Appendix D

Agency Comments and Resolutions

INEEL

PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: The Technology Evaluation Report for the V-tanks, TSF-09/18 at Waste Area Group 1, Operable Unit 1-10 (Draft), DOE/ID-II038, November 2002

DOE-ID

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
SPECIFIC COMMENTS				
1 x	1	2, Figure 2	Extend length dimension on Tank to indicate ~19.5 ft, instead of 16 ft, to make it consistent with the Proposed Plan and proposed ROD Amendment.	Comment Accepted. Figure 2 will be revised to show a length of 19.5 ft, with the lines extended farther out, to near the ends of the tank.
2 x	1.1	4, 1st paragraph	Modify the TER as appropriate to indicate removal of 6000 gal of liquid may not be performed for the CO/S alternatives. The comparative evaluation can stand as is though (assuming 6000 gal is removed during early remedial action) since eliminating the removal will tend to favor the CO/S alternatives even more.	Comment accepted. The paragraph on page 4 shall be changed to read: "Table 3 provides the composition of each of the V-tanks and the overall weighted average for each of the CFTs, as well as other major constituents. The table includes two columns under the "Tank V-3" and "Average" tank concentration headings. One column under each of these headings provides information on current V-3 and Average tank concentrations, while the other column under each of these headings provides V-3 and Average tank concentrations after 6000 gal of supernatant has been removed from Tank V-3. "The mass balances described and referenced in these reports are based on the assumption that 6000 gal of liquid supernatant was removed from Tank V-3, prior to initiating the various technologies. Since that time, however, a decision has been made to not remove 6000 gal of liquid supernatant from Tank V-3, prior to tank remediation (provided the preferred alternative is ultimately selected). The effect of this change is not significant enough to affect the overall technology evaluation effort. As a result, there is no desire to change the referenced mass balances in this report."

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
3 x	1.1	4-5, Table 3	The data in Table 3 needs to be changed to reflect the concentrations with and without the 6000 gallons of liquid removed from V-3.	Comment accepted. The Table shall be revised, with a new column for Tank V-3 added in front of the existing V-3 column, and a second new column for the "Average" concentration added in front of the existing "Average" column. These new columns shall show the determined V-3 and average concentrations, assuming that 6000 gal of liquid supernatant is not removed from Tank V-3, prior to remediation. Subheadings shall then be added to the Table, for all "V-3" and "Average" columns. The new columns shall have the subheading "As Is", while the old columns shall have the heading "6000 gal of Liquid Removed". Since Table 3 is expanding by two columns, it should be setup in landscape, and span two full pages. This should give us enough room for our changes.
4 x	1.2	6, 7th bullet	The original assumption was that GAC filters could be disposed of at the ICDF as debris waste, provided the filters were kept under a 500 ppm TOC concentration. This assumption is no longer valid, and the VOC limits (PCE, TCE, TCA) for GAC disposal at the ICDF are now 6 ppm. This may affect the ability for disposing of GAC filters at the ICDF, for both the IS-CO/S and ES-CO/S options. The decision analysis needs to be rerun to identify this.	Comment was used to modify the decision analysis model to indicate that the TSDF control factors for IS-CO/S and ES-CO/S have been changed to the same input value (7.5, instead of 10) as ISV, and ESV. In addition the Community Protection input values for IS-CO/S and ES-CO/S have been changed to the same input value (8, instead of 10) as ISV and ESV. In addition, the bullet will be changed to three bullets, as follows: • "Macro-encapsulation can be performed on those off-gas units that are not granular in form (such as HEPA filters), provided other WACs are met (e.g., less than 500 ppm total organic carbon [TOC] for ICDF). • Macroencapsulation cannot be performed on those off-gas units that are granular in form (such as GAC and SGAC filters). As a result, they can only be disposed of at the ICDF if they meet Land Disposal Restrictions (LDRs) (i.e., 6 ppm TCE, TCE and PCE, 10 ppm PCB, and 28 ppm BEHP). • Disposal of SGAC filters are allowed at the ICDF, provided they meet LDRs."

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
5 x	1.2	Missing bullet	Include an assumption that 6000 gal of supernatant would be removed from tank V-3, prior to any remediation operation, for the purposes of completing the comparative analysis. Indicate that this may not actually be done for the CO/S alternatives.	Comment accepted. The new bullet says: "For comparative analysis purposes, all proposed remediation technologies were to be initiated after 6000 gal of liquid supernatant had been pre-removed from Tank V-3. This may not actually be done for the chemical oxidation/stabilization technology alternatives, however."
6 x	3	Page 23, last paragraph	With the decision to not pre-remove the 6000 gal of excess supernatant from V-3, prior to remediation, the last sentence in this paragraph needs to be changed to past tense, and the word "originally" needs to be applied to the assumed part of the sentence.	Comment accepted. The last sentence on page 23 (continuing into page 24) now reads: "For each of the alternatives identified above, it was assumed that a portion of the liquid (approximately 6000 gal) from Tank V-3 was decanted, treated, stabilized, and disposed of at the ICDF, prior to the treatment of the remaining sludge and liquid in the tanks."
7 x	3	Page 24	With the decision to not pre-remove the 6000 gal of excess supernatant from V-3, additional words need to be added, following the bullets, stating: 1) that since the time of the original assumption, it has been decided to not remove the 6000 gal from Tank V-3, and 2) that this revised decision did not significantly affect the decision analysis evaluation that had been performed under the original decision, even though it did affect the mass balances that are summarized here (and will not be changed).	Comment accepted. A new paragraph has been added below the bullets on page 24 (Section 3). The new paragraph is as follows: "Since the time of the V-tank technology evaluation, it has been decided to not remove 6000 gal of liquid supernatant from Tank V-3, prior to initiating V-tank remediation. The reason for this change is that excess liquid present in Tank V-3 could be used to assist in implementation of the preferred remediation technology (ex situ chemical oxidation, followed by stabilization) without having to add additional water to the tank wastes. Leaving the excess supernatant in the V-tanks allows for effective minimization of the resulting waste volume associated with V-tank remediation. Although the revised decision will ultimately affect the mass balances associated with each tank, it would not significantly impact the results of the decision analysis evaluation that was made under the original assumption. For this reason, a decision was made to not redo the mass balances for any of the seven technologies under consideration."

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
8 x	3.7	General (p. 45)	Additional Process Description is needed for ES-CO/S, since it is the preferred technology under consideration.	Comment accepted. The second and third paragraphs of this section now read as follows: "In the proposed alternative under consideration, the waste from the V-tanks is initially consolidated into three tanks by pumping the contents from Tank V-9 into Tank V-2. Ex situ chemical oxidation/reduction is then performed in batches of "to be determined" volume, pumped sequentially out of each of the three consolidated tanks. The supernatant and sediment phase within each tank is initially mixed together to produce more uniform batches within the reaction vessel, where the chemical oxidation or reduction reaction is to take place. The proposed mixing process involves transferring a portion of the tank wastes into a holding vessel, and then discharging it back into the tank at high pressure, to better stir up the tank contents. This process is repeated, until it is felt that the tank supernatant and residue phases are felt to be sufficiently mixed that heavier residues in the tank will have been well-mixed in with the other tank residues and liquids. The mixed tank waste is then transferred to the reaction vessel using the same system that was initially used to mix the tank contents. "Once in the reaction vessel, the waste will be stirred to maintain its level of mixing. Prior to and during chemical oxidation/reduction, the stirred tank waste will be adjusted and maintained at a controlled pH, as necessary. This is needed to maintain an optimal environment in the reaction vessel, which should enhance the chemical oxidation or reduction reaction. Charges of chemical oxidant (or reductant) are then introduced in stages to the stirred tank, to allow for chemical oxidation (or reduction) of tank contents in a batch processing manner. The purpose of the initial charge will focus on the volatile organic contaminants that are present in the waste, so there is a desire to minimize the temperature of the reaction vessel during this initial phase, provided the temperature is sufficient to promote chemical oxidation (or reduction). Later charges will focus on the chemical oxidation (or reduction) of the PCBs and oil components that are present in the tank sludge. As a result, this charge may use heating to enhance the chemical oxidation, if necessary. The preliminary evaluation assumed that the chemical oxidant to be used for this technology would be sodium

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
8 (cont.)	3.7 (cont.)	General (p. 45, cont.)		peroxy-disulfate. However, the actual chemical oxidant or reductant for this proposed system will not be defined until a conceptual design has been performed. "During chemical oxidation (or reduction), it is expected that there will be significant volatilization of hazardous VOCs into the off-gas system. To attempt a more complete oxidation (or reduction), plans are to condense the bulk of the volatilized organics in a condenser, with the condensate recycled back to the reaction vessel. Plans are to also include GAC, SGAC, and HEPA filters between the condenser and the off-gas blower (prior to stack release), to fully capture non-condensable hazardous off-gases and respirable particulate, prior to their release to the environment. The GAC should capture residual organic vapors, the SGAC should capture residual mercury vapors, and the HEPA filter should guarantee that the bulk of any radioactive materials are captured in the off-gas system, prior to stack release. "Once a batch chemical oxidation (or reduction) is complete, the contents of the reaction vessel will be transferred to a new tank system, where it will be mixed with cementitious grout, for stabilization purposes. Plans are to stabilize the chemically oxidized (or reduced) batch in the same container that it will be disposed of at the ICDF. Upon removing the chemically oxidized (or reduced) waste from the reaction vessel, the tank can be recharged with another batch of well-mixed tank sludge. This continues until the entire contents of the three tanks have been oxidized (or reduced) and stabilized. "The mass balance for this process is the same as that shown for the in situ chemical oxidation alternative (see Table 14). Upon completion, plans are to dispose of the SGAC filters at the ICDF and the GAC filters at an off-Site TSDF. "While the proposed process is designed for initial tank consolidation, followed by chemical oxidation with sodium peroxydisulfate (and stabilization with grout), one is reminded that this process is only a pre-conceptual effort, designed to evaluate this potential technology against all other technologies under consideration. Conceptual designs and title designs for this approach may differ considerably."

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
8 (cont.)	3.7 (cont.)	General (p. 45, cont.)		These paragraphs should also be acceptable as a response to one of the EPA comments, asking for more information on stabilization.
9 x	3.6	Page 44, Table 15	The secondary waste volume associated with IS-CO/S's non-recoverable equipment needs to be modified to 42 m3, to account for the additional 34 m3 of AEA equipment not included in the original evaluation (IS-CO/S assumed 1 m3 for the AEA equipment, rather than 35 m3). As a result, the total secondary waste volume in this table needs to also be changed to 44 m3.	Comment accepted. Table 15 will be revised such that the total secondary waste volume is 44 m3, and the secondary waste volume described as "Used PPE, consumable materials, non-recoverable equipment" is 42 m3.
10 x	3.7	Page 46, Table 16	The secondary waste volume associated with ES-CO/S's non-recoverable equipment needs to be modified to 58 m3, to account for the additional 34 m3 of AEA equipment not included in the original evaluation (IS-CO/S assumed 1 m3 for the AEA equipment, rather than 35 m3). As a result, the total secondary waste volume in this table needs to also be changed to 60 m3.	Comment accepted. Table 16 will be revised such that the total secondary waste volume is 60 m3, and the secondary waste volume described as "Used PPE, consumable materials, non-recoverable equipment" is 58 m3.
11 x	Section 3	All technolo-gies	Since GAC filters cannot be disposed of as debris at the ICDF, Tables 15 & 16 need to be revised. The tables need to state that the GAC filters for IS-CO/S and ES-CO/S will be disposed of at Envirocare. This is because the estimated concentrations of PCE, TCE, and TCA in these filters will be above 6 ppm. The words in Sections 3.6, and 3.7 need to also be changed to reflect this.	Comment accepted. Tables 15 and 16 have been changed, showing that "Envirocare" will be the Expected Disposition for the GAC filters. In addition, the last two sentences on Page 42 are revised as follows: "Any VOCs not condensed are captured on a granular activated carbon (GAC) bed that will be treated and disposed of at an off-site TSDF (since VOC concentrations are expected to be over 6 ppm). If there are residual mercury vapors, they are captured on sulfur-impregnated GAC bed that can be disposed of at the ICDF, since it is not expected to be a RCRA characteristic waste"

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12 x	Section 4.2.2	Pages 54	The section on administrative feasibility, which implies that each technology's Administrative Feasibility rating should be based solely on the ability to obtain regulatory approval, in the form of waiver/determinations of equivalent treatment, is not felt to be complete. This comment was generated after hearing about Administrative Feasibility concerns that are internal to the INEEL, rather than just supporting regulatory waivers, or determinations of equivalent treatment. Administrative Feasibility ratings need to also include concerns over internal administrative processes, such as SARs and Readiness Reviews. In addition, the section also states that Determinations of Equivalent Treatment are Regulatory Waivers. This is not correct. The paragraph at the start of 4.2.2 needs to suggest that on the basis of our review of all seven technology systems, that there are no regulatory wavers needing to be asked for. Instead, it should be stated that there are administrative processes/permission, such as determinations of equivalent treatment, that need to be granted for some of these technology systems.	Comment accepted. The 1st paragraph of Section 4.2.2 will be changed to read as follows: "The sub-criterion addresses the feasibility of obtaining both internal and external administrative approval to proceed with each proposed technology at the INEEL. The Administrative Feasibility sub-criterion is associated with administrative approvals from INEEL management, as well as Agencies involved in Environmental Remediation decision making at the INEEL (e.g., DOE-ID, IDEQ, and EPA Region 10) and other agencies involved in off-site disposal decisions (as applicable). "To facilitate the determination of each technology's Administrative Feasibility rating, a metric was developed based on five major administrative processes, and their estimated complexity for each of the seven technologies under consideration. The five major administrative processes include: • completion of the Safety Analysis Documentation for the proposed technology, • completion of the Operational Readiness Review process for the proposed technology, • the issue of obtaining approval for each technology as an acceptable alternative for retorting mercury, • the issue of obtaining approval for each technology as an alternative process for PCB destruction, and • obtaining approval for off-site disposal of the primary waste stream, after treatment (if applicable). "Each proposed technology will be assigned a assigned a level of complexity between 0 and 1 (in 0.25 increments), for each of these major administrative processes. The sum of these complexities will then be added up to define a total Administrative Feasibility complexity input value, between 0 and 5, for each proposed technology. These input values will then be applied to the inverse-linear curve shown in Figure 19."

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
12 (cont.)	Section 4.2.2 (cont.)	Page 54 (cont.)		Figure 19 needs to then be changed to reflect a 0-5 range, with the abscissa titled "Administrative Approval Complexity" In the second paragraph of this Section (page 55), change the term "...waivers or permissions..." in the first sentence to "...additional administrative approvals..." Finally, delete the last paragraph in Section 4.2.2 (also page 55).
13 x	4.5.1	Page 64, Last paragraph	The words, regarding Figures 34-39, need to state that the weighting for each of these factors is done on a reverse log basis, over the two orders of magnitude better than the current limitations of concentration, from an LDR standpoint.	Comment accepted. The new paragraph, at the bottom of page 64, now reads: "Figures 34-39 show the value functions metrics for reduction in toxicity and/or mobility of cadmium, lead, mercury, TCE, PCBs, and BEHP. The scale for each value function metric is an inverse log scale, covering two orders of magnitude, with the lower scale defined as the LDR concentration (or leachate value), and the higher scale defined as 1% of the LDR concentration (or leachate value). The value functions chosen for these measures produce: 1) an output score of 10 (best) if the proposed technology system results in a TCLP or totals concentration at least two orders of magnitude lower than the LDR limit; 2) an output score of 5 if the proposed technology results in a TCLP or totals concentration one order of magnitude below LDR limits; and 3) an output score of 0 (worst) if the proposed technology is not expected to meet LDRs. Input values for each technology system were determined by estimating the resulting concentration (or leachate value) for each identified contaminant, following treatment."
14 x	4.9	Table 17 Figures (generic)	All tables shown in the large Table 17 need to be modified to make certain that the output values associated with each technology's rating, are accurately indicated by the arrows. This is particular on the Graphs shown on pages 77, 79, 83, 84, 87, 89, 99 (significant error), and 108.	Comment accepted. The arrows on the various Figures will be modified to provide better indication of the resulting outputs. One should not perform this on the Figures shown on pages 81, 83, 87, 104, and 105, however, until after new curves have been obtained from the new decision analysis model run.

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
15 x	4.9	Page 81	Consistent with comment 11, the curve shown on this Figure, and the overall discussion of Administrative Feasibility should be changed to incorporate Administrative Feasibility issues internal to INEEL management (such as SAR and Readiness Review approvals), as well as external with Agencies and off-site administrators. This factor also needs to be modified in wording, to state that it is not regulatory waivers that are needed, since we don't need waivers. Suggest that the wording be changed by dropping all references to waivers, and only keeping the Administrative/Permissions from other DOE sites or TSDFs.	Comment accepted. Criterion Column The subtitle of "4.2.2, Administrative Feasibility" will be renamed "Number and Complexity of Required Administrative Process Approvals". The waiver scale shall be changed to a "0-5 Administrative Approval Scale", with the "Complexity Scale" defined" as "0-1, 0.25 increments ". The "Note paragraph should be modified to read: "Input is obtained by adding up the complexities for: Safety documentation (SD), Operational readiness (OR), Hg retort alternative (Hg), PCB destruction alternative (PCB), & Off-Site Disposal (OD)" Input Parameter Column This column needs to be revised to show complexity values for each major administrative process and technology. The column should first start with a parenthesis showing "(SD+OR+Hg+PCB+OD = TOTAL)", identifying the order of the complexity values, and the total complexity value associated with each technology. The values applied to each technology are as follows: "ISV: "1+0.5+.25+.25+0=2; ESV: ".75+.75+.25+.25+0=2" TD on/off-Site: ".5+.25+0+0+0=.75" TD on-Site: ".75+1+.25+0+0=2" TD off-Site: ".5+.75+0+0+1=2.25" IS-CO/S: ".75+.5+.5+.5+0=2.25" ES-CO/S: ".5+.25+.5+.5+0=1.75". The Figure on Page 81 will then be modified such that the new abscissas will read "Administrative Approval Complexity", and the Figure will have a range of 0-5, not 0-4. New areas, tied to the input parameters, shall then be added to the figure (make sure outputs are properly identified). Finally, the "Justification" column needs to be rewritten, as follows:

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
15 (cont.)	4.9 (cont.)	Page 81 (cont.)		"ISV has historically had significant SD complexity. Its extensive use warrants a moderate OR ranking. ISV needs Alternate Treatment Standard (ATS) acceptance (and a TSCA risked base petition) for both Hg retort & PCB destruction. Both are of minor complexity, however. "ESV has slightly less SD complexity than ISV, due to its ex situ nature. It is less developed, however, increasing OR ranking. Its similarity to Hg retort & PCB destruction make ATS/TSCA approvals a minor complexity. "TD on/off-Site has moderate SD complexity & minor OR complexity, due to its ex situ nature, small number of components & lack of a thermal oxidizer (TO). It meets Hg retort & PCB destruction requirements. "TD on-Site uses a TO to treat the organic contaminants. This raises SD complexity to major & OR complexity to extreme. It meets PCB destruction, requirements & is similar to approved Hg retort guidelines. "TD off-Site is expected to have moderate SD complexity & major OR complexity, due to its potential for high radiation exposures. It meets Hg retort & PCB destruction requirements. It requires off-Site disposal of the treated primary waste stream. This is further complicated by its unknown status as TRU on non-TRU waste. "IS-CO/S has major SD complexity & moderate OR complexity, due to its in situ, untried nature. ATS/TSCA approvals for Hg retort & PCB destruction are more complex, since they aren't similar to approved processes. "ES-CO/S is expected to have moderate SD complexity & minor OR complexity, due to its ex situ nature. ATS/TSCA approvals for Hg retort & PCB destruction are similar to IS-CO/S (see above)."

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
16 x	4.9	Page 83	The justification section of the INEEL Control Factor (for TSD Facilities) needs to be modified to reflect recent information indicating that the GAC beds for Options 5 and 6 (IS-CO/S and ES-CO/S) will have to be dispositioned off-site, since the VOC concentrations are greater than LDR requirements (See Table 14). This is a significant change for IS-CO/S and ES-CO/S, that requires reducing their input parameters to 7.5, rather than 10, which is equivalent to the same input parameters that are identified for ISV and ESV. In addition, the TSD control factor for Option 4 (TD on-Site) needs to have its input parameter changed to 10 (from 7.5), to reflect information, already identified in Table 11, that all of the generated waste can be disposed of on-Site (since the thermal oxidizer, in front of the GAC bed, should destroy organic contaminants sufficiently that the VOC content on the GAC bed will be below LDR limits).	Comment accepted. The input parameter for TD on Site now reads "10", while the input parameters for IS-CO/S and ES-CO/S now read "7.5". In addition, the Justification section for this criterion now reads: 1st paragraph: "The vitrification alternatives and chemical oxidation (with stabilization) alternatives produce only one waste stream requiring off-Site disposal: the GAC bed. (The ICDF cannot accept GAC filters that do not meet LDRs). The rest of the waste from these four alternatives can be disposed of at the ICDF (including SGAC beds)." 4th paragraph: "The TD on-Site alternative can dispose of all of its waste on-Site (at the ICDF)." Also delete the "Note" at the bottom of the justification section. Finally, adjust the Figure arrows accordingly and eliminate the "(or Envirocare)" statement from the PPE disposition for the TD on-Site alternative, in Table 11 of the TER. All TD on-Site option waste will be disposed of at the ICDF.
17 x	4.9	Page 87	TD on-Site's input value for Community Protection needs to be changed from 8 to 10, since the Thermal Oxidizer unit should destroy all organic contaminants to CO2, so no hazardous VOCs should be captured on the GAC (the GAC will not require off-Site disposal). This makes it consistent with Table 11. IS-CO/S's and ES-CO/S's input value for Community Protection needs to be changed from 10 to 8, to reflect the fact that the GAC beds will have to be disposed of off-Site, just like ISV and ESV, since they cannot be disposed of as debris. As a result, they need to meet LDR limits for VOC concentration, something not consistent with Table 14.	Comment accepted. The input parameter for the TD on-Site option shall be changed to "10", and the input parameters for the IS-CO/S and ES-CO/S options will be changed to "8". In addition, the Justification section for this criterion now reads: 1st paragraph: "The vitrification and chemical oxidation (with stabilization) alternatives require disposal of their GAC beds off-site, which, in turn, requires transportation of a solid, untreated waste. The remainder of the waste is sent to the ICDF" 3rd paragraph: "The TD on-Site alternative involves no off-Site shipments." Also delete the "Note" at the bottom of the justification section. Finally, adjust the Figure arrows accordingly.

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18 x	4.9, and Appendix C	Figure 48 on page 75	With the decrease in the range of secondary waste volume, associated with the model (40-140 m3, instead of 10-140 m3), the model weight associated with the Primary Waste Volume factor needs to be changed from 2.5% to 2.7%, while the model weight associated with Treatment Residual Volume needs to be changed from 1.1% to 0.9%. This change maintains the relative weights of Primary and Secondary waste volumes, while also maintaining a total weight for all waste volumes of 3.6%, as previously agreed upon. The Figure on page 75, showing the percentage of TMV associated with treatment residuals and material treated or destroyed will have to be changed to reflect this.	Comment accepted. This change has been incorporated in the new decision analysis model run. The portion of Figure 48 on page 75 will be modified to reflect the fact that treatment residuals now is only 5.3% (not 10%) of TMV, while Material Treated or Destroyed now is 49.7% (not 45%).
19 x	4.9	Page 103 Figure	The Figure on this page shows that the curve assignations are in terms of less than values. To make this more understandable, it is suggested that the "<" symbol be changed with the "~" symbol. This would better delineate the values that are established for the curve.	Comment accepted. The curves on pages 103 and 168 (Figure 41) need to be modified such that the "<" term is replaced with the "~" term.
20 x	4.9	Page 104	A review of the PCDR has found that IS-CO/S and ES-CO/S inaccurately identified the secondary waste volume associated with the AEA pumping system, by 34 m^3. The other technology systems correctly identified the AEA waste volume as 35 m^3, while IS-CO/S and ES-CO/S identified the AEA waste volume as only 1 m^3. To make the evaluations consistent, the input parameter for IS-CO/S needs to be changed from 10 m^3 to 44 m^3, and the input parameter for ES-CO/S needs to be changed from 26 m^3 to 60 m^3. The effect of this change will also shrink the scale of this criterion to 100 m^3 (40-140 m^3), rather than 130 m^3 (10-140 m^3). This needs to also be corrected.	Comment accepted. The Input Parameters for IS-CO/S and ES-CO/S should read 44 m^3 and 60 m^3 respectively. The curve shown in this Figure (and Figure 42, on Page 69) needs to be modified, such that the range is now 40-140 m^3, not 10-140 m^3. The scale on this page should be changed to read "40-140 m^3". And the arrows on the Figure on Page 104 should be modified to reflect the new, accurate outputs, for each of the seven technologies. The weight changes associated with this modification will be identified in Appendix B and C. These changes have been incorporated in the new Decision Analysis model run.

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21 x	4.9	p. 105, Fig. 43 (p.70), & Sect. 4.6 (p. 69)	The life-cycle costs have been corrected for the draft Proposed Plan, to reflect Present Day value costs, minus Escalation, but with O&M costs added. The total corrected costs for each of these technologies need to be input into this Figure and description of life-cycle costs on this page, so that the costs identified in the Proposed Plan are consistent with what's reported in this report. According to the Proposed Plan, the corrected input parameters for the various technologies are: • ISV-$33.0 M; • ESV-$32.7 M; • TD on/off-Site-$30.3 M; • TD on-Site-$30.3 M; • TD off-Site-$33.8 M; • IS-CO/S-$29.5 M; and • ES-CO/S-$29.4 M. As a result of these changes, the range of the curve needs to be changed to $22.1-$38.9 M, to reflect the assumption that the range is based on -25% of the lowest cost alternative, and +15% of the highest cost alternative. The model weight (identified in Appendix C) does not have to change, however.	Comment accepted. The scale identified in this page needs to be changed to $22.1-38.9 M (the -25%/+15% criteria is still valid). The new input parameters for each of the seven technologies are as shown in the comment. The section on justification needs to be modified, by eliminating "escalation and contingency" from the last sentence, and adding a new sentence, stating: "The cost values have then been reported in terms of net present value, minus escalation costs." The Figure on this page needs to be revised to show the new scale and new arrows specifying the output for each technology system. The Figure on page 70 (Figure 43) needs to also be modified to include the new range scale ($22.1-$38.9 M). In addition, the words on page 69 (Section 4.6) need to be modified to describe the modified cost values. This will require the following changes: 1st paragraph, last sentence: "Agreement was reached with the Agencies to use life-cycle costs (without escalation) that are discounted to net present value, for this metric."
22 x	5.1	Page 109, Table 18; Page 110, Figure 45.	A new Decision Analysis Model needs to be run, to reflect the changes to the model that have been identified in Comments 14, 15, 16, 17, 18, 20, 21, 27 and 28. The results of this model needs to then be input into a revised version of this Table, that reflects the new model inputs. The calculated values in Table 18 should also only be reported to three significant digits.	Comment accepted. This has been performed, with the changed inputs and weighting factors, but still awaits validation. The un-validated results of this new decision analysis are shown in Table 18 (to three significant digits), to reflect the correct values for the new Decision Analysis Model run. This new Decision Analysis Model run will also require a revised Figure 45 that will be corrected, after the model run is validated.

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23 x	5.1	General	The section should provide information on how the data from Table 18 was used to prepare Table 3 of the Proposed Plan.. Words should also be added, similar to what's in the Proposed Plan, identifying what factors played significant influence in making ES-CO/S the preferred technology, over the other six technologies under consideration.	Comment accepted. The second paragraph on page 109 will be modified as follows: "The results of the Decision Analysis Model run, in support of selecting a preferred technology for V-tank remediation, is shown in Table 18. Figure 45 shows a comparison of the various technology systems, compared to the mean value rating for all seven technologies. "A relative evaluation was then made, to assist in overall determination and selection of the preferred technology. The results of the relative evaluation are shown in Table 3 of the Proposed Plan. The relative evaluation was made by spreading the range of absolute values given to each technology, for each major sub-criterion, across a 0-10 scale, then ranking these sub-criteria as "Low", "Moderate" or "High" for each technology. A relative ranking of 0-2 earned a "Low" ranking, a relative ranking of 2-8 earned a "Moderate" ranking, and a relative ranking of 8-10 earned a "High" ranking." Finally, a new paragraph has been added after the bottom paragraph on page 109, to reflect the significant strengths and weaknesses of the various technologies, relative to the preferred technology (ES-CO/S). The new paragraph, following the bottom paragraph on page 109, is as follows: "The ES-CO/S option is preferred over the other alternatives because it is a low-temperature operation, with a simplified off-gas treatment system, that generates a stabilized waste disposed of at the ICDF. Compared to the ISV alternative, ES-CO/S has fewer potential hazards to workers, fewer monitoring concerns, lower costs, and higher system reliability, which more than offsets ISV's relative strengths with regards to technology maturity, less primary waste volume, and increased treatment capability for Investigation Derived Waste (IDW). Compared to the ESV alternative, ES-CO/S has fewer potential hazards to workers, lower costs, and higher system reliability, which more than offsets ESV's relative strength with regards to the ability to treat IDW. Compared to the TD on/off-Site alternative, ES-CO/S has more controllable disposal facilities, fewer off-Site shipments, and fewer

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23 (cont.)	5.1 (cont.)	General (cont.)		potential hazards to workers, which more than offsets TD on/off-Site's increased administrative feasibility. Compared to the TD on-Site alternative, ES-CO/S has fewer potential hazards to workers and higher system reliability, which more than offsets TD on-Site's relative strengths with regards to more controllable disposal facilities and fewer off-Site shipments. Compared to TD off-Site, ES-CO/S has fewer potential hazards to workers, more readily available disposal facilities, lower costs, fewer required off-Site shipments, better system reliability, and a shorter ROD completion time. ES-CO/S's only significant strength over IS-CO/S is that it is a more mature treatment technology. However, that is sufficient to pick it over IS-CO/S, since there are no significant strengths associated with IS-CO/S (relative to ES-CO/S)."
24 x	Appendix A	General	These treatment alternative cost estimates need to be modified, to make them consistent with the totals that were used in the revised Decision Analysis Model for this report. To do this, it is recommended that all Escalation be removed from the spreadsheets. O&M costs should then be added to the spreadsheets, for all out years, along with their projected out-year factor. The spreadsheets should factor up to all projected costs, not discounted to present value. An additional sheet should then be added at the back of each Cost Estimate (for each particular technology), identifying the total costs associated with each particular year, with the costs discounted to present value.	Comment accepted. Plans are to make this modification. The plans will involve removing the escalation column from the current estimates, then adding a page to each estimate addressing what costs are by year, and the discount factor associated with each yearly cost.

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25 x	Appendix B	General	The Relative Weights and Model Weights Identified in this Appendix are not consistent with the Relative Output Weights, Relative Sub-criteria Weights, and Model Weights identified in Appendix C. They need to be corrected, but not until after the new Decision Model has been run, and a new Appendix C has been prepared.	Comment accepted. Appendix B will be modified to be consistent with Appendix C, once a new Appendix C has been prepared. The Appendix B shall have the following changes: 2.1.2 Input Range changed to "complexity number summed over 5 pre-identified administrative actions" "2.1.3" Needs to be added to the Availability of Service and Materials heading. 2.1.1.2 on Input Range, add ", between 8 and 16" 2.2.1a on Input Range, add ". 1-4 year range" 2.2.1b on Input Range, add ", 1-6 year range" "2.2.2" needs to be added to the Community Protection Heading "2.2.3" Needs to be added to the Worker Protection Heading" 2.2.3a on Input Range, change to "up to 7 different hazard types, 3-6 range" "2.2.3" Needs to be added to Environmental Impacts heading "2.3.1" needs to be added to Residual Risk heading Input Range on 2.3.1 and 2.3.2 needs to be changed to "Clean or non-Clean Closure" "2.3.2" needs to be added to Controls heading "2.4.1" needs to be added to Amount of Hazardous Material Destroyed or Treated heading. Change relative weight rating, within category, to "49.7%. Change Model Weight to "8.5%" 2.4.1a Change Relative Weight Within Category to "32%". Change Model Weight to "2.7%". Add ", 2200-2500 m3 range" under Input Range 2.4.1b Change Relative Weight Within Category to "22.67%".

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25 (cont.)	Appendix B (cont.)	General (cont.)		2.4.1c,d & e Change Relative Weights Within Category to "7.56%". Change "Number" in Input Range to "Leachate Concentration, 1-100% of TCLP)" 2.4.f & g Change Relative Weights Within Category to "7.56%". Change "Number" in Input Range to "Concentration, 1-100% of TCLP)" 2.4.1g Add "Concentration" after "TCE" in Heading. Add new row: 2.4.1h Value Function: "BEHP Concentration", State Variable Input: "PBHP", Input Range: "number (mg/kg), Output Variable Label: "PBHPV", Relative Weight Within Category: "7.56%", Model Weight: "0.76%" "2.4.2" needs to be added to Amount of Principle Threat Treated to Reduce Toxicity, Mobility or Volume" heading "2.4.3" needs to be added to Irreversibility of Treatment of COC's heading. Add "0-10,000 year range" to the Input Range "2.4.4" needs to be added to Treatment Residual heading. The Relative Weight Within Category needs to be changed to "5.3%". The Model Weight needs to be changed to "0.9%". The Input Range needs to be revised to state "number (m3), 40-140 m3 range" 2.5 Input Range needs to be changed to read "number ($M), $22.1M-$38.9 M range"
26 x	Appendix C	General	This Appendix C will have to be revised, to reflect the results of the new Decision Analysis Model run that was made for this report.	Comment accepted. Appendix C will be modified to be consistent with the new decision analysis model run. It will be consistent with Appendix B, and will include the changes to the New Decision Analysis Model Run that was described in Comments 14, 15, 16, 17, 18, 20, 21, 27 and 28.

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27 x	Appendix C	Output Values for Plant and Animal Impacts (all technologies)	The current Decision Model shows an output value of 0 for plant and animal impacts, on all technologies. Since all technologies had the same value, this was not a discriminator that changed the relative value of the various technologies. However, with the new Decision Analysis Model run, it is desired to change the model outputs for these factors to 10, for all seven technologies, to make it correct.	Comment accepted. This has been corrected in the new decision analysis model run. It will be identified in

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28 x	Appendix C	Triangu-lated Values	To make the new decision analysis consistent with what was performed before, as well as consistent with each technologies, there will need to be: • best case and worst-case values established for each new cost estimate. In addition, the best and worst-case option for IS-CO/S and ES-CO/S secondary waste will be eliminated, to make it more consistent with the other options. The effect of this comment is as follows: Cost Input / Best Case / Expected Case / Worst-Case ISV 24.7 33.0 37.9 ESV 24.5 32.7 37.6 TD on/off 22.7 30.3 34.8 TD on-Site 22.7 30.3 34.9 TD off-Site 25.3 33.8 38.9 IS-CO/S 22.1 29.5 33.9 ES-CO/S 22.1 29.4 33.8 Secondary Waste IS-CO/S None 44 None ES-CO/S None 60 None	Comment accepted. This was included in the new Decision Analysis Model Run.
29	General		A thorough edit needs to be performed on the document to guarantee that it is consistent with the proposed plan.	Comment accepted. A thorough edit has been performed.

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GENERAL COMMENTS - The general comments are divided into two sub-sections (1) Critique of the Selection of the ES- CO/S process and (2) Critique of the ES-CO/S process.				
1	Critique of the Selection of ES-CO/S		This Report does not make a case for the need to use chemical oxidation with stabilization instead of stabilization alone. Accordingly, it is prudent to evaluate the alternative of stabilization alone without oxidation. Oxidation is primarily directed to address VOCs and SVOCs, which are all in ranges of concentrations that may be amenable with stabilization alone. Obviously, a treatability study will have to be carried possibly with the addition of other grouting agents to conclusively establish the viability of that option (implementing stabilization without oxidation). The option has significant cost saving potential. In addition, it has the added benefit of using fewer chemicals, lesser volume of final wastes, and thereby has fewer hazard potentials. Stabilization alone has been successfully used for addressing comparable levels of organic constituents. For example, Georgia Environmental Protection Division (GEPD) has approved several sites for in-situ stabilization. Four of them are as follows: Completed • Columbus, GA (1992) - VOA[1]=262ppm, PAH[2]=2385ppm • Network Underground (1994) - PCBs>50 ppm • Macon Manufactured Gas Plants (2002) Awaiting Award • Augusta Manufactured Gas Plants (2002) Stabilization was also the technology implemented to stabilize about 100,000 cubic yards of contaminated soil and sludge containing petroleum hydrocarbons with BTEX (Benzene, Toluene, Ethyl benzene and Xylenes) of 1,1018 mg/kg at a site in Indiana. The following two reports [(PTP, 2002) and (DOE, 1998)] would have been particularly relevant for review in considering stabilization alone. However, they were not received in time to support EPA's review.	**To be resolved by Rick Farnsworth.** No change to document. Stabilization was not considered further in this report, because it had already been evaluated and dismissed in the earlier Record of Decision (ROD) for the TAN V-tanks (DOE-ID-10682). On Part II, page 7-4 of the original ROD it states: "...the IDHW has determined, after the release of the Proposed Plan, that the V-tanks are part of a tank system and are subject to State of Idaho HWMA closure requirements. Based on this information, In Situ Stabilization does not meet ARARs since this technology will not meet the LDR ARARs." On page 7-5 of Part II of the original ROD, it implies that Alternative 3, which involved in situ stabilization of the tank contents without chemical oxidation, does not meet the CERCLA threshold criteria of Overall Protection of Human Health and the Environment, and compliance with ARARs. This is the primary reason that it was not considered further under the initial ROD. Since the time of the original ROD, there has been no change with regards to the V-tanks being considered a tank system that is subject to State of Idaho HWMA requirements. As a result, the concept of stabilization without chemical oxidation still does not meet the necessary ARARs. Therefore, stabilization alone, without oxidation, will not meet the CERCLA threshold criteria associated with ARAR compliance, and cannot be considered further, as part of the Technology Evaluation Report. This approach of ignoring those potential technologies that do not meet CERCLA thrshold criteria is documented in the Technology Evaluation Statement of Work that has been previously submitted to the agencies for their review. The comment refers to a number of sites, containing organic contamination, where stabilization has been approved. With CERCLA, certain ARARs (such as LDRs) can be negotiated. I assume that it has been done in these cases. With our case, however, IDEQ has stated that remediation of the tank contents would have to meet LDRs, prior to its disposition in a landfill (per Idaho HWMA closure requirements).

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1 (cont.)	Critique of the Selection of ES-CO/S		a. PTP, 2002 *Transuranic and Mixed Waste Focus Area Testing and Demonstrations Project Final Report-Chemical Oxidation/Grouting Bench-Scale Testing of V-Tank Waste Surrogates*, MSE Technology Applications, Inc., PTP-108, September 2002) b. DOE, 1998, *Direct Chemical Oxidation*, OST Reference #109, prepared by Mixed Waste Focus Area.	To meet ICDF LDRs, the stabilized tank wastes would need to increase in mass by 21-2400 times, with the addition of stabilization materials. Such an increase in mass is not necessary for stabilization purposes, thereby constituting dilution. The high quantity of organic material present in the V-tank waste (up to 20 wt%) may also limit the effectiveness of the stabilization.
2	Critique of the Selection of ES-CO/S	NA	It appears for some reason chemical oxidation was chosen a priori. It is not clear from the text why the commonly used reductive technologies were not considered. Reduction by molasses (an inexpensive substrate), sodium dithionite, or sodium disulfide is typically used.	**Resolved by Dave Tyson.** Comment partially accepted. The selected option for the destruction of organics was chemical oxidation using free radical chemistry. There are two predominant modes for wet chemical destruction: reduction and oxidation. Reduction is primarily a "dehalogenation" process. In the classical sense, chlorides are stripped from existing halogenated hydrocarbons with the skeletal carbon base unaffected. As a result, undesired (hazardous) intermediates could be formed. Under reducing conditions, these intermediates could have limited reaction pathways that would allow for further transformation. Oxidation is a process that attacks the carbon bonds. The classical oxidation end products from the destruction of chlorinated hydrocarbons are carbon dioxide, water, and hydrogen chloride. Due to production of an acid (HCl), oxidation of chlorinated hydrocarbons will experience a drop in pH. Given a **suitable** amount of oxidant, it is felt that there is less likelihood of the formation of hazardous intermediates. To keep the TER more open to alternative treatments, the Chemical Oxidation and Stabilization Options will be expanded to include Chemical Reduction, prior to stabilization. However, it is expected that the aforementioned chemical reductants do not have a reductive strength that is equivalent to the oxidants that are being considered.

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1	Critique of ES-CO/S		Even though Fenton's reagent was mentioned as a possible oxidant on page 63, the reason(s) for discarding it was not discussed. Fenton's reagent has a redox potential of 2.7 Volts (In-situ Oxidation Technology [ISOTEC], Lawrenceville, NJ). It also has the added advantage of producing oxidation without increasing the temperature which will avoid the expense and complication of moisture leaden off-gas and its treatment.	**Resolved by Eric Miller and Dale Cresap.** No change required to the document. Persulfate was selected for the purposes of convenience in evaluating CO/S against other technologies (i.e., vitrification and thermal desorption), as part of the Preconceptual Design effort. Efforts are currently underway (as part of the Conceptual Design) to evaluate all potential oxidants (including Fenton's reagent) for application to V-tanks wastes. It should be noted that only the hydroxyl radical portion of Fenton's reagent possesses the 2.7 V oxidation potential, while hydrogen peroxide possesses only a 1.78 V oxidation potential. In comparison, peroxydisulfate possesses a 2.01 V oxidation potential, while its accompanying radical (SO_4^-) possesses a 2.6 V oxidization potential. It is the the fraction of each associated radical in the chemical oxidation system that will determine the overall effectiveness of the oxidant, not the strength of the radicals themselves. For instance, assuming a 1:1 ratio of products to radicals for each case, the overall strength of Fenton's is 2.24 V (i.e., ((2.7+1.78)/2) while that of peroxydisulfate is 2.31 V ((2.6+2.01)/2). Fenton's reagent is also widely known to be the most aggressive oxidant in terms of both heat and gas generation.
2	Critique of ES-CO/S		The benefits of raising the pH level to 12 by adding sodium hydroxide have not been discussed. The need for such a pH increase should be provided.	**Resolved by Eric Miller and Dale Cresap.** Comment partially accepted. The Technology Evaluation Report does not stipulate a particular pH. Rather it simply states that an "alkaline" pH will be achieved. (The specification of a pH level of 12 is only discussed in the Pre-Conceptual Design report, which is not subject to revision.) Although not provided in this report, the rationale for the pH adjustment is that the groutability of the processed wastes in optimized at, or near, the pH of the neat grout used in the solidification. The pH of most cementitious grouts is in the range of pH 10 -12. This rationale will be added to the Technology Evaluation Report.

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SPECIFIC COMMENTS				
1	5, 3rd Paragraph	63	Fenton's Reagent and Permanganate solutions are mentioned as candidate oxidants here. However, they were not evaluated on page H-1 of Appendix H, and should be.	**Resolved by Eric Miller and Dale Cresap.** For information only, as this comment refers to the Pre-Conceptual Design Report. There is no need to adjust this report, since it is not part of the Administrative Record. Persulfate was selected for the purposes of convenience in evaluating CO/S against the other technologies (i.e., vitrification and thermal desorption), as part of the Preconceptual Design effort. Efforts are currently underway to evaluate all potential oxidants (including Fenton's reagent) for application to V-tanks wastes. It should be noted that only the hydroxyl radical portion of Fenton's reagent possesses the 2.7 V oxidation potential, while hydrogen peroxide possesses only a 1.78 V oxidation potential. In comparison, peroxydisulfate possesses a 2.01 V oxidation potential, while its accompanying radical ($SO_4^{\bullet}$) possesses a 2.6 V oxidization potential. It is the fraction of each associated radical in the chemical oxidation system that will determine the overall effectiveness of the oxidant, not the strength of the radicals themselves. For instance, assuming a 1:1 ratio of products to radicals for each case, the overall strength of Fenton's is 2.24 V (i.e., ((2.7+1.78)/2) while that of peroxydisulfate is 2.31 V ((2.6+2.01)/2). Fenton's reagent is also widely known to be the most aggressive oxidant in terms of both heat and gas generation. Therefore, its use needs to also be evaluated from a safety perspective.
2	5, 4th Paragraph	63	Neither the PTP, 2002, *(Transuranic and Mixed Waste Focus Area Testing and Demonstrations Project Final Report-Chemical Oxidation/Grouting Bench-Scale Testing of V-Tank Waste Surrogates*, MSE Technology Applications, Inc., PTP-108, September 2002) nor the DOE, 1998, *(Direct Chemical Oxidation*, OST Reference #109, prepared by Mixed Waste Focus Area) were not provided in time for review. Thus, one of the major underlying assumptions about the DREs could not be evaluated.	**Resolved by Rick Farnsworth.** We apologize for not providing these documents to you in time for your review. You should have them now. Please provide additional comments, after looking at them, if you desire. It should be remembered, however, that the proposed remediation strategies outlined in the Pre-Conceptual Design report were prepared to evaluate various technologies (i.e., chemical oxidation, vitrification and thermal desorption) against each other. Therefore, technological details discussed in the Pre-Conceptual Design report may be changed during Conceptual Design, as more is known of possible oxidants/reductants that may be used.

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3	5.2.2, 3rd Bullet	66	The Specifications of the American Electronics Association (AEA) were not made available. The plausibility of the transfer of the entire contents of Tanks V-1, V-2, V-3 and V-9 to the reaction vessel could not be evaluated.	**Resolved by Rick Farnsworth.** For information only, as this comment refers to the Pre-Conceptual Design Report. There is no need to revise this report, since it will not become part of the Administrative Record. The term "AEA" does not refer to the American Electronics Association. Rather, it refers to the name of the company that manufactures the AEA pumping system. The initials "AEA" do not stand for anything. The assumption that the entire contents of Tanks V-1, V-2, V-3, and V-9 could be transferred to the reaction vessel, via the AEA system, is based on discussions held between V-tank personnel and personnel from AEA. The assumption is supported by recent surrogate testing activities, using the AEA system, that have been performed for the INEEL, in support of tank cleanup activities at the INEEL, performed in support of the Voluntary Consent Order (VCO).
4	5.5, 2nd Paragraph	71	It is indicated that the first aliquot [of the oxidant] will be added while the solution is at ambient temperature. The paragraph goes on to describe why this sequence is advantageous. However, on the detailed Mass Balance Sheets in Appendix A & C, for tanks V-1, V-2 & V-9, and V-3, the process describes heating the contents to 80° C first before the addition of the final aliquot of oxidant.	**Resolved by Rick Farnsworth.** The proposed remediation strategy outlined in the Pre-Conceptual Design report was for the purposes of convenience in evaluating CO/S against the other technologies (i.e., vitrification and thermal desorption). A new chemical addition strategy, possibly using other chemical oxidants or reductants (other than, or in combination with peroxydisulfate) will be developed as part of the Conceptual Design effort that is currently underway for the "Ex Situ Chemical Oxidation/Reduction, with Stabilization" strategy. Part of the reason for adding chemical oxidant or reductant to the tank sludge, prior to heating, is to avoid volatilization of the F-001 spent solvents in the tank, before they can be oxidized. The error noticed in the Pre-Conceptual Design report reflects a change in the proposed approach for Chemical Oxidation (pre-chemical addition, before heating) that was not consistently applied to the rest of the document. Nevertheless, since it is the Pre-Conceptual Design report, there is no need to make the correction, since the report will not be placed in the Administrative Record.

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5	5.6, 1st Paragraph	74	It is not clear what the protection against personnel exposure to radiation would be. It is mentioned "*As a result, all piping from the individual tanks to the GLRV, the GLRV itself, all piping from the GLRV to the grout mixer/extruder, and the mixer/extruder itself, may need to be shielded.*" Is it or is it not proposed that a two feet thick concrete structure with a half inch of lead shield be built enclosing all the appurtenances? Was the cost of such structure considered in the evaluation?	**Resolved by Rick Farnsworth.** For information only, as this comment refers to the Pre-Conceptual Design Report. There is no need to revise this report, since it will not be part of the Administrative Record. As previously stated, the proposed remediation strategy outlined in the Pre-Conceptual Design report was for the purposes of convenience in evaluating CO/S against the other technologies (i.e., vitrification and thermal desorption). A new strategy that includes shielding requirements will be developed as part of the Conceptual Design effort that is currently underway for the "Ex Situ Chemical Oxidation/ Reduction, with Stabilization" strategy. A 2-ft thick concrete structure was proposed in the pre-conceptual design effort, for shielding the transfer piping between the tanks and the reaction vessel. Shielding issues should be addressed, as part of the Conceptual Design effort. However, the actual shielding design has not yet been finalized.
6	Table 17	85	The length of time to remediate was to be the main descriminator in evaluating the short term effectiveness of the alternatives. By using years on the X axis this effectively removes this subcriterion as a descriminator.	**Resolved by Rick Farnsworth.** No change to document. The decision to evaluate time to remediate in terms of years, vs. shorter time periods, was made as part of the initial agency meeting that was used to support weighting factors. The decision was again agreed to in the second meeting with the Agencies, identifying the preferred remediation technology for the V-tanks. It is recognized that the value function, as currently defined, offers no discrimination to six of the seven identified technologies. At the time this decision was made, however, it was felt that discrimination at shorter time periods was felt to be of limited value to the public and Agencies. In essence, it was felt that concern over time to remediate should not provide a technology discriminator unless the proposed technology's time to remediate was over a year longer (or shorter) than other technologies.

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7	5.1, 1st Paragraph	110	EPA recommends deleting the 2nd sentence. This reads as if the criteria were adjusted to achieve the desired outcome. This was not the case.	**Resolved by Rick Farnsworth.** Comment accepted. The paragraph will be revised to read that the decision analysis model, with its pre-determined weighting factors, was presented to the Agencies for their consideration, along with the recommendation remediation alternative (ES-CO/S) for the V-tanks. The paragraph will also state that sensitvity analyses and pair-wise comparisons were performed at the Agencies' requests, to evaluate how the pre-determined weightings affected the recommended outcome. The paragraph will further state that results of the sensititivity analysis indicated that changes to the weighting factors could alter the relative rankings of six of the seven identified alternatives, but that the observed change in "technology value" was not significant enough to support a change in the recommended technology. Information supporting the decision (from the sensitivity analysis) to support an on-site processing option will be included in a separate paragraph underneath this paragraph.
8	5.1, 4th Paragraph	110	EPA recommends deleting the 2nd sentence. The sentence tends to emphasis that the waste is characteristic and the UHCs apply. However, later in the paragraph, it is made clear that the detection limits from early sampling were above regulatory limits and that future sampling will address this issue. In fact, it is anticipated that future sampling will indicate that the concentration of contaminants of sludge in the V-tanks is below the regulatory limits.	**Resolved by Rick Farnsworth.** Comment partially accepted. The paragraph will be revised to identify that the current assumption (that the V-tank waste is characteristically hazardous) is a conservative one, primarily because the detection limits for many of the characteristically hazardous VOCs and SVOCs were above the regulatory limits in past analyses. The next sentence shall be changed to read that future sampling efforts may be pursued, using lower detection limits, to support the assumption that these trace contaminants are not present in the V-tank waste at characteristically hazardous levels. The next sentences shall be revised to state that if future sampling shows that the hazardous VOCs and SVOCs are below regulatory levels, then the V-tank waste will only require treatment of the listed and associated hazardous constituents in the tank (i.e., the F001 hazardous organics). Otherwise (if future sampling cannot be performed at lower detection levels, or the results of future sampling efforts support the presence of VOCs and SVOCs above regulatory levels), the V-tank sludge will be treated as characteristically hazardous, thereby requiring additional treatment of the full list of UHCs (to meet LDRs).

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PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: Technology Evaluation Report for the V-Tanks TSF-09\18 at Waste Area Group 1, Operable Unit 1-10

DATE: 01/07/03 **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
9	2nd Bullet	114	EPA does not agree that the material in the V-tanks is PCB liquids. The definition of PCB liquid is a homogeneous flowable material containing PCB and no more than 0.5% by weight dissolved material (CFR 761.3). Instead the material in the tanks more clearly meets the definition of sludge. Accordingly, EPA recommends that the CFR 761.61 (b)(2)(i) be the ARAR used in this ROD amendment, i.e. disposal in an approved landfill. ICDF has been approved for disposal of such PCB rememdiation waste by virtue of the Regional Administrators signature on the WAG-3 ROD.	**Resolved by Dave Eaton.** No change to document. While we agree that the material in the V-tank does not meet the definition of PCB liquid, it also does not meet the definition of non-liquid PCB remediation waste that is the subject of the suggested ARAR in the comment at 761.61(b)(2): "Any person disposing of non-liquid PCB remediation waste shall do so by one of the following methods: (i) Dispose of it in a high temperature incinerator approved under §761.70(b), an alternate disposal method approved under §761.60(e), a chemical waste landfill approved under §761.75, or in a facility with a coordinated approval issued under §761.77." The definition of non-liquid PCB remediation waste is based on the paint filter test, also found in 40CFR 761.3: "*Non-liquid PCBs* means materials containing PCBs that by visual inspection do not flow at room temperature (25 °C or 77 °F) or from which no liquid passes when a 100 g or 100 ml representative sample is placed in a mesh number 60 ± 5 percent paint filter, and allowed to drain at room temperature for 5 minutes." That points us to the essence of the problem. We have a multi-phase mixture of a liquid and non-liquid PCB remediation waste. PCB regulations do not specifically address this topic. EPA's TSCA program addressed this dichotomy by publishing a series of questions and answers that can be found on their web site at: http://www.epa.gov/pcb/qacombined.pdf Page 5 of this Q&A responds to the stated comment. ***"Q: How should a facility dispose of multi-phase waste if the highest PCB concentration is found in the solid phase of the waste? Can the waste be disposed of as a non-liquid even though there are liquids present in the waste?*** A: You may separate the waste into phases and dispose of it according to the disposal requirements applicable to each phase. You may also dispose of the waste without separation, based on the phase with the highest PCB concentration. For this example, 40 CFR 761.1(b)(4)(iv) allows disposal of the multi-phasic mixture based on the PCB concentration of the non-liquid phase; however, this section does not override the prohibition on disposing of PCB

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
9 (cont.)	2nd Bullet	114		liquids > 50 ppm in a landfill (§761.60(a)). If you choose to incinerate the multi-phasic waste, the incinerator must be approved to dispose of liquid PCBs. Section 761.50(a)(2) prohibits the processing of liquid PCBs into nonliquid forms to circumvent the high temperature incineration requirements of §761.60(a). If you would like to stabilize the sludge or solidify the sludge at a chemical waste landfill, you must obtain a 40 CFR 761.61(c) approval from the EPA Region."
10	Appendix A, Table A-3	A-7	Table A-3, indicates TCE and PCE as **non** key analytes, but Section A4.1 on Page A-8, Identification of Key Analytes In the Feed, includes these two constituents.	**Resolved by Rick Farnsworth.** For information only, as this comment refers to the Pre-Conceptual Design Report. There is no need to revise this report, since it is not part of the Administrative Record. Nevertheless, TCE (trichloroethylene) and PCE (tetrachloroethylene) are included in Table A-3 as key analytes. The callout for total VOCs, other than TCE and PCE, refers to other VOCs that are not specifically called out in this table, such as 1,1,1-trichloroethane.
11	Appendix B, 1st Complete paragraph	B-4	The uncertainty for the assumption of the degree freedom D_e =100 was not analyzed or discussed.	**Resolved by Rick Farnsworth.** For information only, as this comment refers to the Pre-Conceptual Design Report. There is no need to revise this report, since it is not part of the Administrative Record. The assumption of a Degree of Freedom of 100, for the stick measurement, was assumed, in order to provide some degree of freedom to the overall calculation of error, which was necessary to adequately design the robustness of each evaluated technology. A Degree of Freedom equivalent to 100, for the stick measurement, effectively assumes that the ± 1 in. confidence in the stick measurements is almost exact, and should be included in the error calculation without any further fudge factors, to determine the 95% confidence level.

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
12	Appendix C	C-2	The basis of the "divide-by-20" rule was not discussed. If it was done to reconcile the fact that the protocol for TCLP requires the addition of 20L of extraction fluid per kilogram of soil, then a more appropriate rule (assuming a linear adsorption isotherm) would be (see Mohsen et al. 1997[3]) $$c_w = \frac{c_t}{c_t / c^{TCLP} - 20/\rho_w}$$ where c_w = constituent concentration in the liquid phase of the sample (mg/L) c_t = total concentration of the constituent in the sample (mg/kg) c^{TCLP} = TCLP concentration in the extract (mg/L), and ρ_w = density of water (gm/mL) The departure from the "divide-by-20" rule from the value computed by the above- mentioned formula can be significant, depending on the adsorption characteristics of the constituent.	**Resolved by Dave Tyson.** For information only, as this comment refers to the Pre-Conceptual Design Report. . There is no need to revise this report, since it is not part of the Administrative Record. The basis for the "divide by 20" rule is indeed to account for the 20L of TCLP extraction fluid per kg of solid. The proposed final waste forms are glass (VIT), dried solids (TD), or dry portland cement forms (CO/S). As a result, there is no c_w term (constituent concentration in the liquid phase of the sample). There is only the c^{TCLP} value for the final waste form, which can be conservatively estimated by the "divide by 20" rule applied to the total metal of interest in the waste form. The material balances that are presented only account for total concentrations of constituent in a given residue from a process - this approach provides useful information for processes involving separation/extraction and organic destruction. The amount of metals in a dried solid waste form can be reported, but the toxicity measure (leachability) cannot, except for this conservative rule-of-thumb. Obviously the heavy metals in either the glass form, the calcined solids, or the cement forms are considered fairly insoluble – it is up to the various authors to quantify the estimated amount of leachability reduction that is realized by the final waste form.
13	Appendix C		Detailed Mass Balance Sheets, Item 9 of EX-SITU CO/S: To be consistent CFT should be used instead of COC. On the same page, it is also not clear why steps 28, 29, and 30 are mentioned on the 4th assumption. On the same page it is confusing why the process step numbers start at C and then at 5.	**To be resolved by Rick Farnsworth.** For information only, as this comment refers to the Pre-Conceptual Design Report. There is no need to revise this report, since it is not part of the Administrative Record. The comment is correct, with regards to CFTs instead of COCs. The steps identified in the Assumptions portion of these spreadsheets should refer to steps 6, 7 and 8, for all CFTs. The same correction on steps should be made for the TCE, PCE, VOC &BEHP, Arochlor, and SVOC and TOC destruction assumptions, on all of the Assumption spreadsheets that follow the process flow diagram for EX-CO/S, regardless of what number is currently identified. The process steps referred to on these spreadsheet pages are directly tied to the process steps identified on the process diagram, which is placed in front of these sheets. The reason for the process spreadsheets starting at "C", then moving to "5", is in accordance with the specific aspects of the process flow diagram for EX-CO/S.

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
14	Appendix H	H-1	Two citations (Shaw, 1998 the 1st Paragraph, and Balazs et al., 1998 the 2nd Paragraph) and not in this document's reference list as such, these reviewers could not evaluate the implications of the citations included.	**Resolved by Rick Farnsworth.** We apologize for not providing these documents to you in time for your review. You should have them now. Please provide additional comments, after looking at them, if you desire. It should be remembered, however, that the proposed remediation strategies outlined in the Pre-Conceptual Design report were prepared to evaluate various technologies (i.e., chemical oxidation, vitrification and thermal desorption) against each other. Therefore, technological details discussed in the Pre-Conceptual Design report may be changed during Conceptual Design, as more is known of possible oxidants/reductants that may be used.
15	Appendix H, 4th Paragraph	H-2	No fall back plan is discussed if future treatability studies indicate lack of removal efficiency.	**Resolved by Rick Farnsworth.** For information only, as this comment refers to the Preconceptual Design Report. There is no need to revise this report, since it is not part of the Administrative Record. As previously described, the proposed remediation strategy outlined in the Pre-Conceptual Design report was for the purpose of evaluating CO/S against the other technologies (i.e., vitrification and thermal desorption). The current Conceptual Design effort for the "Ex Situ Chemical Oxidation/Reduction, with Stabilization" strategy is expected to include fall back plans for treatment of VOCs and BEHP (in the event that BEHP cleanup is required to LDR levels, which may not be necessary, if the V-tank wastes are found to not be characteristically hazardous). A part of the Conceptual Design effort includes further Chemical Oxidation treatability studies, aimed at defining the potential destruction of BEHP by peroxydisulfate, or the other chemical oxidants/reductants that may be used in the actual remediation effort.
			[1] Volatile Organic Analytes [2] Polynuclear Aromatic Hydrocarbons [3] M. F. N. Mohsen and R. Page, "Estimating Leachate Concentration form Extraction Test Results", Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection, and Remediation Conference and Exposition, Houston, Texas, November 12-14, 1997	

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PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: The Technology Evaluation Report for the V-tanks, TSF-09/18 at Waste Area Group 1, Operable Unit 1-10 (Draft), DOE/ID-II038, November 2002

DATE: 12/31/02 **REVIEWER:** IDEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
SPECIFIC COMMENTS				
1	Acronyms	xiv	Please consider the addition of the acronym, "BEHP" to this list for clarification to a reader unfamiliar with the compound discussed throughout the latter text sections.	**Resolved by Rick Farnsworth.** Comment accepted.
2	1.2.2, 1st Bullet	5	This statement gives the impression that there may be V -tanks waste ready for shipment to the ICDF in July 2003. The sentence should be reworded to indicate that the ICDF is projected for opening in July 2003 and will be available to receive V-tanks wastes in 2005, when the remedial action is projected to take place.	**Resolved by Rick Farnsworth.** Comment accepted.
3	3.6, Partial paragraph, top of page	42	Please briefly explain what is meant by "*compliance will be achieved* for VOCs through further processing and stabilization". How will compliance be determined?	**Resolved by Eric Miller and Dale Cresap.** Comment accepted. In this section, "compliance" means compliance of the GAC filter, following macroencapsulation, to the ICDF WAC limit of 500 ppm total VOCs. The strategy of pre-treating and sampling at lower temperatures, prior to process completion, is to ensure that the amount of undestroyed VOCs expected to volatilized to the GAC filter, will not exceed the 500 ppm total VOCs limit (after macro-encapsulation) that would allow for its disposal at the ICDF. As noted in the subject report, this so-called "pre-compliance" step will be done through solution sampling and analysis for VOCs. The pre-compliance step will be used to determine if additional oxidant/reductant addition is needed, prior to heating the tank sludge (to enhance the effects of the chemical oxidant/reductant). The paragraph will be re-written to better understand this. However, it should be mentioned that the proposed process was selected for the purposes of convenience in evaluating CO/S against the other technologies (i.e., vitrification and thermal desorption), as part of the Preconceptual Design effort. The current Conceptual Design effort shall finalize the actual oxidant/reductant, its method of addition, and whether or not heating is required.

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PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: The Technology Evaluation Report for the V-tanks, TSF-09/18 at Waste Area Group 1, Operable Unit 1-10 (Draft), DOE/ID-11038, November 2002

DATE: 12/31/02 **REVIEWER:** IDEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
4	3.7, 2nd Paragraph	45	Please describe the solidification phase in more detail. Please state if the ex-situ reactor vessel will become part of the solidification, or if the treated tank contents be transferred from the ex-situ reactor vessel to another container for solidification and eventual disposal.	**Resolved by Eric Miller and Dale Cresap.** Comment accepted. The current plan is that the treated waste from the reactor will be pumped to a mixer/extruder, where it will be stabilized with grout (or other stabilization materials. The stabilized material will then be containerized in 55 gallon drums for eventual disposal at the ICDF (see Figure 11 of the TER, for reference to mixer/extruder). Following treatment of all V-tank wastes, the reaction vessel will then, itself, be grouted and disposed of in the ICDF. This information shall be added to Section 3.7 of the TER.
5	4.1, 2nd Bullet	48	The cost estimators evaluated the costs for the varying alternatives at the pre-conceptual level, which are stated to be within the range of "+50/-30%". The "+50%" value seems very high, compared to the dollar values discussed for all of the alternatives, especially considering the leading alternative selected (ES-CO/S). Please offer a base-of-reference on whether this value is at or near an industry standard for this point in time for a project, and when a more precise cost estimate could be expected.	**Resolved by Bruce Wallace.** This range is provided to us from EPA as the range required for project completion before an ESD would be required. This range is applicable to feasibility study level estimates, which is the level used in the Technology Evaluation Report. The total project completion costs will be evaluated against this criterion, but it is not a consideration in the preparation of the estimate. We have performed a planning level "bottoms up" estimate including escalation, risk evaluation and contingency application. It is expected that the total project cost will comply with EPA's +50/-30% range. A sentence shall be added to the bullet explaining that the "+50%/-30%" range complies with the EPA requirements, regarding the range outside of which an ESD would be required.
6	4.3.1, Figures 23 and 24	57 and 58	Even though the information is provided in the text, Figure 23 would benefit with the addition of an entry at the commencement of the Time (years) axis indicating the starting point such as, "Amended ROD Approval". Figure 24 would also benefit from this same addition. Also, please add the label "Years" to the time axis for Figure 24.	**Resolved by Rick Farnsworth.** Comment accepted. The term "(after Amended ROD Approval)" shall be added to the headings of these two figures.
7	4.9, Table 17	78	This is an excellent Table, which graphically and eloquently illustrates the relationships between tile varying alternatives. One suggestion for the sake of consistency and reading ease would be to align the "Alternative Number" entries to the corresponding "Alternative", similar to the first page of this Table (page 77).	**Resolved by Rick Farnsworth.** Comment accepted. Thanks for the kudos.
8	Ibid	79	As in the prior comment, please space out the "Alternative Number" entries to match those in the "Alternative" column.	**Resolved by Rick Farnsworth.** Comment accepted.

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DATE: 12/31/02 **REVIEWER:** IDEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
9	4.9, Table 17	85	As in the comment previously provided for Figure 24 of Section 4.3.1, please consider the addition of the "Amended ROD Approval" and "Years" labels to this chart.	**Resolved by Rick Farnsworth.** Comment accepted. The "Years" label shall be added to the Figure on page 86, as well as page 85. In addition, the term "(after Amended Rod Approval)" shall be added to the headings of these two figures.
10	4.9, Table 17	86	Same comment (as above) for the chart on this page.	**Resolved by Rick Farnsworth.** Comment accepted. The "Years" label shall be added to the Figure on page 86, as well as page 85. In addition, the term "(after Amended Rod Approval)" shall be added to the headings of these two figures.
11	5.1, Figure 45	110	It is not clear what the basis for the information provided in this Figure is, and what the percentages (vertical axis) indicate. Please explain.	**Resolved by Rick Farnsworth.** Comment accepted. Figure 45 simply refers to the deviation from the average value rating that was recorded for each of the seven prospective V-tank remediation technologies. The Figure shows that all but one of the seven proposed technologies (the "Thermal Desorption, Off-Site Treatment and Disposal" option) were above the average value rating, with only slight differences,. In contrast, the "Thermal Desorption, Off-Site Treatment and Disposal" option was significantly below the average value rating, as well as significantly below the values of the other six technologies that were proposed. This information shall be included in the revised Technology Evaluation Document.

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DATE: 12/31/02 **REVIEWER:** IDEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
12	5.1, Bottom paragraph, Last complete sentence	110	An addition to this sentence, it would help the reader realize that, at the time of sampling and analyses in previous years, the detection limits for the VOCs and SVOCs were above the regulatory limits, and therefore, the more conservative position is taken today unless analytically demonstrated to be otherwise.	**Resolved by Rick Farnsworth.** Comment partially accepted. The paragraph will be revised to identify that the current assumption (that the V-tank waste is characteristically hazardous) is a conservative one, primarily because the detection limits for many of the characteristically hazardous VOCs and SVOCs were above the regulatory limits in past analyses. The next sentence shall be changed to read that future sampling efforts may be pursued, using lower detection limits, to support the assumption that these trace contaminants are not present in the V-tank waste at characteristically hazardous levels. The next sentences shall be revised to state that if future sampling shows that the hazardous VOCs and SVOCs are below regulatory levels, then the V-tank waste will only require treatment of the listed and associated hazardous constituents in the tank (i.e., the F001 hazardous organics). Otherwise (if future sampling cannot be performed at lower detection levels, or the results of future sampling efforts support the presence of VOCs and SVOCs above regulatory levels), the V-tank sludge will be treated as characteristically hazardous, thereby requiring additional treatment of the full list of UHCs (to meet LDRs).
13	5.2.1, Entire section	113 and 114	The four concepts enumerated within this Section are succinctly and very well stated. The positions taken for each bullet are those that were discussed at length between the Agencies in Idaho Falls, Idaho on October 23rd and 24th, 2002. The issues presented adequately reflect the consensus of the Agencies for the resolution of these regulatory challenges.	**Resolved by Rick Farnsworth.** No change required to the document. Thanks for the kudos.
14	6.1, 1st Paragraph	115	It is unclear in this section whether the Proposed Plan is drafted and put out for public comment and subsequently a ROD Amendment is drafted and sent out for public comment later as well. The fourth last bullet implies that this might be the case, but it is hard to follow. Please clarify if this is a combined document for public comment or two separate, subsequent actions. Table 19 seems to imply that these are separate events, although no public comment period is mentioned for the ROD Amendment entry.	**Resolved by Rick Farnsworth.** Comment accepted. The paragraph shall be revised to show a chronological sequence, between submittal of the Proposed Plan Amendment, and finalization of the ROD Amendment. The Proposed Plan Amendment and ROD Amendment are two separate documents. However, only the Proposed Plan Amendment requires a public comment period. The ROD Amendment will incorporate the responses from the public comment period on the Proposed Plan Amendment, and use them to assist in the final ROD Amendment determination, as to which technology should be selected.