



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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June 1, 2011

11-NWP-052

Mr. Christopher Kemp  
United States Department of Energy  
Office of River Protection  
P.O. Box 450, MSIN: H6-60  
Richland, Washington 99352

Re: Review of *Single-Shell Tank System Waste Management Area C Pipeline Feasibility Evaluation*, RPP-PLAN-47559, Revision 0, for fulfillment of Hanford Federal Facility Agreement (HFFACO) and Consent Order Milestones M-045-80 and M-045-081

Dear Mr. Kemp:

The Department of Ecology has reviewed *Single-Shell Tank System Waste Management Area C Pipeline Feasibility Evaluation*, RPP-PLAN-47559, Revision 0. This document is consistent with the expectations of HFFACO Milestone M-45-81 as described in the revised *C-200 Demonstration Plan (Waste Management Area C Demonstration Project Plan, RPP-PLAN-46484, Revision 0)*.

We conclude that the *Single-Shell Tank System Waste Management Area C Pipeline Feasibility Evaluation* covers details on the history of the pipelines; however, before final steps to closure are documented, the following will be necessary:

1. Confirmation of the contents of the Single-Shell Tank pipelines due to the uncertainty in the historical process operations. The extent of confirmation is to be determined.
2. Confirmation of the waste volume in the Waste Management Area (WMA) C pipelines.
3. Determination of the specific interaction with IS-1 activities and the pipelines outside of WMA C fence line.
4. Discussion of characterization activities to determine a clear path forward for closure. The document indicates uncertainty about the waste volumes and contents, and the number, location, and condition of pipelines.
5. Evaluation of risk values for pipeline residuals after approval of the WMA C Performance Assessment and risk assessments.

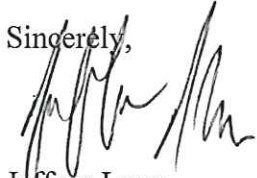
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Further comments are on the attached Review Comment Record. Disposition of these comments and report revision can be discussed in the WMA C Farm Closure meetings.

If there are any questions, contact me at 509-372-7914.

Sincerely,



Jeffery Lyon  
Tank Waste Storage Project Manager  
Nuclear Waste Program

dbm  
Enclosure

Reference: Letter 10-TPD-166, dated December 28, 2010, from T. W. Fletcher, USDOE-ORP, to J. A. Hedges, Ecology, *Submittal of Documentation in Fulfillment of Hanford Federal Facility Agreement and Consent Order (HFFACO) Milestones M-045-80 and M-045-81*

cc w/enc:

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Susan Leckband, HAB  
Ken Niles, ODOE  
Administrative Record: Tank Waste Storage: M-45-101  
Environmental Portal  
USDOE-ORP Correspondence Control  
WRPS Correspondence Control

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<b>Document Number(s)/Title(s)</b> Single-Shell Tank Waste Management Area C Pipeline Feasibility Evaluation, RPP-PLAN-47559, Rev. 0	<b>Program/Project/Building Number</b>	<b>Reviewers</b> Beth Rochette Michelle Hendrickson Nancy Uziemblo	<b>Organization /Group</b>	<b>Location /Phone</b>
		Kristi Wold Brenda Jentzen Cheryl Whalen		

Comment Submittal Approval: Agreement with indicated comment disposition(s) Status: \_\_\_\_\_

Organization Manager (Optional) \_\_\_\_\_ Reviewer/Point of Contact \_\_\_\_\_  
 Date \_\_\_\_\_ Date \_\_\_\_\_

Author/Oriinator \_\_\_\_\_ Author/Oriinator \_\_\_\_\_

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1.	General comment	<p><b>Comment:</b> The text states: "Constituent inventory estimates were then calculated based on a range of residual volumes and on average Best Basis Inventory..." Note that chelating agents and ligands are designed to bind to more metals than simple ion exchange chemical reactions; thus, using average BBI for inventory amount would be inappropriate.</p> <p><b>Modification needed:</b> Use a worst case inventory from the BBI, or a range a volumes, or match the processes most likely to cause pipeline plugging such as chelating agents and ligands used in historical process operations that discharged waste to the tanks to calculate a more accurate inventory.</p>	X		
2.	Page ii, 5 <sup>th</sup> paragraph	<p><b>Comment:</b> The text states: "As with characterization activities, closure activities are not recommended for the purposes of reducing impacts to human health and the environment."</p> <p><b>Modification needed:</b> Correct the statement to read, based on Section 7.3.1., "no supplemental closure actions are recommended..."</p>	X		

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3.	Page 1-1, 1 <sup>st</sup> paragraph	<p><b>Comment:</b> The text states: "For more than four decades beginning in 1944...for storage." This is incomplete.</p> <p><b>Modification needed:</b> Add " and from the tanks via SST system pipelines out to cribs and trenches for waste disposal" to the end of the sentence.</p>			
4.	Page 1-1, 2 <sup>nd</sup> paragraph	<p><b>Comment:</b> The text states: "The SST system is undergoing closure." This is incorrect. Planning for closure is underway.</p> <p><b>Modification needed:</b> Correct.</p>			
5.	Page 1-1, 2 <sup>nd</sup> paragraph and global	<p><b>Comment:</b> The text states: "...the SST components..." Ecology is unsure what is meant by components.</p> <p><b>Modification needed:</b> Provide a definition for components in this document or substitute "ancillary equipment".</p>			
6.	Page 1-1, 3 <sup>rd</sup> paragraph and global	<p><b>Comment:</b> The text states: "This assessment evaluates...pipelines." This is incomplete. Other lines exist in and near WMA C that will need to be addressed for characterization and closure.</p> <p><b>Modification needed:</b> Revise to read that "assessment evaluates all pipelines that are part of the SST Part A or were used as part of the SST transfer system that have not been previously closed." This issue should be part of further discussions with Ecology.</p>	X		
7.	Page 1-4, 1 <sup>st</sup> paragraph	<p><b>Comment:</b> The text states: "This assessment does not address...200-IS-1 OU." These pipelines need to be accounted for and addressed during the WMA Closure process.</p> <p><b>Modification needed:</b> This issue needs to be part of further discussions with Ecology (also see comment referencing p. 1-2, 1<sup>st</sup> paragraph).</p>	X		
8.	Page 1-5, 2 <sup>nd</sup> paragraph	<p><b>Comment:</b> The text numerically lists additional information; however, the assumption of using the BBI for inventory is missing.</p> <p><b>Modification needed:</b> Add #9 "BBI as a basis for inventory".</p>			
9.	Page 2-2, 3 <sup>rd</sup> paragraph	<p><b>Comment:</b> The text list bullets that discuss the requirements for the final cover design and construction. However, this list is not inclusive of all of</p>			

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10.	Page 3-1, 2 <sup>nd</sup> paragraph	<p>the requirements listed in Landfill Closure WAC 173-303-640 (8)(b) Closure and post-closure care, WAC 173-303-665 Landfills and -340.</p> <p><b>Modification needed:</b> Either just reference the WAC citation and delete the bullets, or add additional bullets to discuss all of the design, construction, and operation criteria including:</p> <ul style="list-style-type: none"> <li>- Protects human health and the environment</li> <li>- Complies with cleanup standards</li> <li>- Permanent to the maximum extent practicable</li> <li>- Institutional controls are required when Ecology determines they are required to ensure the continued protection of human health and the environment OR the integrity of the cleanup action</li> </ul> <p>• Construction inspection:</p> <p>(ii) Soil-based and admixed liners and covers must be inspected for imperfections including lenses, cracks, channels, root holes, or other structural nonuniformities that may cause an increase in the permeability of the liner or cover, etc.</p> <p><b>Comment:</b> The text states: "WMA C is part of the A/AX/C complex whose operations can be separated into five operational phases:...". However, these phases are not complete. The PUREX Aggregate Area Management Plan (DOE/RL-92-04) and the Semi-Works Aggregate Area Management Plan (DOE/RL-92-18) list other process operations that sent waste to WMA C tanks.</p> <p><b>Modification needed:</b> Include the following processes from the references listed and how this waste could affect pipeline residual content and volume:</p> <ul style="list-style-type: none"> <li>• REDOX ion exchange/supernate wastes</li> <li>• N Reactor Complexed waste</li> </ul>			

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		<ul style="list-style-type: none"> <li>• Laboratory wastes</li> <li>• PNNL wastes</li> <li>• B &amp; BX Tank Farm Evaporator Bottoms</li> <li>• REDOX</li> <li>• Rare Earth Metals Recovery</li> <li>• Pu recovery operations including RECUPLEX</li> <li>• 209-E (Critical Mass Laboratory) wastes</li> </ul>			
11.	Page 3-1, 3 <sup>rd</sup> paragraph	<p><b>Comment:</b> The text states: "Pipelines built in association with these operations are identified in Appendix A." However, pipelines associated with these added historical processes (see comment #19) and operations need to be accounted for.</p> <p><b>Modification needed:</b> This issue needs to be part of further discussions with Ecology.</p>	X		
12.	Section 3.4 and 3.5, pages 3-7 through 3-11	<p><b>Comment:</b> Note that other chelating agents and ligand used in PUREX, Sr/Cs Recovery Operations and Rare Earth Recovery and experimental processes conducted at the Chemical Engineering Operations Laboratory were also known to clog processing equipment and clog solvent extraction columns through-out operations.</p> <p><b>Modification needed:</b> Include in the use of other chelating agents and ligands that may have led to clogging during operations.</p>			
13.	Page 3-11, 5 <sup>th</sup> paragraph	<p><b>Comment:</b> The text states: "The 216-C-8 French drain...do not mention 216-C-8."</p> <p><b>Modification needed:</b> Explain the relevance of the French Drain information or delete the paragraph.</p>			
14.	Page 3-1, Table 3-2	<p><b>Comment:</b> Table 3-2 presents "Failed Pipelines in WMA C". However, various entries are missing. According to DOE/RL-92-18, 1957 was a bad year for 241-C lines with Teflon gaskets.</p>			

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		<b>Modification needed:</b> Review and include this information.			
15.	Page 3-9, 2 <sup>nd</sup> paragraph	<p><b>Comment:</b> It is stated that there is a discrepancy in drawings from 2 diversion boxes to 2 tanks. Such occurrences add to uncertainty of all pipeline locations.</p> <p><b>Modification needed:</b> State what other drawings are suspect and how this discrepancy was resolved.</p>			
16.	Page 3-14, 1 <sup>st</sup> paragraph	<p><b>Comment:</b> It is stated that cascade lines tended to plug during TBP transfers.</p> <p><b>Modification needed:</b> Detail how it will be confirmed if the cascade lines between tanks are still plugged in order to determine pipeline waste residuals.</p>			
17.	Page 3-18, Table 3-2	<p><b>Comment:</b> Table 3-2 presents "Failed Pipelines in WMA C". However, various entries are missing. According to limited 200-IS-1 OU project documents (last version of the work plan) pipelines 200-E-111 and 200-E-116 have also failed.</p> <p><b>Modification needed:</b> Include this information.</p>			
18.	Page 4-1, 1 <sup>st</sup> paragraph	<p><b>Comment:</b> The text states: "This is based on a review of the...were completed." This statement is incorrect. As the Leak Loss investigations indicate, over flows of tanks and pipelines could not be detected and occurred often. Thus the process records were not a precise accounting of the volume of waste transferred. <b>Modification needed:</b> modify this sentence.</p>			
19.	Page 4-1, 5 <sup>th</sup> paragraph	<p><b>Comment:</b> The text states: "Various pipelines were installed...the transfers occurred." This statement is not true. The timing of the pipeline failure or plug should be known and matched to the inventory if the records on transfers and flushing are adequate.</p> <p><b>Modification needed:</b> Include this information or change your basis for characterization and remediation requirements as process records alone are</p>	X		

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		unable to prove or disprove the volume or inventory remaining in the WMA lines.			
20.	Page 4-3, Section 4.1.1, 1 <sup>st</sup> paragraph	<p><b>Comment:</b> The text states: "Plugged lines tended to be associated with transfers involving TBP and were predominately in the cascade lines between tanks in WMA C." However, no inventory for TBP is included in this document.</p> <p><b>Modification needed:</b> Include the inventory of TBP associated with the pipelines.</p>			
21.	Page 4-3, 1 <sup>st</sup> and 2 <sup>nd</sup> paragraphs	<p><b>Comment:</b> It is unclear if the calculations are using ~230 or 145 lines for determining residual volume.</p> <p><b>Modification needed:</b> Clear number of pipelines (lines) estimated in WMA C.</p>			
22.	Section 4.1.1, page 4-3 and Section 7.1, page 7-1	<p><b>Comment:</b> It is stated that based on historical process operation records, pipelines were flushed. However just relying on historical records is inconclusive, <b>Modification needed:</b> Further group discussion is needed on pipeline verification sampling to support WMA C closure.</p>	x		
23.	Pages 4-4 and 4-5	<p><b>Comment:</b> The text states: "DOE/RL-2003-11..." This study refers to pipelines that were designed, operated, and constructed vastly different than the waste transfer pipelines in WMA C. The waste properties within the study were cooling water with minimal sediment and sludge. The viscosity and density mirror water, not the tank farm sludge and dissolved slurries that were historically routed through lines at WMA C. The differences in hydraulics and sediment transport and different design, material properties, and operations of the waste lines are not comparable. And definitely should not be used to establish any estimates of residual pipeline volumes or inventories.</p> <p><b>Modification needed:</b> provide basis and relevance to WMA-C.</p>			
24.	Page 4-5, Table	<p><b>Comment:</b> The table shows that there are two orders of magnitude</p>			



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	4-2	difference between the lowest and highest pipeline volume estimates. <b>Modification Needed:</b> USDOE and Ecology will need further discussion and resolution of estimate process, with the establishment of an acceptable range of values for the volume and mass for the values presented on Tables 4-3, 4-4 and 4-5.			
25.	Sections 4.1.3 and 4.1.4	<b>Comment:</b> The actual pipeline residual inventory is an estimate. No sampling has been performed to prove or disprove these estimates. <b>Modification needed:</b> Until characterization is performed to prove or disprove these estimates, the worst-case assumptions should be considered and discussed for agreement. After resolution of this issue, the assumptions that Ecology agrees to will need to be modeled and presented for closure risk based calculations and actions.			
26.	Page 4-7 to 4-9, Tables 4-3 & 4-4	<b>Comment:</b> The tables show estimated inventories of selected radionuclides and non-radionuclides. However, none of these estimates include a maximum inventory basis or a maximum volume of pipeline plugging. These Tables change estimates based on the miles of piping listed and the mileage of piping is known to be at least 8 miles. Thus the columns representing 4 and 6 miles of piping are not applicable. <b>Modification needed:</b> Further discussion is requested on revising these tables to include 10 and 15 miles of piping with a maximum inventory and 100% plugged and using a range of values.			
27.	Page 4-10, 1 <sup>st</sup> paragraph	<b>Comment:</b> The text states: "Note that miscellaneous tank inventories (catch tanks, vaults, pits) are not presented but are estimated to contribute around 1% more to the total chemical and radionuclide inventory in WMA C assuming 90% retrieval." However, there is no basis for this assumption. <b>Modification needed:</b> Include an Appendix with these calculations based on actual characterization data or delete this sentence.			

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28.	Page 4-10, 2 <sup>nd</sup> paragraph	<p><b>Comment:</b> The text states: "As shown in Table 4-5...estimated in pipelines." There are no data to support this assumption of inventory.</p> <p><b>Modification needed:</b> Include an Appendix with these calculations based on actual characterization data or delete this paragraph.</p>			
29.	Page 4-10 to 4-13, Section 4.2	<p><b>Comment:</b> This section describes a creative approach to determine the residual uncertainty of the number of pipelines in WMA C, resulting volumes, and residual inventories associated. However, not enough data is known to quantify any amount of uncertainty, other than:</p> <ul style="list-style-type: none"> <li>• Early estimates of the number of pipelines were off by 160%</li> <li>• Early estimates of the length of pipelines were off by 160-175 %</li> </ul> <p>Obviously we have gained more knowledge as the closure process progresses. Still the tank farm contractor is unsure of the exact number of pipelines and their lengths. This issue needs to be part of further discussions with Ecology.</p>	X		
30.	Page 4-13, Section 4.2.2, last paragraph of section	<p><b>Comment:</b> The text states: "By applying operational history for WMA C and the revised length of pipelines and extrapolating the results of previous characterization studies, the uncertainty of the volume of residual waste in WMA C pipelines can be reduced."</p> <p>The revised length of pipelines has instead increased from 4 to 5 mi (see p. 4-10) to 7 to 8 miles, and the number of pipes has increased from 145 pipes to 230 pipes. Yet the revised volume for pipes is now 3 times lower than the previous estimate of 7200 L. This yields increased uncertainty, rather than decreased uncertainty. The estimate of 2600 L is not bounding.</p> <p><b>Modification needed:</b> This issue needs to be part of further discussions with Ecology.</p>			
31.	Page 4-13 – 4-14, Section 4.3, general	<p><b>Comment:</b> Ecology cannot accept the risk values given in this section, since we have not accepted the fate and transport assumptions and the scenarios used to perform the calculations. These will only be approved</p>	X		

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		after the WMMA C PA and risk assessments are approved. The title of Section 4.0 is Estimate of Pipeline Residual Inventories. This section should only include inventories and should not include risk evaluation results. Section 4.3 should be a separate chapter, expanding the discussion to include a basis for use of Appendix B in the scoping analysis for the "feasibility evaluation" <b>Modification needed:</b> After discussion and agreement with Ecology, provide a detailed discussion of Appendix B, or delete section 4.3.			
32.	Page 5-1, 2 <sup>nd</sup> paragraph	<b>Comment:</b> The text states: "All have been isolation but may..." What information do we have that proves all pipelines have been isolated? The term isolated is not defined (i.e. cut, capped?). <b>Modification needed:</b> Include the reference(s) that state all WMMA C pipelines are isolated and define that term in the document. Or remove that statement.			
33.	Page 5-2, 3 <sup>rd</sup> paragraph	<b>Comment:</b> The text states: "Pipeline characterization poses significant difficulties..." Explain why it is different from soil characterization in terms of "difficulties and work exposure." Some amount and form of characterization for the pipelines within the farm are needed to validate and verify your closure assumptions. <b>Modification needed:</b> Supply the additional information and either re-write this section or delete it.			
34.	Page 5-5 and 5-6, Tables 5-1 and 5-2	<b>Comment:</b> The tables list the characterization technologies and commercial deployment platforms potentially applicable for the pipelines in WMMA C. In part the point of this FS was to evaluate these technologies and provide a basis for the best available technologies to be implemented. <b>Modification needed:</b> Incorporate this information into the document, and determine scope of future demonstrations or data gathering efforts.	X		
35.	Page 5-7, Section	<b>Comment:</b> The text states: "Two pipelines (231-Z and 235-5)..."			

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	5.3.1, 1 <sup>st</sup> paragraph	Typographical error. <b>Modification needed:</b> Change "235-5" to "234-5".			
36.	Page 5-12, Figure 5-5	<b>Comment:</b> The figure is illegible. <b>Modification needed:</b> Replace the figure.			
37.	Page 5-18, 3 <sup>rd</sup> paragraph, Summary	<b>Comment:</b> The text states: "Photographs of the inside of line 840D are contained in Appendix B of the report." However, there are no photos of the line 840D in Appendix B of this report. <b>Modification needed:</b> Clarify which Appendix B these photos can be found or include them in this report.			
38.	Page 5-18, 5 <sup>th</sup> paragraph	<b>Comment:</b> The text states: "The examination of abandoned...in line 840." However, the field report stated that the examination of the abandoned lines were discontinued as personnel could not see through the sludge encountered and the crawler could not make it over the large, rough patches of corrosion. <b>Modification needed:</b> Revise this paragraph to include these technical issues.			
39.	Page 5-18, 7 <sup>th</sup> paragraph	<b>Comment:</b> This paragraph notes that deploying a crawler into the WMA C pipelines would further exacerbate residuals within the lines. However, in previous sections, statements have been made noting that very limited amounts of residuals are thought to be present in WMA C pipelines. <b>Modification needed:</b> Clarify your quantification of residuals and revise this document.			
40.	Section 5.3.3, Page 5-19	<b>Comment:</b> There is no basis or reference for the cost of a sampling plan developed for pipelines outside of the WMA C area in conjunction with the 200-IS-1 OU estimated at approximately \$3 million. <b>Modification needed:</b> Provide the full cost estimate calculations with labor identified or delete this sentence.			
41.	Page 5-19,	<b>Comment:</b> RPP-PLAN-31715 is not contained in the TPA Administrative			

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	Section 5.3.3 and Page 5-21, 1 <sup>st</sup> paragraph	Record. <b>Modification needed:</b> Please add it or use another reference.			
42.	Page 5-21, 1 <sup>st</sup> paragraph	<b>Comment:</b> The text states: "Completion of tank retrieval is a prerequisite to pipeline characterization at WMA C because of space limitation and interferences with retrieval equipment." There is no basis for this project assumption. <b>Modification needed:</b> Provide information why tank retrieval is a basis for pipeline characterization; "space limitation and interferences" would not necessarily impact the operations if they were conducted simultaneously. This would be a case by case basis and planning is needed prior to making this assumption. Either include all of the logistical information or delete this sentence.			
43.	Page 5-21, 2 <sup>nd</sup> paragraph	<b>Comment:</b> The text states: "If non-removal characterization..." The paragraph states that any work on pipelines would be expensive and lengthy. However, as characterization and screening have never been attempted, these remain unknowns. Also see comment on RPP-PLAN-31715. It is not currently an acceptable reference. <b>Modification needed:</b> Provide a better basis for this paragraph or delete it.			
44.	Page 6-1, second bullet	<b>Comment:</b> The bullet discusses grout filling of the pipelines. However it is unclear if the technology will be applied to the encasements and actually grout the outside of the pipelines also. <b>Modification needed:</b> Provide clarification.			
45.	Page 6-3, bullet "1"	<b>Comment:</b> The bullet discusses additional costs associated with the excavation, hauling and placement of suitable fill. These costs will be the same for any remedy including installation of a final cap. <b>Modification needed:</b> Delete this bullet.			
46.	Page 6-11, 1 <sup>st</sup>	<b>Comment:</b> The text states: "Personnel would undergo training for the			

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	paragraph	following..." How is the training applicable to this section? Training is not mention for the other alternatives. All specific actions would require some form of activity-specific training. <b>Modification needed:</b> Either include training requirements for all alternatives or delete this sentence.			
47.	Page 6-11 to 6-15, Examples A&B and Tables 6-1&2	<b>Comment:</b> Examples A & B estimate quantity of material that would need to be excavated and removed. However, it is important to note that these are just an estimates based on limited assumptions with no field verification. <b>Modification needed:</b> Either clearly state the assumptions for the estimates and calculations or obtain actual numbers based on field verification for schedules and costs presented in Tables 6-1 & 6-2.			
48.	Page 6-16, 1 <sup>st</sup> paragraph	<b>Comment:</b> The discussion on the 2004 proof-of-principle grout filling tests states that the lines were not plugged to stabilize the residual waste. <b>Modification needed:</b> Discuss more recent successful tests or conduct tests to create an acceptable grout filling.			
49.	Page 6-17, bullets "b" and "c" and the summary, and Page 6-21, bullet "c"	<b>Comment:</b> The bullets discuss the challenges with grouting the pipelines. However, various grout mixes and delivery methods could be modified to provide reliable assurance that pipelines are indeed filled. Also, if the tanks are filled with grout, vent gases will have to be addressed then as well, as are they are during retrieval efforts. Really, this may be a technical requirement, but not a limiting factor and a reason to exclude this technology from further application to pipeline closure. <b>Modification needed:</b> Modify the text to note that these considerations will also be encountered and addressed during tank grouting closure operations, delete the summary, and include this technology for further consideration on page 6-21 for all pipelines and not just "(Encased pipelines only)".	X		

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50.	Page 7-1, 7 <sup>th</sup> bullet	<p><b>Comment:</b> The bullet over-generalizes the previous characterization efforts for pipelines.</p> <p><b>Modification needed:</b> Modify the text to state "...in non-tank farm pipelines..that residual waste is present with an unknown amount of standing liquids."</p>			
51.	Page 7-1, 8 <sup>th</sup> bullet	<p><b>Comment:</b> The bullet states that the models and calculations for residual wastes within the tank farm piping are "highly conservative and unrealistic".</p> <p><b>Modification needed:</b> This issue needs to be discussed in meetings with Ecology.</p>	X		
52.	Page 7-2, 3 <sup>rd</sup> & 4 <sup>th</sup> bullets	<p><b>Comment:</b> These bullets state conclusions that Ecology does not agree with. Field verification and validation of residual inventories and costs associated with screening, characterization, and remediation are needed.</p> <p><b>Modification needed:</b> This issue needs to be discussed in meetings with Ecology.</p>			
53.	Section 7.2.1, page 7-3	<p>Some confirmation of the contents of the SST pipelines before final closure is necessary.</p> <p><b>Modification needed:</b> Discussion is needed on an alternative to USDOES recommendation, with some method of verification sampling before WMA C closure.</p>			
54.	Section 7.2.1, page 7-3	<p><b>Comment:</b> The text states: "Pipeline characterization technologies are described and evaluated for potential use in WMA C. This evaluation concludes that due to the low impacts of human health and the environment from pipeline residuals, further characterization of pipelines in WMA C is not recommended."</p> <p><b>Modification needed:</b> There is insufficient basis at this time for this conclusion. Characterization is needed before a conclusion such as this can be made. This issue needs to be discussed in follow-on meetings with</p>			

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55.	Page 7-2 to 7-8, Sections 7.2 & 7.3	<p>Ecology.</p> <p><b>Comment:</b> These sections discuss that the recommendations for pipeline characterization and closure actions are based solely on estimates, limited to no actual data, and opinion.</p> <p><b>Modification needed:</b> Either revise these sections based on data from processing facilities and tank farm efforts with DSTs and SST operations, and obtain some field data to support these or other characterization and closure recommendations OR delete the sections, including Table 7-1, as there are more inaccuracies and opinions than facts presented. This issue needs to be discussed in meetings with Ecology.</p>	X		
56.	Page A-1-A-12 Appendix A, Master Waste Management Area C Pipeline Table	<p><b>Comment:</b> Explain why construction material is not known for all structures. Units are missing for size, length, depths.</p> <p><b>Modification needed:</b> Add units.</p>			
57.	Appendix B, General	<p><b>Comment:</b> Ecology does not accept the risk assessment performed in this appendix at this time.</p> <p><b>Modification needed:</b> This issue needs to be discussed in meetings with Ecology. The following comments on Appendix B are for information purposes.</p>	X		
58.	Page B-1, Section B.2, 1 <sup>st</sup> paragraph	<p><b>Comment:</b> Ecology has consistently asked for intrusion evaluation to include excavation. In this case, it would involve pipeline excavation. Ecology has minimal concerns about cases where a small hole is drilled through a pipeline. It is not surprising that this type of intrusion would yield very small risk.</p> <p><b>Modification needed:</b> Provide an evaluation of risk associated with pipeline excavation. Additionally, provide an evaluation of direct human</p>	X		



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		contact and ecological protectiveness.			
59.	Page B-4, Table B-2	<p><b>Comment:</b> The table should include an evaluation of pipeline inventory using a volume of 10,600 L (2,800 gal).</p> <p><b>Modification needed:</b> Please include this evaluation.</p>			
60.	Page B-10, text before equations	<p><b>Comment:</b> The assumption that only 1% of the waste is released over the first 10 years of pipeline failure, followed by release of the remaining 99% over 5000 years is speculative. The release mechanisms require further development and discussion with Ecology. This document does not need a speculative risk assessment. Feasibility studies should instead evaluate risk reduction associated with remedies. This assessment does not achieve that and should be abandoned.</p> <p><b>Modification needed:</b> Abandon this assessment.</p>	X		

