



U.S. Department of Energy
Office of River Protection

0078550

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

JUL 31 2008

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REISSUE (A)
08-TF-049

Ms. Jane A. Hedges, Program Manager
Nuclear Waste Program
Washington State
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99352

RECEIVED
JUL 31 2008
EDMC

Dear Ms. Hedges:

RESOLUTION OF WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY)
COMMENTS ON SINGLE-SHELL TANK (SST) RETRIEVAL SELECTION AND
SEQUENCE DOCUMENT - RPP-21216

- References:
1. ORP letter from S. J. Olinger to Jane A. Hedges, Ecology, "Request for Extension to Respond to Comments," 08-TF-043, dated June 19, 2008.
 2. Ecology email from J. J. Lyon to R. A. Quintero, ORP, "M-45-02N Comments, Electronically Sent," dated May 21, 2008.
 3. Ecology letter from J. J. Lyon to S. J. Olinger, ORP, "Single-Shell Tank (SST) Retrieval Selection and Sequence Document RPP-21216, Revision 3, Hanford Federal Facility Agreement and Consent Order (HFFACO) Milestone M-45-02N," dated May 15, 2008.

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Consistent with the process identified in the Hanford Federal Facility Agreement and Consent Order (known as Tri-Party Agreement), Section 9.2, this letter provides the U.S. Department of Energy, Office of River Protection (ORP) plan for response to Ecology comments and update of the RPP-21216, SST Retrieval Selection and Sequence document.

In reference 1, ORP requested an opportunity to meet and discuss Ecology's comments on the subject document. On July 2, 2008, the proposed disposition of Ecology comments provided in References 2 and 3 were discussed with Ecology. Based upon those discussions, ORP and its contractors will modify RPP-21216 as described in the attached Review Comment Record. ORP plans to provide the updated RPP-21216 document to Ecology by September 15, 2008.

In Reference 3, Ecology requested information on plans for investigation of new retrieval technologies. As discussed at the July 2, 2008, between Ecology and ORP staff, retrieval technology development appears to be outside of the scope of the subject report, but could be discussed separately. ORP and its contractors have, to date, developed numerous retrieval technologies for both sound and assumed leaking tanks. Further retrieval technology development will continue to build on the lessons learned to date and is included in baseline planning assumptions. Attachment 1 provides summary of technology development efforts used to improve SST retrieval efficiency and effectiveness.

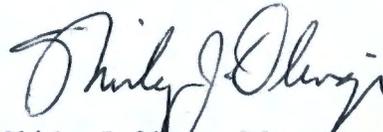
Ms. Jane A. Hedges
08-TF-049

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Please be advised that RPP-21216 could be impacted by ongoing Tri-Party Agreement negotiations. If you have questions, please contact me, or your staff may contact Ron L. Frink, Acting Federal Project Director for Tank Retrievals, (509) 591-1889.

Sincerely,



Shirley J. Olinger, Manager
Office of River Protection

TF:RLF

Attachments

cc w/attach:

J. C. Fulton, CH2M HILL

S. Harris, CTUIR

J. J. Lyon, Ecology

C. L. Whalen, Ecology

N. Ceto, EPA

S. L. Leckband, HAB

G. Bohnee, NPT

K. Niles, Oregon Energy

R. Jim, YN

Administrative Record 5-2-4

CH2M HILL Correspondence

Environmental Portal, LMSI

Retrieval Technology Developed, Deployed or Planned

Oxalic Acid Dissolution	Deployed in tank C-106 in 2003
Vacuum Retrieval System (a dry retrieval method similar to a rug vacuum on a robotic arm)	Deployed in 4 tanks in C-Farm from 2003 through 2006
Mobile Retrieval Tool (first generation crawler)	Developed in C-109 in May 2008
In-line density monitor (coriolis flow meter)	Deployed in C-Farm tanks since 2004
Variable height pump	Deployed in 3 tanks
Improved video camera systems for use in-tank	On-going development and deployment. Used in every retrieval.
Salt mantis	Deployed
Aardvark (off-riser sampler)	Deployed
Alligator (improved post retrieval sampling device)	Deployed
Rotary Viper (Ultra-high pressure mixing device that fits down a 4" riser)	Deployed
High Concentration Caustic Dissolution	Deployed
Raman real-time monitoring probe (in-line chemical species Monitor)	Developed
In-line cesium monitor	Deployed
Robotic arm camera system	Developed
Sand mantis (Salt Mantis with improvements and with an eductor pump on the crawler)	Developed (to be deployed first at SRS)
Fold Track	Deployed
High Resolution Resistivity Leak Detection Monitor (a higher accuracy ex-tank leak detection system for use during retrieval operations)	Deployed
Tank integrity remote (annulus) inspection tool using Synthetic Aperture focusing Technique developed by PNNL	Deployed
Residual Waste Measurement	4 Different methods have been developed; one method has been deployed and used in all tanks at Hanford to date.
Robotic Arm	Demonstration Planned

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5. Document Number(s)/Title(s) SST Retrieval Sequence Document and DST Space Evaluation Document for M-45-02-N RPP-21216, Rev. 3 – “Single Shell Tank (SST) SST Retrieval Selection and Sequence Document”	Project Manager Name 	Reviewer Name Nancy Uziemblo Jeff Lyon Les Fort Ed Fredenburg Nina Menard Robbie Biyani Suzanne Dahl Beth Rochette		
<u>Organization Manager (Optional)</u> 	10. Agreement with indicated comment disposition(s) 			
	<u>Reviewer/Point of Contract</u> <u>Date</u> <u>Author/Originator</u>		<u>Reviewer/Point of Contract</u> <u>Date</u> <u>Author/Originator</u>	

Item	Location in document	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted.)	16. Status
Items Taken from Transmittal Letter					
L1.		A model evaluation using the Ecology retrieval assumptions, with no restriction on the number of simultaneous retrievals in the southwest quadrant, calculating the necessary amount of new double shell tank (DST) space.		Section 6.6 already provides a sensitivity case in which the constraint on the number of simultaneous retrievals in the southwest quadrant was relaxed from two to six. This case assumed that no new double shell	

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				<p>tank space would be required. Additional information (in the form of added text and a new section) will be provided in Section 6 to discuss the results from a case that includes both the six simultaneous retrievals in the southwest quadrant and the enhanced retrieval technology performance.</p>	
L2.		<p>Additional detail in sections 5.2.1, "Potential Double-Shell Tank Space Options," and 6.6, "Sensitivity of the Ecology Case to Double-Shell Tanks Capacity" to evaluate the pros and cons of additional DST space. This text will be based on the results of the requested evaluation in item 1 through the Waste Treatment Plant (WTP) start-up.</p>		<p>Additional text will be provided in section 5.2.1 to address the pros and cons of additional DST space based upon the model results presented in this report. An additional write up in section 6 will be added showing the impact of increased DST capacity via larger (1 Mgal) Waste Receiver Facilities.</p>	
L3.		<p>An evaluation of the single shell tank (SST) retrieval completion date by supplying high level waste (HLW) at an optimum feed blend. This must address the results and evaluate a maximum blending case, unrestrained by risk-based retrieval or tank farm closure objectives. "Unrestrained" means retrieving SSTs, based on optimizing blending and maximizing waste loading in the HLW melters, rather than prioritizing the retrieval sequence based on retrieving high risk tanks first. Include the assumption that retrieval technology performance would not be a constraint. Two items that could be considered are increasing the number of simultaneous retrievals and that the Mobile Retrieval System performs as well as Modified</p>		<p>Further discussion of the benefits of feed blending will be added to section 6. The discussion will address the benefits that may be achieved and will also discuss the constraints that must first be resolved in order for feed blending to result in benefits to the overall mission duration. Issues to be discussed will include: retrieval constraints must first be resolved, infrastructure and retrieval planning must be coordinated to target a desired blend, sufficient HLW melter capacity must be provided to</p>	

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		Sluicing for retrievals.		process the IHLW canisters that result from a targeted blend in a desired duration, and lastly, but most importantly, sufficient LAW melter capacity must be provided to allow the ILAW product to be processed in the same duration as the IHLW product.	
L4		Document the planned scope of work, and work completed as of today, for investigation of new retrieval technologies that perform better than modified sluicing and mobile retrieval systems.		The current document addresses performance criteria through the assumptions used in the modeling cases. A discussion of plans for improved retrieval technologies and work completed to date can be provided outside of this TPA deliverable. The requested additional documentation for retrieval technology performance appears to be outside the scope of this milestone.	
L5.		An evaluation that would complete all SST retrievals by 2040. Use of USDOEORP assumptions, or further modifications to other assumptions, will need to be reviewed and agreed to by Ecology.		Another sensitivity case (using an existing model run) based on the ORP case with enhanced retrieval rates will be added to section 6 that demonstrates the ability to complete all SST retrievals in CY2040. The assumption set used for the evaluation can be made available for Ecology. Due to the use of an existing model run changes to the assumptions will not be possible.	

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Comments Transmitted on an Attached RCR					
1.	Page 4 able ES-1 (as well as supporting section tables)	Incorporate the overall volume of glass and the percentages of waste loading for both high and low activity glass. This would provide a better comparison than MT, in that BVS volume waste volume (disposal volume) needs to be represented between the ORP and Ecology cases.		Accept: Will add the requested information.	
2.	Page 4 Executive Summary, Conclusions 2 nd bullet	Without a time element (i.e., completion of the RPP mission by _____) this conclusion doesn't say very much. Even one DST would "support retrieval and completion of the RPP mission." What we would like to know is how much could the RPP mission be shortened by having additional DSTs available.		Accept: Will revise the wording to say the following: Model results for both the ORP and Ecology cases indicate that there is sufficient existing double-shell tank (DST) space to support retrieval of the committed tanks prior to the startup of the WTP. Using the model runs and existing knowledge of the time required to construct new DSTs as a basis suggest that there would be only a limited time prior to the start of WTP where additional DST space would ease constraints on SST retrievals.	
3.	Page 4 Executive Summary Conclusions 5 th bullet	This bullet mentions the sensitivity cases that are addressed in 6.4 through 6.8. Section 6.5 concludes that increasing LAW or HLW melter capacity doesn't have much benefit given the anemic SST retrieval rates that were assumed. Section 6.8, on the other hand, shows significant acceleration of SST retrieval and WTP waste processing if SST retrieval rates were improved. It might be worth mentioning in this bullet or in a new 6 th bullet that decisions on upgrading melter		Accept: Will revise the text to indicate that if waste retrieval rates are improved, these modeling results suggest the mission duration might be further reduced with improvements to waste feed blending and melter capacities and to refer the reader to section 6.8.	

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		capacities should not be put on the back burner based on this study. Improvements in melter throughput would significantly reduce WTP waste processing durations if technology or operational improvements are made in SST retrieval performance.			
4.	Page 4 Executive Summary Last bullet	Provide additional information on topics that could significantly benefit completing SST retrieval operations earlier than what is being assumed. For example higher waste loading through blending, better TOEs, improved water usage, retrieval technology sequencing, melter improvements, etc.		Accept: Additional discussion will be added to section 6.9 (to resolve comment number 32) and to the Executive Summary to further address the limiting factors for both the ORP case and the Ecology case and to identify the additional variables that could improve the schedule to complete the tank waste retrieval and processing mission..	
5.	Page 13 Section 1.2 Middle of the page	Assumed capacity of the HLW melters should also be listed as a major difference in the ORP vs. Ecology cases.		Accept: Will list the assumed capacities of the HLW melters as a major difference.	
6.	Page 13-14 Table 1-2	Assumptions table should also provide MT of Na or Na ₂ O assumed processed.		Partially Accept: Assumptions did not specify the mass of Na or Na ₂ O to be processed. Will add a footnote indicating that these runs did not assume that more caustic would be needed to keep Al in solution.	
7.	Page 14 Table 1-2	Note for clarification Notes 1 and 2 called out for "As-Retrieved SST Waste Volumes" and "SST Retrieval Durations" should both be changed to Note 4. Existing Note 3 should be changed to Note 4. Footnote 3 at the bottom of the page should be moved to Table Note		Accept: Notes and footnotes will be corrected.	

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		3 at the end of the table.			
8.	Page 19 Section 1.3 Last paragraph	<p>Add to this discussion that by altering just one assumption (volume percent of solids contained in the waste removed from the lower layer by the Mobil Retrieval System) could change the MRS minimum retrieval duration significantly. Simply doubling the volume percent solids in the solutions from the lower layer of tank waste to the Batch Tank decreased the MRS operational duration by 33% and the waste volume by 31% (by over 40 million gallons). The determined minimum duration (~47,400 days) was less than that reported in RPP-21216, Rev. 2-A. This clearly demonstrates the influences of key assumptions on the HTWOS model results. Provide a clear explanation and description of the key assumptions that drive the HTWOS case results, including the alternative cases. Some suggestions are provided below:</p> <ul style="list-style-type: none"> ▪ Improving the Total Operating Efficiencies (TOE) for all cases by just 10% for all retrieval systems can reduce the overall waste retrieval operations by 5 years. ▪ Increasing the MRS Batch Tank size could significantly improve operations; increasing the batch size by just 200 gallons would decrease the minimum retrieval time by 33% (reflecting the same results of doubling the volume percent of waste in the last 20,000 gallons of waste retrieval operations). ▪ Provide a better described Modified Sluicing retrieval solids curve (altering the assumed curve to reflect actual sluicing data from four C- 		<p>Partially Accept: The sensitivity of results identified by the reviewer are more appropriately addressed in section 6.8. A statement will be added to the end of this paragraph to say: The sensitivity of the Vacuum Retrieval system performance to the mission is addressed in Section 6.8.</p> <p>Note: The assumptions used were the best available information at the time of modeling. Alternative assumptions for the MRS system performance are outside the scope of this document. The assumptions were accepted by Ecology prior to initiating modeling. It would be speculative and inappropriate in a primary document to deduce the results of alternative assumptions without first running the model or having sufficient collaborative data to reach the conclusions proposed in the comment.</p>	

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		<p>Farm 200 series tanks) could reduce the minimum retrieval time for MS by ~ 8%.</p> <p>Commentary: Changes such as these (sensitivity analyses of key assumptions and prominent parameters) needs to be evaluated as part of the alternative case assessments that are described in Section 6. Without understanding the basis behind the key assumptions, output from the HTWOS model can only be used as a trend analysis. The information provided within this document is based on a set of assumptions that may or may not be representative of process planned throughout the ORP mission. True sensitivity analyses need to be conducted to fully illustrate variance and influences such key assumption have on using information to make decisions. The HTWOS results provided in this document do not accurately present the system, they appear to be precise, as demonstrated by the significant numbers used in the results, but without providing an uncertainty for those numbers, their accuracy is unknown.</p>			
9.	Page 21 Table 1-3	Incorporate the overall volume of glass and the percentages of waste loading for both high and low activity glass. This would provide a better comparison than MT, in that BVS volume waste volume (disposal volume) needs to be represented between the ORP and Ecology cases.		Accept: Will add the requested information.	
10.	Page 26 Section 2.2 Tables 2-1, 2-2, and 2-3; Appendix D	The document does not discuss worker safety. The terms "short-term risk" and "long-term risk" have unusual definitions in this document, with short-term risk being applied to groundwater and long-term risk being applied to airborne releases. Typically, short-		Reject: The "unusual" definitions of the two terms were established during the development of the retrieval pool concept, which satisfied the milestone in previous	

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		term risk refers to worker risk, which includes airborne components. With this definition for short-term risk (i.e. worker risk), the document does not address short-term risk. The term long-term risk is typically applied to the vadose zone and groundwater pathways.		revisions of the document. In addition, Ecology participated in developing the basis for ranking risk used by the model runs. The text reflects the process used to rank the risks.	
11.	Page 28 Section 2.2 Table 2-1, 2-2, and 2-3 Appendix D	The document does not discuss the principle non-radiological hazardous constituents and it appears that these were not considered in the ranking process for tanks.		Reject: Ecology decided which risk factors to use in the ranking process for the tanks and was asked to comment on the explanation for the ranking basis before issuance of this revision.	
12.	Page 30 Section 2.2, #2	Ecology did not direct restricting the farm tank retrieval sequence to be accomplished by sequential tank number. The intent was to retrieve a full farm and complete that action. Furthermore, Ecology also did not restrict the retrieval activity to a single farm at a time, but could perform multiple farms at any one time. The intent was to retrieve waste from farms based on risk (those with perceived higher risk first) and to complete that farm. The intent was to avoid retrieving all but one tank and let it sit for a decade. Retrieve West Area before East Area. This did not mean that if other activities could be performed for other operational constraints like feed blending, then those factors need to be incorporated into the retrieval sequence.		Accept: The text will be simplified to eliminate discussion of sequencing by sequential tank order. Ordering the tanks by sequential tank number was an intermediate step performed by the Tank Farm Contractor as part of developing the two sorting lists that were used as input to the HTWOS model. The modeling did implement Ecology's requested priority and allowed some flexibility for overlapping retrievals.	
13.	Page 32 Section 3.2 Table 3-2 and Appendix C, Table C-4; Assumption called	Comment: The Total Operating Efficiency (TOE) key assumption for waste retrieval operations is improperly applied and should be addressed in an uncertainty range. The minimum retrieval duration calculations provided by the spreadsheet "SST Retrieval Assumptions for Mission Modeling," SVF-		Partially Accept: Do not agree with the analysis regarding the impact of changing TOE on the minimum retrieval durations. Page C-66 in Appendix C (and Section 1.3, Estimates of SST Retrieval	

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	out in 4 th paragraph, page C-66	<p>1283, Rev.2, calls out the key assumption that the TOE used to determine the minimum retrieval duration was based on tanks farms. However, the assumption states that "The TOE is expected to increase as technology improves and operational lessons learned are applied." This is inconsistent and must be corrected. To state that tank farms being retrieved at lower TOEs after tanks in tank farms with designated higher TOEs is inconsistent with this key assumption. Conducting a simple sensitivity analysis by varying the TOEs used in baseline retrieval duration spreadsheet from 30% to 70% showed that the TOE of 30% increase retrieval duration by ~50% (increasing minimal retrieval duration to ~90,000 days) and a 70% TOE would decrease the total retrieval minimum duration over the baseline by ~25% (decreasing the minimum retrieval duration to ~44,000 days). To reflect this in operating years, that would mean a possible uncertainty range associated with the SST waste retrieval operations TOE of completing waste retrieval 7 years earlier than projected by the ORP baseline or 14 years later. To specifically state a given duration to such exactness does not provide an accurate picture of the simulation. The uncertainty in the designation of TOE is significant and needs to be added to the text and document summary.</p>		<p>Volumes and Durations) will be revised to clarify that it was recognized the assignment of TOE by farm in the order that each farm was retrieved using results from the Tank Farm Contractor Lifecycle Baseline would lead to an inconsistency because the order of retrieval by farm would change in response to new modeling assumptions. Using past modeling results to determine the order by farm was considered adequate for determining the length of the mission because any changes in TOE assignment due to changes in the farm retrieval order were expected to offset each other. That is, if the TOE values were reassigned based on a new-modeled order, the sum of all of the minimum retrieval durations was expected to be approximately the same.</p> <p>This expectation was tested during comment resolution by recalculating the minimum retrieval durations and their sums using TOEs assigned by the order farms were retrieved in the ORP and Ecology cases, and comparing those sums to the sum obtained using the TOEs assigned in SVF-</p>	

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				<p>12832, Rev. 2. The sum of minimum retrieval durations increases by about 1% to 2% if the TOE values are assigned using the SST farm retrieval order from the Ecology case and from the ORP case, respectively.</p> <p>Separately, the issue regarding the uncertainty associated with the TOE that can be achieved in future retrieval operations and what would constitute a more reasonable assignment of TOE should be the subject of future discussions about SST retrieval technology performance.</p>	
14.	Page 40-41 Section 4.0 Last paragraph page 41, last sentence on page 42	The conclusion that it is "difficult to retrieve sufficient SST waste into the DST system, there isn't as much dilute waste available as feed to the evaporator" doesn't make sense. The correct reason is that much of the water added to retrieve SST in Ecology's case is also used to transfer the waste and therefore, less boil down of the waste is necessary. Correct this miss-conception.		Partially Accept: The sentence will be revised to clarify. The quotation in the comment is not a direct quote from the text of the document.	
15.	Page 42 Table 4-1	Add a foot note to the Ecology case that states there is additional SST waste to be retrieved (e.g., TRU) that influences waste totals.		Accept: A footnote will be added to the total DST inputs from SSTs for the ORP case indicating that the total does not include SST wastes that are retrieved directly to a treatment process (e.g., the TRU wastes).	

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16.	Page 43 Table 4-2	Add a foot note to the table that states for the Ecology case that states much of the dilute SST retrieved waste is used to transfer solids as the result of TRU waste being retrieved.		Accept: A footnote will be added to the table indicating that the increase in the volume of WTP feed for the Ecology case is due to using dilute liquids to deliver HLW solids and to the delivery of transuranic waste solids to the WTP for processing.	
17.	Page 43 Table 4-3	Add a foot note to the table that states for the Ecology case provides an explanation for the significant increase in volume being transferred to WTP.		Partially Accept: An explanation of an increase in the volume being transferred to the WTP is not applicable to Table 4-3. The footnote added to Table 4-2 to resolve comment 16 will explain the increase in feed volume.	
18.	Page 52 Section 5.2.1 Last paragraph	Provide information as to the effect on duration of the RPP mission should additional DST space be made available for feed blending or other process improvements. The HTWOS logic is based on assumptions. ORP case shows SST retrieval past 2040. Would additional DST enable meeting that date? Questions such as these needs to be addressed in the document to better understand the constraints and sensitivity of HTWOS assumptions. This section does not address the true adequacy of the DST system in meeting the RPP mission. A table needs to be added that shows if 8 new DSTs were added, this is the result, the mission is shortened by 2 years; if 28 tanks are added the RPP mission is shortened by 10 years. This would enable a cost/benefit analysis and a determination for Ecology to determine if there is a need to "acquisition of additional tanks."		Partially Accept: Do not agree with the analysis in the comment regarding the benefit of adding new DSTs. Section 6.6 will be expanded to include a discussion of results from a case run after the issuance of RPP-21216, Rev. 3, where the size of the Waste Retrieval Facility (WRF) tanks were increased to 1 Mgal each. A reference to Section 6.6 will be added to Section 5.2.1. Ecology was asked to identify the size and location of additional DSTs for modeling purposes in the approved assumption set. Ecology did not provide assumptions for	

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				modeling additional DSTs in the HTWOS. Modifying the model to include additional DSTs requires a significant investment in time including the definition of other supporting system changes (i. e., piping and jumper pits).	
19.	Page 52 Section 5.2.2	Bring forward into the Executive Summary the statement "RPP mission being limited by the SST retrieval assumptions." This information is the limiting aspect of the whole report and for both primary cases. It is the reason both the ORP and Ecology cases are showing significant changes and operating past the 2040 goal date. Furthermore, there is no assessment of effects of new DSTs. Would new DSTs enable waste blending scenarios, earlier retrieval option, etc.? Using the restricted SST retrieval assumptions, having 8 more DSTs available would reduce retrieval operations by two years, by having 28 new DSTs, a feed blending could take place and reduce WTP operations by 10 years and complete retrieval operations by the same order of magnitude. Therefore, this section does not meet the intent of the TPA milestone for a DST space evaluation.		Partially Accept: Do not agree with the analysis in the comment regarding the benefit of adding new DSTs. Pg 4 bullets 1 & 5 currently address the limitations of the mission due to retrieval. Text will be added to Section 6.8 to point out that the mission was not constrained by DST space even with enhanced retrieval assumptions. Section 5.2.2 and the remainder of the document have been structured to meet the requirements established by TPA milestone M-45-02. The "intent of the milestone" and results presented in the report can be addressed by the 3 parties during meetings identified by the milestone description, or other suitable TPA venue.	

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20.	Page 54 Section 6.0	This section needs to focus on how to meet the goals established. Table 6-1 shows that the Ecology case was looking at retrieving the waste from the higher risk tanks first. If that can not be done and meet the goals as established, then that "variance" needs to be addressed. Furthermore, this section (or an appropriate subsection) needs to address what may need to be required to meet the goals. For example, if additional sequential retrieval operations are necessary, then so state. This would benefit decisions associated with pending TPA negotiations.		<p>Partially Accept: Do not agree that the section needs to focus on how to meet the goals established.</p> <p>Two sensitivity runs were performed to address these concerns, the simultaneous retrieval constraint sensitivity run and the retrieval technology performance sensitivity run. The results from those runs are discussed in Sections 6.7 and 6.8.</p> <p>The report has been structured to meet the requirements identified in the TPA milestone description.</p> <p>The regulatory basis for additional analysis of Ecology goals, beyond the model results presented in this report appears to be beyond the scope of the milestone description. The milestone does call for the 3 parties to meet within 60 days to address the need for additional DSTs. Ecology goals could be addressed in that forum.</p>	
21.	Page 55 Section 6.2 last paragraph on page 55 and Table 6-2	The section is to discuss the ORP case and the reasons why there are significant (10+ years) in operations delay beyond the start-up of WTP. This would be a good place to discuss the potential enhancements of adding DSTs to improve waste blending and the increase of waste volume resulting from the changes in the retrieval assumptions.		<p>Partially Accept: Do not agree on the purpose for the section of the document.</p> <p>Text will be added to clarify the meaning of the lines. That is, the Assumed Capacity lines represent</p>	

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				<p>a production schedule if the HLW and LAW melters operate at their assumed capacities and the Projected WTP IHLW or ILAW Production represents how well the model was able to provide feed to keep the melters operating. The deviations of the Projected WTP Production lines from the Assumed Capacity lines (~4 years for ILAW and ~10 years for IHLW) indicate that the system was not able to provide enough feed to the melters to keep them operating at the assumed capacity during the RPP mission.</p> <p>The CH2M Hill and ORP interpretation of these model results does not support building new DSTs for blending until other retrieval constraints are overcome. A new section will be added to present results from a sensitivity case where the ORP case was rerun using the enhanced retrieval assumptions to support the CH2M HILL and ORP interpretation.</p>	
22.	Page 56 Table 6-2	Provide units for Total LAW Glass (MT) and IHLW Waste Loading (Na ₂ O?). Also should provide metrics for ILAW waste loading in glass and/or bulk vit boxes.		Accept: Will add the requested information.	

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23.	Page 56 Figure 6-1	This figure shows that an additional 4+ years of ILAW operation is required over the projected WTP ILAW, even with Supplemental Treatment. The figure needs to also show the significance of Supplemental Treatment in the ORP case.		Accept: The text added to resolve comment number 21 resolves part of this comment by clarifying the meaning of the lines. Another figure will be added to show the significance of Supplemental Treatment in the ORP case.	
24.	Page 57 Figure 6-2	This figure shows that an additional 8+ years of IHLW operation is required over the projected WTP IHLW, even with TRU alternate treatment. The figure needs to also show the significance of TRU Treatment in the ORP case.		Partially Accept: Do not agree with the Ecology interpretation of the IHLW outages. The text provided for the resolution of comment number 21 (clarifying the meaning of the two lines) explains what this figure represents. A sentence will be added to Section 6.2 to indicate that if the TRU wastes were processed through the WTP, the number of IHLW canisters would increase by about 15% and it would take about 32 months to process that additional 15% of IHLW canisters and another figure will be added to Section 6.3 to compare the IHLW production for the ORP and Ecology Cases.	
25.	Page 58 Section 6.3	The section is to discuss the Ecology case and the reasons why there are significant (14+ years) in operations delay beyond the start-up of WTP due to a significant decrease in waste loading. This would be a good place to discuss the potential enhancements of adding DSTs to improve waste blending and the increase of waste volume resulting from the changes in the retrieval assumptions.		Partially Accept: Do not agree that the 14+ year delay is directly due to a significant decrease in waste loading. The text provided for the resolution of comment number 21 (clarifying the meaning of the two lines) explains what this figure represents. Both the operational	

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		<p>Furthermore, it would be good to show the increased ILAW melter capacity and required over Supplemental Treatment of the ORP case.</p>		<p>delays and the significant decrease in waste loading are a consequence of implementing the baseline retrieval technology assumptions and the risk-based retrieval sequence. Text in the paragraph on the top of page 58 (the third sentence) will be revised to clarify this. Figure 4-2 shows that not all of the existing DSTs were needed. The figure added to resolve comment number 23 will show information about melter capacities.</p> <p>The report has been structured to meet the requirements identified in the TPA milestone description. Additional analyses were provided as requested by Ecology and established by accepted modeling assumptions.</p> <p>The regulatory basis for additional analysis, beyond the model results presented in this report, is not evident from reading the milestone description.</p> <p>The milestone does call for the 3 parties to meet within 60 days to address the need for additional DSTs.</p>	

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26.	Page 59 Section 6.4	This section is an informative true Sensitivity Analysis that needs to be expanded to include the uncertainties associated with feed blending. Add to this section "undergoing total blending concepts (e.g., additional DSTs, or process enhancements by DST pre-treatment, aggressive SST retrieval sequence and waste staging, etc.) for WTP IHLW processing requirements can be reduced by almost 30% for the ORP case and over 30% for the Ecology case. This could be a reduction of as much as 18,000 MT of IHLW vitrified waste and shorting the HLW WTP mission by as much as 20 years (waste processing being completed as early as 2046 for the Ecology case)."		Partially Accept: Do not agree with the analysis on the potential reduction of IHLW and associated mission acceleration. Text will be added to Section 6.4 to clarify that the mission as modeled in the Ecology Case is first constrained by SST retrieval and then by HLW treatment. Both of these constraints would need to be removed before HLW blending would need to be addressed as a mission constraint. If, and when, the HLW treatment becomes the primary mission constraint, there are approaches to HLW blending that could be applied, such as pair-wise blending.	
27.	Page 59 Figure 6-4	This figure shows that an additional 11+ years of IHLW operation is required over the projected WTP IHLW. The figure needs to also show the significance of not performing the TRU Treatment as in the ORP case and how this additional waste is extending the IHLW processing (call out as an additional point, etc., on the figure.		Partially Accept: Do not agree with Ecology's interpretation of the IHLW outages. The text provided for the resolution of comment number 21 (clarifying the meaning of the two lines) explains what this figure represents. Text will be added to compare the number of IHLW canisters between the two cases and discuss reasons for the differences, along with a new figure added as part of the resolution to comment number 24.	

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28.	Page 60 Section 6.5	This alternative case, assuming larger melter capacities and based on an assumed waste loading, was not fully addressed because the waste retrieval rate and tank sequencing constrained (overshadows) any such enhancement. Therefore, any work on this alternative was meaningless, other than showing the new retrieval rate assumptions is the bottleneck. Provide more of a discussion that this alternative could not be fully assessed because of the SST retrieval rate assumptions.		Accept: Text will be added to indicate that the retrieval technology performance needs to improve before evaluating the impact of increased melter rates.	
29.	Page 61 Section 6.6	This section is in error. Ecology did not request ORP to not evaluate increasing DST system capacity. The system is still constrained by DST space, when looking at feed blending scenarios, the fact that evaporator runs must be made, and multiple retrieval operations to improve the retrieval operations. This section does not comply with Milestone M-45-02N criteria and is deficient. Correct this by performing a true sensitivity analysis on the effects of increasing DST space.		Partially Accept: Do not agree that the section is deficient. Do not plan to perform extensive sensitivity analysis on the effects of increasing DST space. However, the section will be revised to clarify that the case requested by Ecology was not run because results from the other cases indicated that the mission was limited by SST retrieval performance and not by a lack of DST space. This section will be expanded to include additional discussion of the results that indicate that the mission is not limited by DST space, together with results from additional modeling performed after the issuance of RPP-21216, Rev. 3, in which the size of the Waste Retrieval Facility (WRF) tanks were increased to 1 Mgal each.	

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30.	Page 63 Section 6.7	This alternative case shows the effect of increasing the number of simultaneous retrieval operations in just one quadrant. It also shows that the revised retrieval rate and volume assumptions significantly impact the RPP mission timeline. By increasing the number of simultaneous retrievals, the RPP mission can be completed (using the Ecology case) almost ten years sooner. Expand this assessment to establish what kind of range of simultaneous retrieval operations would be required to meet certain performance and mission goals.		<p>Partially Accept: Do not plan to expand the assessment as requested in the comment. Text will be added to discuss why the six simultaneous retrieval constrain in the southwest quadrant was chosen. Additional information (in the form of added text and a new section) will be provided to discuss the results from a case including both the six simultaneous retrievals in the southwest quadrant and the enhanced retrieval technology performance. For this new case, all SST waste retrieval was completed in March 2052 and waste processing was completed in October 2056.</p> <p>The regulatory basis for additional analysis beyond the model results presented in this report, is not evident from reading the milestone description. The milestone calls for the 3 parties to meet to address the need for additional DSTs, rather than establishing the date at which the mission can be completed.</p>	
31.	Page 66 Section 6.8	This alternative case shows the effect the revised retrieval rate and volume assumptions have on the RPP mission timeline. By decreasing the waste dilution assumptions (higher waste loadings) and altering the retrieval technology deployment (using the Ecology case) almost ten years sooner. Expand		Partially Accept: Do not agree with the projected decrease in mission length and do not plan to expand the assessment as requested in the comment.	

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		<p>this assessment to establish what kind of range perceived performance retrieval operations would be required to meet certain performance and mission goals. This would be extremely helpful in establishing criteria for alternate retrieval technologies or optimization of existing retrieval technologies.</p>		<p>Additional information will be provided to discuss the results from an ORP sensitivity case that used enhanced retrieval technology performance. For this new case, all SST waste retrieval was completed in October 2040 and waste processing was completed in April 2045. In this case, TRU waste was separately retrieved and packaged for disposal at WIPP.</p> <p>The regulatory basis for additional analysis beyond the model results presented in this report, is not evident from reading the milestone description. The milestone calls for the 3 parties to meet to address the need for additional DSTs, rather than establishing the date at which the mission can be completed.</p>	
32.	Page 70 Section 6.9	<p>Add a final bullet that addresses that there are sizable needs for future sensitivity analysis efforts (and this is not beyond the scope of this activity; see note at the end of this comment). Some of the suggested prominent variables and assumptions that need to be evaluated to establish the uncertainty associated with these key assumptions are categorized as follows:</p> <p>Waste Retrieval Operations:</p> <ul style="list-style-type: none"> ▪ TOE 		<p>Accept:</p> <p>Additional discussion will be added to section 6.9 to further address the limiting factors for both the ORP case and the Ecology case and to identify the additional variables that could improve the schedule to complete the tank waste retrieval and processing mission.</p>	

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		<ul style="list-style-type: none"> ▪ Waste Volumes ▪ Layer Retrieval Rate Assumptions ▪ MRS Batch cycle frequency and volume ▪ Increases/decreases in volumes % solids <p>DSTs:</p> <ul style="list-style-type: none"> ▪ Blending Requirements/solids levels/settling <p>WTP Processing:</p> <ul style="list-style-type: none"> ▪ Effects on processing rates from SST Waste Blending <ul style="list-style-type: none"> - Effects of waste loading ▪ Affects on processing rates from SST Waste Blending <ul style="list-style-type: none"> - Affects of waste loading ▪ LAW Vitrification processing rate ramp up ▪ LAW Rates ▪ HLW Vitrification processing rate ramp up ▪ HLW Rates <p>Incorporate into this section the need to perform sensitivity analyses such as these listed above to optimize the RPP mission plan. By simply implementing strategies to enhance waste feed blending, shorten retrieval operations, and reduce waste dilution (higher solids loading) could once again show that the RPP mission timeline is constrained by DST space and WTP treatment capacities. The four alternative cases show that up to 20 years could be reduced from the HTWOS baseline if a combination of improvements were made.</p> <p>Note: If it is determined that undergoing true sensitivity analyses is beyond the scope of this activity, then a paragraph needs to be added to the</p>		<p>The new text will discuss that the results presented in this report indicate that the RPP mission duration for both the ORP case and the Ecology case are initially constrained by the rate of SST retrieval. The discussion will further identify that subsequent constraints differ between the ORP case and the Ecology case. The sequence of constraints for the ORP case is SST retrieval, followed by ILAW treatment duration and then by IHLW treatment. Due to the additional HLW load imposed on the Ecology case by the treatment through WTP of the TRU wastes, combined with an assumed lower maximum HLW melter capacity, the sequence of constraints for the Ecology case is SST retrieval, followed by IHLW treatment and then by ILAW treatment duration. The text will identify that, as indicated by the included sensitivity cases, additional technical factors, such as waste feed blending, waste processing rates, and glass waste loading, while not rate constraining as modeled in this report, could also impact the duration of the retrieval and processing mission. The scope of this TPA M-45-02N</p>	

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		Executive Summary and the Introduction. The Statement is "This effort is to establish an SST waste retrieval sequence based only on the USDOE/ORP budget and planning baseline and does not evaluate alternatives or prominent parameter sensitivities to optimize process rates or life-cycle costs. This effort is primarily to model USDOE/ORP baseline planning using best available information and associated assumptions as a single case study. Variations or alternative cases such as that of the Ecology case and the four alternative cases are to indicate areas of further consideration and potential opportunities and will not be reflected into the USDOE baseline, but merely provide indications of potential opportunities for improvement to the USDOE/ORP baseline."		milestone report is to focus on the sequence of the Single Shell Tanks and the capacity of the DST system. If the model is also to be used to establish a technical and regulatory basis for optimizing the mission then it is recommended this additional scope be explicitly established through the Tri Party Agreement process.	
33.	Page C-8 Table C-1	Assumptions table should also provide MT of Na or Na ₂ O assumed processed		Partially Accept: Assumptions did not specify the mass of Na or Na ₂ O to be processed. Will add a footnote indicating that these runs did not assume that more caustic would be needed to keep Al in solution.	
34.	Page C-29 Table C-1	Multiple-use box lids are mentioned for Bulk Vit. Due to the potential for spreading contamination (when the hood is separated), single-use lids were going to be used. Confirm the use of single-use vs. multiple-use box lids for the STP system for the ORP case.		Accept: Single-use box lids were assumed for the DBVS/BVS and multiple-use box lids were assumed for the East and West STP facilities in the ORP case. The basis for these assumptions were provided in an email to Ecology (dated 11/1/2007), prior to Ecology concurring with the detailed modeling assumptions on	

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				December 4, 2007. No change to the document is needed.	
35.	Page C-67 Appendix C, Assumption called out in 1 st paragraph,	<p>The MRS retrieval key assumptions need to address uncertainty by identifying the plausible ranges in the key assumption. Conducting simple sensitivity analyses by varying the prominent key assumption parameters can significantly alter the HTWOS outcome and give rise to quantifying the uncertainty in the key assumptions. Example is limiting the batch tank size to 400 gallons. Increasing the batch tank size to 600 gallons would decrease the MRS minimum retrieval duration by ~20% giving rise to the possibility of completing SST retrieval operations 6 years earlier than the ORP Baseline (in 2041). Varying the ranges of the MRS Target Volume Calculations would also show similar characteristics. Just increasing the volume % solid waste (to 4%, doubling) in the slurry for the waste volume being retrieved less the 30,000 gallon would have a very similar effect as increasing the batch tank volume, also possibly completing retrieval operations 6 years earlier, but would significantly decrease the calculated total waste volume by as much as ~40 million gallons (down to ~90 Mgal over the baseline ~131 Mgal). By doing both, increasing the batch size (to 600 gallons) and increasing the bottom layer volume % solids, could result in waste retrieval operations being completed in 2037, ten years earlier. This would clearly result in DST and WTP treatment impacts.</p> <p>The uncertainty in the designation of key assumptions, as shown above, is significant and</p>		Partially Accept: Do not plan to discuss the uncertainty to the degree requested in the comment. This is addressed in the resolution to comment number 8 and no change to this section of the document is needed.	

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		needs to be added to the text and document summary.			