closure process provided in this portion of the document. The tank farms will be closed under WAC 173-303-610. The only path to landfill closure would be through WAC 173-303-640. DH
Page 1-9 Lines 1-2	It is not acceptable to move directly to landfill closure performance standards. Performance standards for closure are specified in WAC 173-303-610. DH
Page 1-9 Line 4	Please make reference (author, title) to the plan that has been developed to better characterize past leaks in the tank farms. DS
Page 1-9 Lines 17-21	Leaks/spills from tanks in WMA B-BX-BY have impacted groundwater and thus both vadose zone and groundwater characterization are proceeding. Please correct in future documentation. JC
Page 1-9 Line 29	Clean closure is not based on size of tank farm ... although the report says "... under optimal conditions clean closure of the smallest SST tank farm (AX tank farm) would result in a substantial commitment of resources in terms of impact to workers and cost..." NU
Page 1-9 Lines 29-37	USDOE's conclusion that the clean closure of one tank farm (AX) does is not offer enough bang for the buck is not regulatory based. Since the SSTs do not have secondary containment, then closure for these systems must comply with regulations regarding closure of tank systems (WAC 173-303-640 and WAC 173-303-610). DS
Page 1-10 Lines 8-11	As the SSTs are in the 200 areas and will be closed under WAC-173-303-610, how is this statement relevant? JC

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page 1-10 Lines 12-13	Strike this bullet. The US Ecology site is not an acceptable comparison for use in the SST closure process. The regulatory and administrative mechanisms are not similar. US Ecology is licensed by Washington State Department of Health as a radioactive landfill under Nuclear Regulatory Commission (NRC) regulations. In addition, the waste disposal mechanisms and waste types are different. The site has waste burial trenches and three partly emptied 23,000-gallon resin tanks (much of the toxic tank waste was placed into thousands of drums and buried in on-site trenches). Several smaller tanks were removed in the past. It is undergoing a Model Toxic Control Act (MTCA) investigation in lieu of a RCRA Corrective action process and it is in early stages of characterization. Final site disposition has not been determined. DH
Page 1-10 Lines 14-25	Appendix H does not provide the framework for landfill closure. TPA M-45 combined with Appendix H provides retrieval residual goals and does not address closure. The closure plan will address Appendix H and then risk of remaining contamination. SD
Page 1-10 Lines 17-35	Missing is the characterization (RFI/CMS) stage needed to make informed closure/remediation decisions. Revise text to include the missing information. DH
Page 1-14 Figure 1.1	See comments for Page xi, Figure ES.4, as this is the identical figure. Change future versions of this figure to incorporate previous comments. JC, SD
Page 1-15 Figure 1-2	Revise figure to reflect latest TPA M-45 negotiations. SD
Page 1-16 Line 1	Refer to other comments throughout this comment package relating to Landfill closure regulations (including Page 1-3, Line 22). DH
Page 1-16 Section 1.8.1	Section 1.8.1. Missing from this section is a bullet for Closure Criteria and Data Quality Objectives (DQO), considering the current fast track work in that area. DH
CHAPTER 2	
Page 2-1 Lines 12-22	Add to this list, "Contaminated soil" and "Contaminated (by tank waste releases) groundwater". Also list the correct number of inactive miscellaneous underground storage tanks (IMUSTs) associated with SST closure. JC
Page 2-1 Line 21	Add the 242-B Evaporator. JC
Page 2-8 Line 7	Please describe the specific type of monitoring conducted to date. Clarify that vadose zone ("soil") monitoring has been limited to gamma monitoring and is also depth and distribution limited. JC, DH
Page 2-8 Lines 32-34	Missing from the list of considerations for closure options is applicable regulatory requirements, potential exposure to dangerous/hazardous waste, future site use, etc. Revise text to include the above. DH
Page 2-9 through 2-13	It is assumed that the partial list of components matches those identified in the current SST Part A as well as any description required by the TPA M-23 milestones (if not, then match the lists). DH
Page 2-14 Lines 9-11	The text needs to be revised to read "The SST system will continue to be operated under interim status and, as closure activities progress, each of the six SST WMAs will be final status closed under WAC 173-303 610 and 640 regulations. Requirements specified in the TPA will also be met. No Part B RCRA permit application will be submitted." SD

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page 2-15 Line 1	Please add technetium 99 (Tc-99) to the list. It may not be a major contributor to volume estimates; however, it is a primary risk driver. SD
Page 2-16 Figure 2.5	For each schematic of tank construction, add the names of the tank farms in which such structures exist. Please correct. JC
Page 2-17 and 2-18	Add to this table estimated leak losses from all the remaining units listed as bullets on page 2-1. JC
Page 2-19 Lines 11-28	The text describes complex chemical processes that contributed to the tank waste. It also describes the difficulty and uncertainty in estimating tank contents. Given this information, it appears that the major list of tank waste constituents provided on Pages 2-14 and 2-15 should be expanded to include at least some of the other waste process constituents described on Page 2-19. Please revise. DH
CHAPTER 3	
GENERAL COMMENTS	
Chapter 3	TPA M-45 considers that SSTs will be closed under one consolidated action that addresses hazards of chemicals as well as radionuclides. SD
Section 3.1.9.5	This section contains information which should be moved to Section 3.1.9.4. Move paragraph to appropriate section. BBK
Section 3.3.1.2	Contains inaccurate information. According to Ecology's 1993 Contained-in Policy "contaminated environmental media may be determined to no longer contain hazardous waste when the hazardous constituents in the media fall below site-specific, risk-based levels <u>and</u> the media does not exhibit a characteristic." Revise incorrect text. BBK
Section 3.3.1.3	Has no regulatory basis and should be removed from Chapter 3 Regulatory Framework. Provide regulatory basis or remove text. BBK
Section 3.3.2.1	Has no regulatory basis and should be removed from Chapter 3 Regulatory Framework. Provide regulatory basis or remove text. BBK
Section 3.3.2.2	Section 3.3.2.2 provides an inadequate evaluation of Modified Closure. Instead of reiterating the Hanford Facility Dangerous Waste Permit conditions, develop this option fully. BBK
Page 3-1 Line 26	Revise the text as follows: "Further NEPA and SEPA analysis is required..."
Page 3-2 Lines 9-10	As noted in previous comments, the SSTs will be closed according to WAC 173-303-610 as specified in the TPA. DH
Page 3-2 Section 3.1	Add the following text to HWMA: "Dangerous Waste Regulations, Chapter 173-303 WAC". Also add SEPA to the list of State requirements. LR, DH, SD
Page 3-5 Line 1	A closure plan will be required to close SSTs. Delete "A Part B Permit..." and replace with "An approved closure plan..." LR, SD
Page 3-5 Line 2	At the end of the paragraph add the following sentence: "Once approved, the closure plan will be added to the Hanford RCRA site-wide permit through the permit modification process." LR, DH
Page 3-9 Lines 13-15	Code of Federal Regulations 10 CFR 61 codifies regulatory requirements for treatment and disposal of low level radioactive waste. None of the tank waste is low-level waste. Explain how this is relevant to the high-level waste contained in the SSTs. JC

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page 3-9 Lines 16-19	Ecology disagrees with USDOE's assertion that high level waste left in place can, by administrative declaration, be considered Class C low level waste (LLW) (an NRC designation for operating reactors). JC
Page 3-9 Lines 29-30	The SSTs are RCRA TSD facilities. As such, the Point of Compliance (POC) for each SST WMA is the fenceline of the facility. There is no allowance in the regulations for a buffer zone. JC
Page 3-9 Line 31	It is inappropriate to assess impact for only 1,000 years when there are mobile components of the waste that have half-lives on the order of 10 E5 years. Impacts must be modeled into the future to show dissipation beyond peak contamination at POCs and other potential impact areas. Please correct. JC, DH, SD
Page 3-14 Lines 1-3	Strike the last sentence. Replace with the following text: "SSTs continue to be used for active storage of mixed radioactive waste. SSTs shall be subject to final RCRA closure requirements according to the terms specified under HFFCA M-45 milestones and WAC 173-303." DH
Page 3-17 Figure 3.1	Under Groundwater Quality, add WAC-173-340, as the tanks will be closed under WAC 173-303-610 which references WAC 173-340. JC
Page 3-21 Lines 21-29	"...clean closure requires the removal or decontamination of ALL dangerous waste, waste residues....." ...not to exceed MTCA Method B numeric cleanup levels. Both MTCA and the TPA require that all relevant and appropriate regulatory cleanup levels be considered in determining a cleanup (closure) action. NU, DH
CHAPTER 4	
GENERAL COMMENT	
1. Ecology and USDOE are currently conducting a DQO process to establish sample/analysis requirements for SST closure. The statement on Page 4-13 that substantial effort and interaction with regulatory agencies will be required for the closure DQO does not match the abbreviated schedule for the current closure DQO process. Ecology understands that the current DQO process is only a first attempt (preliminary closure DQO) and that there is a need to revisit this DQO and update is when appropriate time and resources can be devoted to the process. The current non-facilitated DQO workshop schedule allows one month to complete the process. This abbreviated schedule is in place to match the accelerated SST framework and individual tank closure plans. The current DQO shall generate a schedule to continue and refine the closure DQO process in the future. DH 2. Missing is a description of contaminated soil sample/analysis needed to remediate and characterize the near surface area of the tank farms. Provide the missing information. DH	
Page 4-1 Lines 8-9	Strike the sentence beginning with "If retrieval to these levels is not believed possible," Replace with "If, after retrieval of waste to the maximum extent technically possible, the TPA waste residual goal cannot be met, USDOE may submit a detailed explanation as part of a waiver request from Ecology." DH
Page 4-1 Lines 22-26 and Page 4-12 Lines 11-17	For purposes of the soil inventory study that concluded that a total of 1,030 curies of Tc-99 discharged to liquid waste disposal sites compared to 194 curies discharged from past tank leaks, did this account for the other chemical forms of this long-lived fission product? DS, SD

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Pages 4-1 through 4-4	Considering the numerous unresolved questions/comments relating to risk scenarios and pathways stemming from the C-104 and S-112 F&R review, contaminants of concern (CoCs) and risk pathways will develop over time. These comments will be resolved and incorporated in future retrieval and closure documents. Specific risk pathways must be agreed to, as well as a better understanding of tank waste. Ecology agrees that the CoCs presented in the report include major risk drivers based on information collected to date. DH, SD
Page 4-12 Lines 31-33	Current characterization of tank waste does not take in consideration the remaining 4-6 inches of waste. If the remaining 4-6 inches have never been characterized, the list of CoCs will need to be reevaluated. The text states that "pre-retrieval samples may not be representative." Ecology understands that pre-retrieval samples will not include the bottom portion of tank waste due to the potential of damaging the tank wall and causing leaks. Therefore, a key portion of the waste will not be sampled prior to retrieval. Until characterization of waste residual occurs, uncertainty will be elevated relative to risk and final disposition of the SST. DS, DH
Page 4-13 Table 4.1	Page 4-4 lists niobium, neptunium, and thorium as post-closure inadvertent intruder CoCs and as CoCs that pose a regulatory concern for tank farm closure from a waste classification standpoint. However, these CoCs are not list in table 4.1. DS
Page 4-14 Lines 12-21	Describe current efforts as well as planned efforts to solve the difficulties described in obtaining residual waste samples in SSTs. DH
Page 4-14 Lines 22	The text states that a closure DQO will be complete in 2006. Development of a DQO for the C-106 SST closure demonstration is currently underway. This DQO is only for C-106 and additional DQO efforts will be needed for other SSTs. A revised statement/schedule relating to DQO needs and timing is needed. DH
Page 4-15 Lines 16-26	Gamma logging is only effective for those constituents that emit gamma radiation. Provide a description of the constituents identified using gamma logging. In addition, describe the key waste constituents not found using gamma logging. Describe results and plans for alternate methods of logging such as neutron logging for the drywells. DH
Page 4-15 Line 33	The referenced document is from 1988. Does an updated list of drywell locations and logs exist? If so please provide that information. NU
Page 4-15 Lines 35-37	The statement reads that historical gross gamma logging has been analyzed and interpreted for all tank farms; however, A, AX, C and U Tank Farms are omitted. Please correct. JC
Page 4-16 Line 2	Change "speciation" to "species identification". JC
Page 4-16 Lines 15-16	Gross gamma surveillance logging of dry wells was terminated in 1994. The spectral gamma baseline logging was complete by 1999. What follow-on logging is presently being conducted, i.e., describe frequency, tools, and logging rates. (Also see comment page 4-15, Lines 16-26.) JC, DH
Page 4-17, Line 4	Provides depth distribution of contaminants only as deep as the deepest dry well (125 – 150 ft.) which is considerably short of groundwater at a depth of 220+ ft. JC
Page 4-17 Lines 1-6	Spectral gamma logging is a welcome addition to the arsenal of logging tools, but it does not detect presence or flux of beta-emitting radionuclides, some of which are long-lived, mobile and control risk. Please qualify. JC

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page 4-17 Section 4.4.4 and Appendix B Pages B-8 to B-12	This section (and related issues in Appendix B) lacks a discussion of Ecology recommendations for an adequate groundwater monitoring network. The SST WMAs will be closed under WAC 173-303 regulations and must include adequate groundwater monitoring in order to make closure decisions. In future SST implementation and closure plan documents provide a discussion of regulatory requests and USDOE plans for additional groundwater monitoring wells. Include a diagram of each SST WMA showing associated monitoring wells and locations for additional proposed wells. Indicate if any wells are properly screened. DH
Page 4-17 Line 24	Delete the following text: ". . . because of elevated CoCs in downgradient monitoring wells." Replace with ". . . because of elevated indicator parameters that may reflect CoCs in downgradient monitoring wells." JC
Page 4-20 Lines 10-13	Tc-99 activity levels have been as high as 81,500 pCi/L and have stabilized at ~76,000 pCi/L in well 299-W23-19 which is located adjacent the SX-115 tank in the southwest corner of SX Tank Farm. Please correct. JC
Page 4-21	Why are the U.S. Environmental Protection Agency (EPA) led groundwater units [BP-5 and Zp-1] also discussed as noted on page 4-18, line 31, see page 4-19, line 6 also. NU
Page 4-21 Lines 32-40	The regulated RCRA TSD unit includes the tank, waste therein, and waste that has leaked to the surrounding soil and underlying groundwater. Groundwater may be separately addressed as part of a groundwater operable unit, but the TSD also includes the groundwater. Please correct. JC
Page 4-23 Lines 6-9	During decommissioning of borehole 41-09-39 adjacent the SX-108 tank, a screen was placed at the bottom of the borehole before decommissioning and a sodium bromide tracer was placed in the well that has yet to be detected in the Point of Compliance wells outside the perimeter fence. Also, contaminants have been detected in older wells (carbon steel, perforated casing) inside the SX Tank Farm that are now dry because of a declining water table. Please correct. JC
Page 4-23 Lines 18-19	The understanding of the mobility of Cs-137 is understood for waste types and conditions that prevailed in the SX Tank Farm (specifically SX-108), but while the same principles should apply elsewhere, this statement should be qualified to indicate that it is not yet a "universal truth". Please correct. JC
Page 4-24 Line 18	It appears the text should read "psychrometer", not "psychometric" NU
Page 4-24 Lines 24-25	It is assumed waste surface conditions vary somewhat between tanks and even within the same tank. Describe how varying tank waste conditions would affect the accuracy and performance of direct surface-level measurements. Examples would be helpful. DH
Pages 4-24 & 4-25 Section 4.5	In the LDM F&R document, operational leak detection varies with USDOE categories of tanks (active, inactive, interim-stabilized) and ranges from periodic measurements with FIC, ENRAF, or LOW, with the frequency ranging from a few days to a few years. This section discusses general principles, but conceals the inadequacy of leak detection. Please expand and clarify. JC

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
CHAPTER 5	
GENERAL COMMENTS	
Section 5.3	1. Section 5.3 of the HFFACO states that "Unless closed in accordance with Sections 6.3.1 or 6.3.3, TSD units shall be permitted for either operation or post closure care pursuant to the authorized State Dangerous Waste Program (173-303 WAC) and HSWA . . . All TSD units that undergo closure, irrespective of permit status, shall be closed pursuant to the authorized State Dangerous Waste Program in accordance with 173-303-610 WAC." Future SST System Closure Plans should be written to incorporate requirements promulgated in WAC 173-303-610. BBK 2. The basic premise of the Single-Shell Tank System Closure Work Plan (DOE/ORP-2001-18, Revision 0) is that the planning baseline for the SST farms will be landfill closure. This premise is based on the HFFACO section 6.3.2 option of 'Closure as a Land Disposal Unit.' However, Section 6.3 of the HFFACO also states that "DOE will follow applicable Federal and State statutes, regulations and guidance documents, and written policy determinations that pertain to the closure process for TSD groups/units." Closure of the SST farms as landfills would not be in compliance with existing regulatory requirements. The SST farms are not a land disposal unit, they are tanks, therefore a closure plan must be developed incorporating requirements promulgated in WAC 173-303-610 and 640. The SST System Closure Plan should be written taking into account requirements promulgated in WAC 173-303-610 and 640, and permit requirements specified under permit conditions II.J and II.K of the Hanford Facility Dangerous Waste Permit # WA7890008967. BBK 3. The basic premise of the Single-Shell Tank System Closure Work Plan (DOE/ORP-2001-18, Revision 0) that the planning baseline for the SST farms will be landfill closure ignores all tank closure requirements promulgated in WAC 173-303-640(8). Future SST System Closure Plans should be written taking into account tank closure requirements promulgated in WAC 173-303-640(8). BBK 4. In accordance with HFFACO Change Package M-45-00-1A, the Single-Shell Tank System Closure Work Plan (DOE/ORP-2001-18, Revision 0) will be modified and updated every two years until the closure plan requirements can be fulfilled. It is proposed that the Single-Shell Tank System Closure Work Plan will "evolve" into the Single-Shell Tank System Closure Plan. In anticipation of this "evolution", the Closure Work Plan should address the content of a closure plan. The Work Plan is not compliant with WAC 173-303-610 (2), (3), (4), (5), and (6). Future SST System Closure Work Plans should be re-written to address closure/closure plan requirements promulgated in WAC 173-303-610(2), (3), (4), (5), and (6). BBK 5. If the SST System cannot be closed in compliance with WAC 173-303-640(8)(a), and USDOE makes a demonstration that not all contaminated soils can be practicably removed, in accordance with WAC 173-303-610(1)(b) subsections (7) through (11) of that section apply. Future SST System Closure Plans should be written to address post-closure/post-closure plan requirements promulgated in WAC 173-303-610(7), (8), (9), (10), and (11). BBK

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page 5-1 Lines 18-20	The agreement on RPE methods was at a high-level, conceptual stage. The RPEs that have been delivered have fallen far short of Ecology expectations. Further discussions are needed to agree on how to proceed on a path forward that will satisfy regulatory concerns. JC
Page 5-4 Figure 5-1	What was the actual basis for risk in this graph? NU
Page 5-5 Lines 15-20	All parties need to discuss this portion of the document since it has significant implications over several tank farm related projects. NU, DH
Pages 5-5 through 5-12, Section 5.4, including 5.4.1, 5.4.2, 5.4.3, 5.4.4, 5.4.5, 5.4.6 and all associated figures.	The document implies that C-106 and other SST units may circumvent the requirements stated in TPA milestone M-45-00 to retrieve as much waste as technically possible. Only then can USDOE follow the TPA M-45 appendix H process to ascertain if additional waste removal is warranted. The previous C-106 retrieval effort was designed to eliminate safety concerns. It was not designed to achieve the goal of retrieving as much waste as possible with a maximum residual waste volume of 360 cubic feet. Planned disposal of high-level waste and TRU waste at Hanford is unacceptable and has been rejected by the public, tribes, and stakeholders. Revise the entire section (including subsections) and associated figures to eliminate any statements about applying a waiver process for tanks not meeting the requirements stated in M-45-00. DH, BBK, JC
Page 5-8 Lines 22-23	What are the "performance goals" to be achieved here to define "Tank Closure"? JC
CHAPTER 6	
GENERAL COMMENTS	
Page 6-1 Lines 15-20	This section of the work plan needs to clarify that the only path towards a landfill closure are through WAC 173-303 610 and WAC 173-303-640 and that some contaminated soil and ancillary equipment may have to be removed, treated, and properly disposed. DH
Page 6-1 Line 22	Strike the following text: "... developing risk-based criteria for guiding waste retrieval and LDMM systems: ..." Refer to the required resolution of this issue as stated in the July 20, 2002, conditional approval letter for the C-104 and S-112 F&R documents. Ecology rejected this approach in the July 20 letter and in the numerous attached risk-related comments. DH
Pages 6-3 to 6-4 Figure 6.1	Strike the text in the following box: "RPE Requirements (Risk-Based) Residual Waste & Leakage". Revisions to the decision box should be discussed by both parties. One possible version of a revised decision box is as follows: "TPA Requirements for Retrieval of As Much Waste as Technically Possible. Application of LDMM Lessons Learned." DH
Pages 6-5 to 6-6 Figure 6.1(Cont'd)	Several major concerns exist as follows: (1) Explain the term "Interim Closure" as applied in this Figure. (2) Strike the text in the Box labeled as "RPE Requirements (Risk-Based) Residual Waste & Leakage". (See earlier related comment.) (3) Update the chart to include individual tank closures. (4) RPEs lead to risk decisions on closure. Add this missing pathway. (5) Explain the term "Interim Retrieved Status" as applied in this figure. (6) Portions of this decision flow chart are confusing and seem to imply that tanks not meeting TPA specific residual waste limits may be closed without retrieval efforts. This is unacceptable. Explain/revise the chart and state that TPA directed actions to retrieve as much waste as technically possible with a maximum of 360 cubic feet (large SST tanks) will be followed. DH

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page 6-7 Lines 6-8	The work plan only discusses two past tank retrievals utilizing equipment not designed to remove tank contents to the M-45 requirements. A conclusion regarding the ability to achieve M-45 retrieval goals based on these two tanks is premature. DH
Pages 6-8 to 6-12 Section 6.2.1	Currently, no SST meets the TPA M-45 requirements related to maximum allowable residual waste. Planning not to retrieve any SST fails to comply with the requirements under M-45 and WAC 173-303. This section should be revised in future related documents. DH
Page 6-9 Line 4	We might have supplemental treatment technologies, MIGHT ...and they won't be alternate. NU
Page 6-9 and Page 6-10, Figure 6.2	Strike the text and figure. The text and figure have not been agreed to by Ecology. Supplemental treatment technologies may be explored but have not yet agreed to by Ecology. Further testing and analysis is needed prior implementation to supplement vitrification. The TPA requires that all SST waste be treated with vitrification. Ecology has consistently disagreed with in-place, in-tank disposal of tank waste. All tank waste must be retrieved to the extent technically possible. None of this discussion should be carried forward to the SST closure plan. USDOE has expressed some of these approaches to accelerate clean up in Performance Management Plans; however, Ecology has not agreed to baseline changes. Specifically Ecology does not agree with any options that leave tank waste in tanks. Additionally, when USDOE has, in theory, identified low risk waste in specific tanks; however, some of those tanks are actually rated extremely high relative to risk to groundwater. Therefore, the basis of such analysis is questionable at best. Remove this entire discussion from future implementation plans and SST closure plans. It is highly unlikely that USDOE will be successful at administratively reclassifying 53 million gallons of waste previously designated as high-level waste. Ecology does not support this approach. JC, DH, SD
Page 6-11 Lines 13-16	Indicates that "44 SSTs have sufficiently low radionuclide concentrations that the waste meets NRC near-surface land disposal criteria for radioactive waste and; therefore, the waste in these tanks would not be retrieved and the waste is disposed of in-place." This is not compliant with TPA M-45 or WAC 173-303 requirements. Rewrite Chapter 6 to be compliant with TPA M-45 and WAC 173-303-610/640 requirements. BBK, DH, NU
Page 6-11 Lines 28-32	The highly uncertain nature of tank contents is noted. DH
Page 6-11 Lines 32-35	It seems that the strategy is not only unacceptable, but it also is missing a significant risk pathway. What other pathways are not considered in this strategy? Does it consider cumulative/additive risk from other non tank units near the tank farms? See the C-104 and S-112 risk-related F&R/RPE comments. DH
Page 6-12 Lines 1-17	Planned "in-situ disposal" of 9.6 million gallons of tank waste (including S-102) is unacceptable. Ecology will not agree to leave 9.6 million gallons of waste to be disposed of in the tanks. Do not include such a discussion in future tank-related documentation. DH, SD
Page 6-12 Lines 25-28	TPA milestone M-45 and SST Closure Plan schedules call for only one tank to be closed by 2004.
Page 6-13 Table 6.1	Add to the "Data quality objectives" box, a statement that the only closure DQO to be developed in 2002 will be for C-106. Additional work will be required to establish a DQO (or set of DQOs) to apply to all SST closures. DH

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page 6-13 Table 6.1	Under "Risk analysis", an evaluation of the long-term performance of the closure demonstration tanks is scheduled for 2002. Sufficient data may not be available within the next few months, especially for C-farm, lacking in soil/vadose zone/ancillary equipment characterization. See Ecology comments related to C-104 and S-112 F&R/RPE risk. DH
Page 6-13 Table 6.1	Project plans need to include SEPA/NEPA analysis and requirements. SD
Page 6-13 Table 6.1	The box titled "Remove liquids from tank C-106" implies that the existing solids in C-106 will not be retrieved. This is not acceptable. Revise this part of the table to indicate that solids will be retrieved also. DH
Page 6-13, 6-14, and 6-15	C-106 retrieval and closure will need to include plans to remove both liquid and remaining solids to the maximum extent technically possible with a maximum allowable residual of 360 cu. ft. SD
Page 6-14 Table 6.1	The box titled "Stabilize tanks" states tanks will be filled with grout. Somewhere in the work plan describe how the grout will be used to ensure proper mixing with residual tank waste. DH
Page 6-15	How will SEPA be addressed for C-106? Also, how will land disposal restrictions (LDR) be addressed for C-106? SD
Page 6-15 Lines 2-4	... enabling assumptions for closure demo. "following liquid removal closure with the remaining inventory in tank C-106 can be shown to be protective of human health and the environment" ... This concept does not follow the M-45 requirements to attempt to retrieve to the maximum extent practicable, etc. This is not acceptable. NU, DH
Page 6-15 Lines 5-7	Point of Compliance has already been established at the tank farm (or farm group =Waste Management Area) fenceline. Revise the bullet. DH
Page 6-15 Line 8	Strike this bullet. Most, if not all sampling efforts have not extended to the lower limits of tank waste. Residual waste is likely to include this area of the tank. Considering this fact and the questionable condition of archived samples and the differential layering that has occurred within the waste, it is not acceptable to assume that a sufficient basis for residual waste inventory can be established using archived samples. DH
Page 6-15 Lines 9-10	Explain how much waste will be classified as LLW. Also state that this will not circumvent the waste retrieval/closure requirements listed in TPA M-45. DH
Page 6-15 Lines 13-14	Revise the text to include SEPA requirements and the potential for a supplemental EIS to address closure issues. DH
Page 6-16 Line 16	Is the SAC going to "...provide the capability that will meet the composite analysis requirements of DOE O 435.1..."? Describe how the SAC (and/or other related efforts) will provide sufficient cumulative risk information in support of retrieval/closure decisions. NU, DH
Page 6-16 Lines 22-24	It is assumed the text is referring to MTCA Method C levels for continued industrial use of the tank farm soil for some limited time. Method C levels may not be protective of ground water. Describe how the site can guarantee long-term industrial use, institutional controls and cover performance considering the long-lived contamination likely to remain in site soil. See C-104 and S-112 F&R/RPE risk related comments regarding failed cover scenario and related pathways. DH

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page 6-17 to 6-18 Section 6.5	Closure performance standards have yet to be resolved. (see C-104 and S-112 F&R/RPE risk related comments) This section will likely be significantly revised after resolution to the above-mentioned risk-related Ecology comments. Ecology considers this section incomplete and, considering the pending comment resolution process, will withhold most comments at this time. DH
Page 6-17 Line 28	Explain the use of 25 mrem/y vs. 15 mrem/yr. NU, DH
Page 6-18 Lines 12 -14	Use of any point of compliance other than the tank farm fenceline is unacceptable. Also impacts already have been assessed beyond 1,000 years. What is the basis for limiting assessment for 1,000 years? Since certain risk scenarios for long-lived contaminants will take much longer to evolve, assessments should be conducted to model the extent of contamination for the duration of impacts. Revise this section. DH
Page 6-24 Lines 6-8	Other documents have described a shorter performance period. Please explain the discrepancy. DH
Page 6-26 Lines 1-14	Revise the text to state that long-term ground water monitoring will be required, considering the waste likely to remain in the site soil. DH
Page 6-27 Lines 5-6	Explain why the state dangerous waste regulations are referenced in association with the Comprehensive Environmental Response, Compensation and Liability Act. DH
Page 6-27 Lines 30-39	Describe how the stated three steps will be coordinated with tank farm schedules and information needs. DH
Page 6-28 Lines 1-8	Ecology agrees that cumulative risk assessment is an important part of any risk evaluation process. The text states that radioactive waste will decay over time. This sounds like if we wait long enough none of the waste will remain to be a problem. Some of the radioactive waste has half-lives ranging from thousands to millions of years. Time is relative and the long half-life radioactive constituents remaining in the ground at Hanford must be properly addressed and documented for future generations. DH
CHAPTER 7	
Page 7-1 Lines 2-5	DOE Order 435.1 is not included in this portion of the document. Please clarify. DH
Page 7-1 Lines 9-14	The text seems to imply that risk will be the main driver in determining SST retrieval requirements. TPA milestone M-45 already establishes the initial requirement of retrieval as much waste as technically possible (with a maximum residual of 360 cubic feet for the large SST tanks). Revise the text to indicate that only after the above TPA requirement has been met, will risk be considered. DH
Page 7-1 Lines 36-39	A small point perhaps, but the description of the objective of these previous risk evaluations should be simply to evaluate risk to assist in decision making, rather than attempting to demonstrate compliance with various regulatory requirements in an a priori manner. Neutrality is more consistent with objectivity. DD
Page 7-1 to 7-2 Section 7.1	Although NEPA is discussed in this section, a discussion relating to SEPA requirements is missing. Provide additional text describing how SEPA will be integrated and addressed relative to risk. DH
Page 7-2 Lines 9-15	Describe how the work started under the Hanford Tanks Initiative (HTI) project has continued after the HTI funding ended. DH.

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page 7-2 Lines 25-37	Please clarify the statement: "Different types of risk will be evaluated and compared before closure of the tanks." What are the different types of risk and what exactly will be compared? For example, comparison of short-term human risk vs. long-term human risk may not be possible, due to differences in assessment methods. Similarly, comparison of long-term human vs. ecological risk presents compatibility problems, as well. DD
Page 7-2 Line 38	Clarify that the "Appendix H" described in the text throughout Section 7 does not refer to the TPA Appendix H. DH
Page 7-3 Lines 2-6	Human and ecological risk methods are conceptually similar, but not identical. Please revise. DD
Page 7-3 Lines 27-29	List citations (if any) describing these decision support tools. In addition to the tools listed, consider including some type of bounding analysis which takes into account conservation of mass (e.g., Morgan, MG. 2001. Environ. Sci. Technol. 35:162A-164A). DD
Page 7-3 Lines 33-36 Bullet 2	Section 6.3 of the work plan indicates the Systems Assessment Capability (SAC) is limited in nature and is used to support analysis requirements for DOE O 435.1. It also states that an effort to integrate the SAC and RPE system models will be required. Describe the integration effort and provide a status. Explain how that relates to bullet #2. DH
Page 7-3, Bullet 2 Lines 33-36	Regarding the site-wide groundwater model/risk-based uncertainty analysis, please explain how cumulative risk will be evaluated. Describe space and time scales to be assessed in the context of risk. DD
Page 7-4, Bullet 1 Lines 1-4	Regarding tank-specific RPEs, cumulative risk should be computed on a tank farm basis, as well. DD
Page 7-4 Figure 7.1	Please describe the linkages in greater detail between the four risk assessment tools. For example, how exactly will site-specific assessments be integrated over the entire Hanford site? DD
Page 7-5 Lines 11-20	Please describe the "unit factor approach" for the risk receptor model. Is the risk receptor model similar in approach to modular risk analysis, described by Whelan et al (1994, PNL-SA-24239)? DD
Page 7-6 Lines 10-16	Why does the SAC tool broaden its scope to include economic and cultural impacts, as well as human and ecological risks? How exactly does the SAC estimate impact the regional economy and culture? Uncertainties associated with these extended objectives may be so large, as to erode the credibility of the overall SAC effort. Also refer to comments Page 7-3, bullet #2. DD, DH
Page 7-6 to 7-7 Section 7.1.3.3	Ecology has numerous concerns regarding the current RPE process as well as the USDOE interpretation of how the information will be used. Refer to conditional letter and attached RCR comments for the C-104 and S-112 F&R/RPEs. DH
Page 7-6 Lines 26-28	Please describe distinctions between uncertainty vs. sensitivity analyses. DD
Page 7-6 Lines 29-37	It is not clear how risks from individual tanks will be combined to evaluate tank farm risks or how individual tank farm risks will be combined to evaluate site-wide risks. Please clarify these methods of aggregation for evaluating cumulative risk. DD
Page 7-7 Lines 5-10	In addition to workers and the public, a Native American exposure scenario and ecological risk should also be evaluated. DD

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page 7-7 Lines 11-18	In addition to groundwater pathways, air and soil (including foodchain) pathways should also be evaluated in the RPE method. DD
Page 7-7 Section 7.1.3.4	Describe recent Los Alamos statistical analysis conducted on Hanford tank farms. Ecology understands the Los Alamos study concluded the uncertainty related to SST waste is approximately 11 orders of magnitude. Include a discussion of this effort. DH
Page 7-7 Lines 36-38	There appears to some missing text here, since the "following questions" are absent. Please correct. DD, NU
Page 7-8 Line 15	Explain how the FIR analysis accounts for a time period of 1,000 years when modeling of waste constituents such as uranium indicate the peak will occur after 10,000 years. DH
Page 7-8 Lines 1-15	In addition to human health risks, ecological risks should also be evaluated in the Field Investigation Report (FIR). What is the basis for predicting groundwater impacts over a 1,000 yr period? DD
Page 7-9 Lines 22-31	Describe in greater detail how risk from multiple source terms will be "proportionally allocated" to meet overall site-wide risk limits. DD
Page 7-9 Lines 39-40	Since contaminant concentrations are continuously changing in space and time, risk estimates should be presented as a function of space and time. In addition, risk integration should employ meaningful scales along these dimensions. DD
Page 7-10 Lines 19-26	Error. This paragraph implies that, based on applicable regulations, only radiological source terms are analyzed. Ecology formally commented on many inadequacies associated with the EIS including problems with properly incorporating chemical risk. Note that a chemical (i.e., nonradionuclide) risk assessment has also been completed for the US Ecology site (Kirner Consulting, Inc. 1999. Final Chemical Risk Assessment for the Commercial Low Level Radioactive Waste Disposal Facility, Richland, WA). DD, DH
Page 7-10 Line 34	(Refer to previous comment Page 1-10, Lines 12-13) Comparison to US Ecology is premature and inappropriate considering the many unresolved issues and comments associated US Ecology. In addition, US Ecology is not a participant in TPA process and is undergoing a different regulatory process in lieu of RCRA corrective action. A detailed comparison between US Ecology and the SST system would entail significant resources and, at this stage of development, the effort may not be useful. Instead, it may be beneficial to add any applicable lessons learned from US Ecology to future closure/retrieval documents. A comparison of regulatory processes would not be considered an applicable lesson learned. NU, DH
Page 7-11 Lines 1-3	A data quality objectives (DQO) process is currently underway in order to identify the type, quantity, and quality of nonradionuclide data required for a site investigation at the US Ecology site. DD
Page 7-11 Lines 13-18	Explain these references. NU
Page 7-11 Lines 21-28	Although only an example, ecological risk is omitted. It should be included. DD
Page 7-11 Lines 31-36	Note that quantifying costs and benefits of alternative remediation technologies is inherently subjective and uncertain. DD

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page 7-12, Bullet 2 Lines 28-29	Please describe how background risks will be characterized. DD
Page 7-13 Lines 9-13	A more definitive term for "toxicological risk" (as used here) would be "nonradiological contaminant risk." DD
Page 7-13 Lines 16-19	This inverse relationship between public health risk vs. worker risk has been discussed by Church (2000. The unacknowledged transfer of risk. Environ. Sci. Pollut. Res. [Special Issue] 2:79-84). DD
Page 7-14 Lines 17-19	In addition to release of contaminants to the atmosphere and groundwater, include releases to soil and related soil-based pathways (e.g., soil ingestion, foodchain, etc.). DD
CHAPTER 8	
Page 8-1 Line 29	Describe how U-107 will be a demo site for retrieval. Clarify that U-107 is not yet listed in the TPA M-45 milestone series as a specific retrieval project. NU, DH
Page 8-3 Lines 16-17	The C-104 F & R document contains general premises for leak detection, but does not specify specific methods. Methods that are separately under development in other programs are not mentioned in the C-104 F & R, nor is there an insertion point identified in the schedule at which time the selected methods for LDMM will be incorporated. This is a major failure of that report and needs to be corrected. At a minimum, a schedule for development, selection, and incorporation of LDMM into tank waste retrieval operations needs to be included in this closure plan. Assurance of funding to support this continued technology development and testing should also be included. JC
Page 8-3 Line 24	LDMM is not subject to impacts on project schedule; it needs to be done. NU
Page 8-3 Line 31	What are the stated "...volumetric methods similar to the EPA-approved methods used on underground petroleum tanks and external methods for leak detection"? NU
Page 8-3 Lines 16-37	Ecology documented significant concerns with risk based LDMM strategy in the recent C-104 and S-112 F&R/RPE comments and associated conditional approval cover letter. Resolution to these comments must be incorporated into future retrieval and closure documentation. DH
Page 8-4 Line 25	Explain how topographical mapping techniques for solid surfaces can be applied as a leak detection method. Describe the accuracy associated with this method. DH
Page 8-5 Section 8.5.1	There is some question regarding the ability to mix stabilization materials (i.e., grout) with residual waste. Describe the effectiveness of mixing materials with residual waste in order to meet various requirements such as LDR, WIR determination, and future tank performance standards. DH
APPENDIX A – RETRIEVAL PERFORMANCE EVALUATION METHODOLOGY AS A TOOL FOR MAKING RETRIEVAL AND CLOSURE DECISION	
Page A-1 Lines 8-16	In addition to short and long-term human health risks, risks to ecological receptors (i.e., terrestrial and aquatic biota) should be assessed. Within long-term human health risks, Native American and children scenarios should be included. DD

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page A-2 Lines 5-16	"Allowable leak loss" is not an acceptable term. The regulations allow no leaks. In reality some leakage may occur during retrieval activities. USDOE must use the best technically practicable efforts during retrieval to minimize leaks. This should be consistent with the "as low as reasonably achievable" (ALARA) principle in radionuclide regulation. In this regard, ALARA should not only consider long-term human health risk but also short-term risks to workers during the retrieval process. DD, DH
Page A-2 Lines 17-20	Ecology believes the RPE attached to the C-104 F&R document fell short of these objectives (see the F&R related comments). In addition the S-112 and C-104 RPEs did not include an uncertainty analysis. What is the basis for this statement? Please clarify. JC, DH
Page A-4 Lines 1-5	Peer review was conducted on the AX-104 RPE, but the comments were not incorporated due to cancellation of the HTI Project for which this effort was intended. Many of the comments made on the AX-104 RPE were not incorporated into the C-104 and S-112 RPEs. Certain key USDOE RPE work group RCR comments as well as many comments generated by Ecology during the C-104 Draft F&R/RPE review were not addressed in the C-104 and S-112 RPEs. These comments need to be resolved and incorporated into future RPE and Closure documents. JC, DH
Page A-4 Lines 26-35	Missing from the definition of closure for SSTs is key language from Section 6.3 of the TPA Action Plan as follows: "The TSD units containing mixed waste will normally be closed with consideration of all hazardous substances, which includes radioactive constituents." If USDOE does not intend to include certain constituents in the closure process, then additional text is needed describing how and when USDOE intends to go back into the SST system to address the additional constituents. DH
Page A-5 Lines 14-17	Describe differences between the proposed RPE process and EPA's data quality objectives (DQO) process. DD
Page A-5 Lines 20-22	Revise the term "Retrieval leak loss limit". The regulatory limit is zero. Leak loss during retrieval should target zero losses; realistically, waste retrieval should be technology driven such that the design permits retrieval of as much waste as possible while minimizing leak losses to the extent technically practicable. Calculation of "an acceptable leak loss based on risk" is not acceptable and is not supported by the TPA or regulations. JC, DH
Page A-5, Bullet 1 Lines 20-22	Re "retrieval leak loss limit," see comment on page A-2, lines 5 - 16 (re ALARA). DD
Page A-5 Lines 23-26	Revise the bullet to reflect the actual TPA language. State that each tank must be retrieved to remove as much waste as technically possible with tank residues not to exceed 360 cubic feet in each of the 200 series tanks and 30 cubic feet in each of the 100 series tanks. DH
Page A-5, Bullet 2 Lines 23-26	Note that although residual waste is described in terms of waste volume remaining and percent waste removed, this description is not very informative in terms of actual contaminant inventory. Residual waste should be translated into contaminant concentrations. DD
Page A-7 Lines 2-4	Add the TPA to "federal and state regulatory requirements." JC
Page A-7, Bullet 1 Lines 11-20	Again, "environment" includes protection of ecological receptors, thereby entailing performance of an ecological risk assessment. DD

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page A-7 Lines 13-14	If requirements for waste retrieval and tank farm closure are sensitive to "the values of stakeholders, Tribal Nations and the public", then provide a description of plans and schedules to submit F&R documents/RPEs, closure documents and other waste retrieval documents for public review. Please clarify. JC, DH
Page A-7, Bullet 3 Line 23	Detail how "cumulative impacts" will be assessed over relevant space and time scales. DD
Page A-7 Line 23	Please add a fourth bullet to read, "Return of groundwater/soil to maximum beneficial use." JC
Page A-8 Figure A.3	Note that "Environment" includes more than "Groundwater." Other environmental media are soil, surface water, and sediment. "Environment" also includes ecological receptors (i.e., terrestrial and aquatic biota). DD
Page A-8 Figure A.3	Revise box to read, "Public Health and the Environment During and After Closure". JC
Page A-8 Line 5	Waste retrieval and tank closure should be technology based, not risk based. Also see comment page A-7, lines 13-14. JC
Page A-8 Lines 5-13	Describe how "total source term for the tank farm" will be computed. DD
Page A-8 Lines 18-19	To provide some measure of assuredness, the data used to support an RPE should be that obtained during tank farm/vadose zone characterization carried out under the RFI/CMS process. Please clarify and correct. JC
Page A-9 Lines 5-7	This may be the process for an RPE, but an uncertainty analysis was not included with the S-112 and C-104 RPEs submitted to Ecology. The only uncertainty included in both RPEs was a reference to the AX RPE uncertainty analysis. This was not acceptable (see C-104 and S-112 RPE comments). Please clarify. JC, DH
Page A-9 Lines 9-10	What decisions are being discussed and with what players? Please clarify. JC, DH
Page A-9 Lines 10-18	Describe potential qualitative and quantitative uncertainty analyses which might be employed in the RPE. DD
Page A-9 Lines 12-13	"....to select an option for implementation." of? Please clarify and be specific. JC
Page A-9 Lines 23-30	A performance measure of retrieval to the maximum extent technically possible with residual waste of no more than 360 cubic feet (for 100 series tanks) has been established in the TPA. What additional performance measures are being considered? Please clarify. JC, DH
Page A-10 Figure A-4,	Retrieval is required of all tanks. Delete this decision box labeled "Is Retrieval Required?" JC, DH
Page A-11 Line 8	Who will make the decision as to what is "technically practicable" and how will it be made? Please clarify. JC
Page A-11 Line 19	Delete the words "Determining" and "Limits" from the heading for Section A.1.4.1. DH

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page A-11 Lines 20-23	Note that risk is a function of contaminant exposure to receptors (human and ecological). In addition to groundwater pathways, it is possible that risks may occur via soil-based exposure pathways (e.g., soil ingestion, foodchain ingestion, inhalation of resuspended soil, external exposure to soil radionuclides) and air-based exposure pathways (e.g., inhalation, external exposure to radionuclides in air). DD
Page A-11 Line 24	What is the meaning of the first nine words in this sentence? Rewrite for clarity. JC
Page A-11 Paragraph 4 Bullet 2 Lines 24-36	Re "leak loss," see comment on page A-2, lines 5 - 16 (re ALARA). Also, no matter how it is phrased (i.e., "level of retrieval leak loss that could occur while maintaining regulatory limits"), the regulatory limit is zero. Revise this section. DD, DH
Page A-12 Lines 2-11	Again, groundwater is not the only exposure pathway determining risk. This paragraph also assumes that the residential farmer scenario is limiting and that all contaminants are carcinogenic. Neither of these assumptions may be true (e.g., Native American or intruder scenario may be a driver, ecological risk may be a driver, noncarcinogen contaminants may be present which must meet a hazard index of one). Proposed waste management area covers have a 500-year design life. A number of contaminants will remain in the ground for orders of magnitude longer than 500 years, allowing for potential future movement of contaminants to the surface by plants and animals. The resulting air, direct contact, etc. human health and environmental pathways must be addressed/analyzed. DD, DH
Page A-12 Lines 13-14	What is the meaning of this sentence? Please rewrite for clarity. JC
Page A-12 Lines 13-19	This paragraph is unclear. Please revise. DD
Page A-12 Lines 22-32	The text describes risk-based waste retrieval which is not acceptable. TPA milestone M-45 requires that tanks be retrieved to the extent "... technically possible ..." Refer to the numerous previous work plan (and F&R) comments. Please revise this paragraph. JC, DH
Page A-13 Lines 4-5	This document incorrectly describes an RPE approach that uses risk to define extent of tank retrieval, whether or not a tank needs to be retrieved, and to define initial LDMM requirements. This approach goes beyond the intended use of the RPE (as understood by Ecology). The RPE is intended to provide risk information to assist in certain tank farm decisions, not to initially establish retrieval residual and LDMM limits. Based on the first two RPEs (C-104 and S-112) the process is still in the development phase and must evolve further to become acceptable and useful. Refer to C-104 and S-112 F&R/RPE comments. Missing contaminant pathways, lack of sufficient characterization, lack of cumulative risk analysis, and lack of an uncertainty analysis are some of the key areas of improvement needed for the RPEs. Ecology does not support the technical approach or findings of retrieval performance evaluations as currently submitted. Provide rationale for the statement that stakeholders and Tribal Nations support the current RPE efforts. JC, DH
Page A-13 Lines 8-9	This sentence implies that the RPE establishes retrieval and residual waste limits. M-45 establishes these limits. Either strike or revise this text. DH
Page A-13 Lines 10-11	Strike "technology development." JC, DH, SD

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page A-13 Lines 13-15	Describe specifically how stakeholders and tribal nations were provided opportunity to comment on the final RPE submittals. Ecology is aware of the evolution of the RPEs through work groups with associated RCR comments; however, input by stakeholders and Tribes should be at the final RPE submittal stage. Tribes, etc. were involved in the up-front process for AX, but have they had a chance for input since then? JC, DH, SD
Page A-13 Lines 16-17	While the RPE method can be coordinated with the groundwater/vadose zone integration project, experience with C-104 indicates a lack of communication. Specify how this coordination will occur. JC
Page A-13 Lines 18-20	Risk is not the basis for waste retrieval or acceptable leak loss. Technology forms that basis. Please rewrite and correct. JC
Page A-13 Paragraph 2 Bullet 3 Lines 26-27	Describe how various source terms will be combined and how cumulative risk will be estimated for an entire tank farm or an even larger spatial scale. Estimation of cumulative risk will ultimately be needed for assessing regional risk on the Hanford site (e.g., Composite analysis for low-level waste disposal in the 200 Area plateau of the Hanford site, PNNL-11800; Modular risk analysis for assessing multiple waste sites, PNL-SA-24239). Attempting to calculate risk for SST waste management areas in isolation, without incorporating cumulative risk from contamination outside the farm fenceline, is not acceptable. DD, DH
Page A-13 Paragraph 2, Bullet 5 Lines 33-34	Re the tradeoff between short-term (worker) vs. long-term (public) risk, see comment for page 7-13, lines 16 - 19. DD
Page A-16 Lines 1-2	WAC 173-340 is not in the Federal Register or the Code of Federal Regulations. It is in the Washington Administrative Code. Please correct. JC
APPENDIX B CLOSURE STRATEGY ISSUE STATUS	
GENERAL COMMENT	
Appendix B	Ecology questions the relevancy of this appendix to SST closure planning. How are these issue statements to be used? Describe what is meant by the "open" and "closed" status. Ecology does not agree with language presented in several of the issues including # 3.01, 3.04, 4.01, 4.02, 5.01, 5.02, 5.03, 7.03, 7.05, 8.03, and 8.06. DH
Page B-8, Issue 4.02 Lines 15-16	The Tank Farm/Vadose Zone Project is characterizing the vadose zone and groundwater under the RFI/CMS process (M-45) to determine whether additional interim and/or corrective measures may be needed before closure. However, the Field Investigation Reports will contain data/information useful for closure of the tanks, but the need for additional data to support closure may still exist. The FIR may not be the end of characterization investigations needed for closure of tanks. In addition, a FIR has been completed for only one SST WMA, with several more remaining to be completed. Please correct. JC

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page B-10 Lines 13-22	A TSD unit includes the tank, the waste therein, the waste that has leaked to soils, and waste that has migrated through the vadose zone from the TSD facility to groundwater (i.e., groundwater contaminated by a tank release). Also, it is necessary to determine not just the amount, but also the composition of the waste leaked to the ground. Please correct. JC
Page B-13 Lines 30-33	Listed are general objectives of borehole logging, but not the means by which these data will be gathered; i.e., the specific logging method, radius/depth of investigation, location, and number of drywells to be logged, logging rate and frequency etc. Please provide this information or reference where it can be found. JC
Page B-20	Why is the issue "Cost/Benefit tradeoffs for Leak Mitigation devices" closed ...are we still in discussion? NU
APPENDIX C – HYDROGEOLOGICAL INFORMATION	
Page C-16 Lines 5-26	No mention is made of Cold Creek and Dry Creek which, although intermittent, do provide some recharge to the unconfined aquifer. Please correct. JC
Page C-16 Lines 27-31	What about S-10 Pond? Please amend to include. JC
Page C-24 Line 37	This is a judgment without any provided basis. Please provide basis or delete. JC
Pages C-26, C-28 Figures C.10, C.12	Figure C.10 is in units of feet; Figure C.12 is in units of meters. Please correct so that they are consistently the same units to allow direct comparison or provide contours of both units on each map. JC
Page C-30 Lines 5-6	This is old text, all of which is no longer applicable, as is the case for this sentence. Please delete and update this previously written material to make it current. JC
Pages C-34–C-37 Table C.2	Please make the following changes: (1) Shade the upgradient wells as indicated in the footnotes, (2) explain whether bimonthly means twice monthly, or every other month, and (3) identify what is meant by supporting data. Please correct. JC
Pages C-38, C-39	Figures C.13 and C.14 are illegible. Please correct. JC
Page C-40 Lines 23-25	Dispersivity is also a monitoring efficiency model (MEMO) input. Please correct. JC
Page C-40 Lines 28-31	Since the publication of WHC-SD-EN-AP-012, the water table has significantly declined and the groundwater flow direction has changed because of the cessation of liquid waste discharges to ground. These efficiency calculations are out of date and no longer valid. Please correct. JC
Page C-41 Line 21	Water levels are no longer reported quarterly to Ecology. Please correct. JC
Page C-42 Line 6	WMA U is in groundwater quality assessment monitoring status under interim-status regulations, not detection (indicator parameter) monitoring status. Please correct. JC
Page C-42 Lines 16-17	RFI/CMS investigations are for both vadose zone and groundwater contaminant investigations. Please correct. JC
Page C-42 Lines 18-19	A groundwater assessment monitoring plan has already been prepared for WMA U, but Ecology has not received word that WMA C is in groundwater quality assessment monitoring status. Please update and correct. JC

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page C-43 Lines 2-3	Analytical and water level measurements are no longer supplied quarterly to Ecology. Please update and correct. JC
Page C-44 Line 17	Add recreation to the list of uses for the Columbia River. JC
Page C-44 Line 20	Add a bullet that reads, "Concentration/activity at the Columbia River." JC
Page C-44 Lines 27-28	Please explain what is meant. JC
Page C-45 Line 5	Add to this sentence, "...and whether pre-closure corrective action is needed." Please correct. JC
Page C-45 Lines 13-14	The Environmental Restoration Contract terminates (as of this date) on December 31, 2002. Please update and correct. JC
Page C-45 Lines 32-33	Groundwater wells intended to monitor cribs adjacent to tank farms provide some data relevant to groundwater quality in the vicinity of tank farms, but could hardly be construed as effectively monitoring the SSTs. Please correct. JC
Page C-51 Lines 25-26	The leak at BX-102 that was reported in 1971 may well have been declared when an overfill of this tank in 1951 that leaked finally arrived at a drywell. Please update and correct with recent information determined by the Tank Farm/Vadose Zone Investigation of WMA B-BX-BY. JC
APPENDIX D – DESCRIPTION OF SINGLE-SHELL TANK FARMS, SINGLE-SHELL TANKS, AND ANCILLARY EQUIPMENT	
General Appendix D	Recent deliverables under TPA Milestone M-23 include a complete description of the SST system. The closure work plan description should match the description contained in the M-23 deliverable. These two descriptions should match the description to be included in the future SST System (Framework) Closure Plan. Due to staff limitations caused by the parallel Framework Closure Plan effort, Ecology will not review this version of the SST system description. However, Ecology will review the SST system description provided in the certified SST System (Framework) Closure Plan and cross-check that description against the M-23 deliverable. DH
Page D-17 Table D-3	What is the date of this information ...is this the latest? NU
APPENDIX E – SINGLE-SHELL TANK INTERIM STABILIZATION OPERATIONS AND SURVEILLANCE SYSTEMS	
Page E-2 Line 11	Explain what is meant by "administratively declared stabilization", especially if the target criteria are not met. JC
Page E-8 Lines 21-30	The logging that was conducted through 1994 was gross gamma logging. What logging/monitoring is being conducted after completion of the baseline spectral gamma surveys? Please correct and update. JC

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
APPENDIX F – COMPLEX-WIDE TANK CLOSURE PROGRESS AND ISSUES	
Page F-26 Section F.3.4.3	For a RCRA TSD, the Point of Compliance is clearly spelled out in the regulations, and that is the fence line of the WMA. Assessment of whether the regulations are met will be at the Point of Compliance. Alternate points may be used for illustrative purposes, but Ecology will hold USDOE accountable for performance at the fence line. Please correct. JC
Page F-29 Last paragraph	The only Point of Compliance for closure of a RCRA TSD is the fence line of the WMA. Please correct. JC
Page F-30 Table F.2	Revise the text describing Closure Work Plan updates. The new TPA M-45-06A milestone replaces the Closure Work Plan concept with a Tank Farm Closure/Post Closure Implementation Plan to be submitted 06/30/04 and every two years thereafter. DH
Page F-30 Table F.2	Under the heading "Compliance Timeframe", 10,000 years is listed as the likely compliance timeframe for final closure. Considering that, for the groundwater pathway, modeling indicates uranium is on the rise at the POC beyond 10,000 years, explain the basis for limiting compliance to 10,000 years. In addition, how does the 10,000-year timeframe compare to a future failed cover scenario with potential animal and plant uptake of long-lived radionuclides? DH.
Page F-30 Table F.2	Other than possibly the "inadvertent intruder" scenario listed, all Hanford scenarios are focused on groundwater. Missing are several key scenarios, including those related to a future failed cover scenario with plant, animal, and erosion caused transport of contaminants to the surface resulting in spread of contamination to human and ecological targets via several pathways including inhalation, ingestion, bioaccumulation, etc. Provide the missing scenarios and pathways. DH.
APPENDIX G-INITIAL SST WMA CORRECTIVE ACTIONS, VADOSE ZONE AND GROUNDWATER CHARACTERIZATION ASSESSMENT, AND THE INTEGRATION OF VADOSE ZONE AND GROUNDWATER ACTIVITIES AT SPECIFIED ASSOCIATED SITES	
Page G-1 Lines 17-18	Field investigations at WMAs T and TX-TY have been extended another year to include boreholes in WMAs T and TY. Please update. JC
Page G-5, Line 1	See comment page F-29, last paragraph. JC
Page G-6 Lines 15-17	The plume intercepted by W23-19 shows the highest values for Tc-99 in that well, but the plume extends beyond that single well at lower activity levels. Please correct. JC
Page G-8 Line 28	The conclusion was to avoid the use of high sodium supernate. Please correct. JC
Page G-9 Line 3	To clean close the SSTs would require excavation to depths of over 100 feet and create not only an open pit mine, but create extremely high hazards to workers involved in the effort. Please delete. JC
APPENDIX H – RISK ASSESSMENTS	
Appendix H, General	Missing from the SST System Closure Work Plan is a section discussing uncertainty related to risk analysis. DH

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Appendix H, General	Appendix H focuses on human health risk and largely neglects risk to ecological receptors. Ecotoxicity is only briefly mentioned in Section H.6.0. It is suggested that a separate Appendix be prepared which details a conceptual site exposure model for ecological receptors. Separate flow chart diagrams of the conceptual site exposure model for humans and for ecological receptors should be prepared. The human model should include pathways associated with both short and long-term risks. The ecological receptor model should include both terrestrial and aquatic receptors. DD
Page H-1 Line 9	Describe "routine exposure". Compare it to a non-routine exposure and provide some examples. DH
Page H-1 Paragraph 2 Lines 10-23	It is stated, "Exposure routes for radionuclide contaminants transported through the atmospheric pathway include ingestion, inhalation, dermal contact, and external exposure." In general, these routes also apply to radionuclides transported via soil, groundwater, surface water, and sediment media. Furthermore, with the exception of external exposure, these routes apply to nonradionuclide contaminants via all media, as well. Include analysis of all the above-mentioned exposure routes in future risk assessment documentation. DD, DH
Page H-1 Lines 25-34	The last two sentences of this paragraph, describing accident and routine hazards, are poorly written. Please clarify and revise. DD
Page H-2 Lines 9-11	Risk analysis may include a comparison between different theoretical compliance points; however, the only acceptable regulatory POCs associated with the SST WMAs is the fenceline for each WMA. Revise the text to reflect this concept. DH
Page H-2 Line 18	Missing from the list of supported activities is SEPA. Provide the missing reference to SEPA. DH
Page H-2 Line 19	Insert "RCRA (WAC 173-303-610)" between "tank farm" and "closure". DH
Pages H-2 to H-3 Section H.1.2	See previous comments (including the C-104 and S-112 F&R/RPE comments) regarding missing future failed cover scenario with associated air, direct contact, ingestion pathways affecting both human and ecological targets. Considering the fact that, after remediation efforts are complete, significant amounts of long-lived contaminants will likely remain in the soil/ancillary equipment in the upper soil column, risk must be calculated for future release scenarios and pathways. Provide the missing risk information. DH
Pages H-3 to H-4 Section H.1.2.1	The text indicates source terms for long-term human health risk are limited to the "human accessible environment". Clarify the text to include non-human (plant/animal) access to the source term. Although the proposed tank farm cover design is robust, considering the long-lived contaminants likely to remain in the upper soil column after remedial actions, it is possible that cover break down will occur allowing transport of some of the contaminant source to the surface by plants and animals. DH
Page H-3 Lines 23-35	Regarding long-term human health risk, the text indirectly indicates that inadvertent human intrusion is an even greater concern than groundwater contamination. Therefore, please direct the reader to Section H.1.2.5, provide a more detailed description of the intruder scenario, and list associated exposure pathways (e.g., incidental soil ingestion, inhalation of suspended dust, foodchain ingestion, etc.). DD

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page H-3 Lines 37-39	In addition to human health risks, note that seeps and springs along the Columbia River may also contribute to ecological risks. DD
Page H-4 Line 9	Clarify that past leaks and releases are not just from tanks. State that lines/ancillary equipment also contributed to releases at tank farms. DH
Page H-4 Lines 13-21	Due to large data gaps in contaminant inventory, what type of uncertainty analysis is planned for source term characterization? Provide additional text. DD
Page H-4 Lines 24-26	The text implies that historical data considered leak/releases only from tanks. Clarify that releases from lines/ancillary equipment will also be included.
Page H-4 Lines 35-39	Please add "sediment" to the media to be considered (i.e., second sentence). Contaminant transport in sediment will need to be evaluated in the Columbia River. DD
Page H-4 to H-5 Section H.1.2.2	The text states that contaminant transport through the vadose zone and groundwater will receive the greatest consideration. While Ecology acknowledges this is an important transport mechanism, other transport mechanisms are possible and must be considered. A possibility of a future cover failure exists; therefore, associated transport scenarios allowing movement of contamination to the surface via plant and animal uptake must be included. (See previous related comments.) DH
Page H-5 Lines 6-19	Although contaminants may disperse relatively quickly in the water column in the Columbia River, contaminants may accumulate in river sediments, depending on physical and chemical properties. DD
Page H-5 Lines 20-29	The discussion on models should mention model and parameter uncertainties, calibration methods, and validation procedures. DD
Page H-5 Lines 30-36	In addition to spatial scale, temporal scale is also critical to model development. DD
Page H-5 Lines 38-40	Air releases are not limited to just gases and vapors. Refer to previous comments regarding a future failed cover scenario and associated plant/animal/insect transport of long-lived particulate contamination. Revise the air release section to include this information. DH
Page H-6 Lines 7-26	Note that human receptors should include children and Native Americans, in addition to the more standard receptors (e.g., adult resident, farmer, fisher, adult worker, etc.). In addition to ingestion, inhalation, dermal absorption, and external exposure (radionuclides), the list of exposure pathways should also identify foodchain ingestion (e.g., ingestion of vegetables, fruits, beef, milk, etc.). DD
Page H-6 Lines 34-41	Note, too, that in addition to the well driller and homesteader scenarios, the intruder may be a Native American with an associated scenario (e.g., sweat lodge, fish consumption, etc.). DD
Page H-7 Lines 2-5	Clarify that accident analysis is part of the short-term human health risk evaluation (if this is the case). DD
Page H-8 Lines 2-10	Please see comment for page H-4, lines 13-21. DD
Page H-9 Section H.4.0	This section is very short and generic. Provide details/analysis relating to release rates. If this information is not yet available, provide a schedule indicating when and how it will be made available and included in SST closure plans. DH

SINGLE-SHELL TANK SYSTEM CLOSURE WORK PLAN COMMENTS	
Page H-10 Lines 2-6	I would suggest that at least some of the parameters (e.g., partition coefficients) be treated stochastically in the modeling, since their variability is relatively large. Focused field work to obtain site-specific data may be appropriate in some of these cases. DD
Page H-12 Section H.6.0	Section H.6.0 should be expanded with far more detail and reference citations. DD
Page H-12 Lines 2-10	Note that many exposure parameters are also found in EPA's Exposure Factors Handbook (EPA/600/P-95/002Fa, b, &c) and Wildlife Exposure Factors Handbook (EPA/600/R-93/187a&b). Native American exposure factors are listed in Harris and Harper (1997. Risk Anal. 17:789-795). Other Hanford reports with relevant exposure parameters and scenarios include the Tank Waste Remediation System/EIS (DOE/EIS-0189), Columbia River Comprehensive Impact Assessment (DOE/RL-96-16), and vitrification facility risk assessment work plan (RPT-W375-EN00001). DD
Page H-12 Lines 11-18	A few more references that contain relevant human health toxicity information are the following: 1. EPA's Health Effects Summary Tables (HEAST) lists toxicity values (e.g., reference dose, cancer slope factors) for nonradionuclides (EPA-540-R-97-036) 2. HEAST also lists cancer slope factors for radionuclides 3. EPA's Federal Guidance Reports Nos. 11, 12, and 13 lists radionuclide internal dose conversion factors (EPA-520/1-88-020), external dose coefficients (402-R-93-081), and risk coefficients (EPA 402-R-99-001), respectively 4. USDOE's Risk Assessment Information System (RAIS) lists various toxicity values for nonradionuclides and radionuclides. A few more references for ecotoxicity are the following: 1. EPA's Screening Level Ecological Risk Assessment Protocol (SLERAP) for Hazardous Waste Combustion Facilities (EPA 530-D-99-001A) lists bioconcentration factors (BCFs) and toxicity reference values (TRVs) for many nonradionuclides and a variety of ecological receptors 2. Ecology's Model Toxic Control Act (MTCA, WAC 173-340) lists soil cleanup levels for plants, soil biota, and wildlife for several nonradionuclides 3. USDOE's Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota (DOE-STD-XXXX-00) lists biota concentration guides (BCGs) for radionuclides in soil, sediment, and water for aquatic and terrestrial biota. BCGs are based on the International Atomic Energy Agency (IAEA) report (1992. Tech. Rep. Ser. No. 332) which specifies 1 rad/d (aquatic animals and terrestrial plants) and 0.1 rad/d (terrestrial animals). DD
Page H-12 Lines 16-17	The text implies additional work is needed to document toxicity to terrestrial receptors. Provide plans/schedules to supply the missing information. DH
APPENDIX I – BARRIER AND MARKER SYSTEM DESIGN CONSIDERATIONS	
Pages I-1-I-26	Discussion of barrier design and selection criteria pre-supposes closure of the SSTs as a landfill. While landfill closure may come to fruition, no decision(s) on closure/remedial measures has as yet been reached. JC