



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

3100 Port of Benton Blvd • Richland, WA 99352 • (509) 372-7950

May 23, 2008

Ms. Shirley J. Olinger, Manager  
Office of River Protection  
United States Department of Energy  
P.O. Box 450, MSIN: H6-60  
Richland, Washington 99352

Re: Corrected Enclosure to Department of Ecology Letter '241-C-110 Tank Waste Retrieval Work Plan, RPP-33116, Revision 1,' Dated May 20, 2008

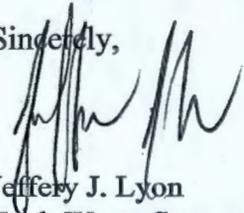
Reference: Letter dated May 20, 2008, from J. J. Lyon, Ecology, to S. J. Olinger, USDOE-ORP, "241-C-110 Tank Waste Retrieval Work Plan, RPP-33116, Revision 1" 0077261

Dear Ms. Olinger:

The Review Comment Record (RCR) enclosed with the reference letter contained a numbering error. A corrected RCR is enclosed. I apologize for any inconvenience.

If you have any questions, contact me at 509-372-7914.

Sincerely,

  
Jeffery J. Lyon  
Tank Waste Storage Project Manager  
Nuclear Waste Program

nu/aa  
Enclosure

cc w/enc:

Keith Carpenter, CH2M  
Moses Jaraysi, CH2M  
Jeff Luke, CH2M  
John Schofield, CH2M  
Stuart Harris, CTUIR  
Gabriel Bohnee, NPT  
Russell Jim, YN

Susan Leckband, HAB  
Ken Niles, ODOE  
Administrative Record: 241-C 5-24  
CH2M HILL Correspondence Control  
USDOE-ORP Correspondence Control  
Environmental Portal

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Document Number(s)/Title(s)	Program/Project/Building Number	Reviewers	Organization/Group	Location/Phone
RPP-33116, Revision 1 C-110 TWRWP		Michelle Mandis Les Fort Beth Rochette Nancy Uziemblo Joe Caggiano Jeff Lyon	Nuclear Waste Program Cleanup Section	3100 Port of Benton Blvd Richland, WA 99354 (509) 372-7950

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

\_\_\_\_\_  
Organization Manager (Optional)

\_\_\_\_\_  
Reviewer/Point of Contact

\_\_\_\_\_  
Reviewer/Point of Contact

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

\_\_\_\_\_  
Nancy Uziemblo  
Author/Originator: Ecology

\_\_\_\_\_  
Author/Originator

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1)	General Comment	Cyanide is present in tank C-110. Also, cyanide has been observed in groundwater near C-farm. Furthermore, cyanide is an anion, does not bind strongly to soils, and may leach to groundwater ( <a href="http://www.epa.gov/safewater/dwh/c-ioc/cyanide.html">http://www.epa.gov/safewater/dwh/c-ioc/cyanide.html</a> ). However, cyanide risk assessment results have not been provided in this TWRWP and the risk and hazard results in this TWRWP may be an underestimate of chemical hazards associated with these tanks and associated retrievals. This is further compounded by the lack of data on contaminants not included in the BBI (ex. Tributyl phosphate). These factors will need to be considered by Ecology during tank retrievals.  This comment is for the record and does not require a			



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		<p>4) New Comment on 10/18/07 following meeting between Ecology, CH2M HILL and ORP. (following comment written by CH2M HILL based upon comment as understood)</p> <p>It must be verified that the Appendix B data for Tc-99 is still conservative for a C-110 retrieval leak because the AN-106 Tc-99 composition used for the</p>		<p>obtaining a sample until it is needed will have no impact on the ability to analyze the DST sample for 99Tc.</p> <p>Regarding the comment that the white paper was based on one data point, the white paper states that the last DST sample closely matched the expected DST concentration. The expected DST concentration was based upon mixing of SST 99Tc with the DST 99Tc. The DST 99Tc was based upon previous DST samples and the SST 99Tc was based upon the BBI.</p> <p>The quantity of 99Tc in the AN-106 supernate is &gt;250 times the quantity in the C-110 supernate, and the relative standard deviation for the C-110 supernate 99Tc concentration is 16.9, not two orders of magnitude. Any variation in the C-110 supernate 99Tc concentration from that given in Appendix A within the limits of the relative standard deviation will have negligible impact on the DST supernate 99Tc concentration.</p> <p>4) Five AN-106 samples were taken in May of 2007 from different heights in the tank and were 0.0159, 0.0174, 0.0197, 0.0177 and 0.0167 <math>\mu\text{Ci/mL}</math>. The average is 0.0175 <math>\mu\text{Ci per mL}</math>. Allowing for the receipt of the remaining heel in C-108, and all of C-109 and C-110, the AN-106 supernate concentration calculates to be</p>	

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		risk calculations in RPP-33116 Rev 0A was based on AN-106 samples from May 2006, while most of the supernate in AN-106 was later transferred out in the fall of 2006 and replaced with supernate from another DST.		0.0475 $\mu\text{Ci/mL}$ . The risk calculations in Appendix B were based upon an estimated 99Tc concentration of 0.0477 $\mu\text{Ci/mL}$ , or almost exactly the same number, so no change will be made to the Appendix B risk calcs for 99Tc.	
4)	Section 2.1.1	<p>Ecology would like to continue to receive the major schedule elements such as design, construction, and field retrieval activities (that are to be included with the TWRWP as addressed in Appendix I) in the monthly Tri-Party Agreement Manager Milestone Review Meetings.</p> <p>This comment is for the record and does not require a response from USDOE for this TWRWP.</p>			
5)	Section 2.1.2 and 3.8	<p>Reference the IQRPE Decision Logic for Equipment Repair, Maintenance, or Replacement/Instillation as described in RPP-16922, Latest Revision.</p> <p>Any modification to the system "requires" an IQRPE for this retrieval system since it is essentially an extension of the DST System.</p> <p>Furthermore, the central caisson design is being modified from its original design and therefore "must" be certified by an IQRPE in accordance with the WAC regulations. There is no past integrity assessments to certify that the center corrugated caisson can be used for secondary-containment. Also, provide the same information for existing risers and pits that are to be used during the waste retrieval operation.</p> <p>Therefore, central caisson, risers and pits that are used during the retrieval are part of the retrieval system and require an IQRPE assessment and certification.</p>			
6)	Section 2.1.3.2	Address that the process control waste level limit on waste depth will be established during the PCP as stated in sections 3.1.2 and 4.6.1.			

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		Requested editorial change.			
7)	Section 2.1.4 Page 2-8 b.	<p>Include the following text in "b": "The BBI is the best available data; however, the information and the risk and hazard values derived from the BBI are insufficient for closure."</p> <p>The uncertainty in the inventories is large (some standard deviations exceed the actual inventory values and many are not reported). Consequently, it is not demonstrated that the contaminants contributing 95% of the risk have been properly identified.</p>		<p>Per Appendix I of the HFFACO, the requested addition is not applicable to a TWRWP. Appendix I, of the HFFACO, in Section 2.1.3 states, "TWRWPs will address only those actions associated with waste retrieval."</p> <p>Added words to 2.1.4 saying, "The information on risk and hazard values for future closure actions will be derived from post-retrieval sampling."</p>	Closed
8)	Section 2.1.4	Please discuss the historic heat load of the tank. The tank does contain organic wash waste, and Ecology has concerns that a significant amount of waste may remain on the walls and stiffener rings.		<p>Attachment #2 is a plot of the C-110 temperature since 1991. This is as far back as the SACS data from the TWINS database goes for this tank. The plot shows the temperature has been essentially ambient since 1991.</p> <p>It is unnecessary to go back to stored data records to get earlier temperature data for several reasons. First, the lack of any significant temperature decrease in the plot shows there is a relatively low level of heat producing radionuclides present, so the temperature would not have been significantly higher in the past since Sr-90 (predominant heat generating sludge radionuclide) has a half life of about 29 years. This means the heat generation rate from Sr-90 in 1952 when the addition of heat producing sludge was completed would have been about 2.6 times what it was in 1991. Second, Figure 2-3 shows the surface and sludge level history. The vast majority of sludge was added between 1946 and 1952 when 1-C waste, the</p>	Closed

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				<p>first cycle waste from bismuth phosphate processing, was added to the tank. Several hundred thousand gal of OWW waste was added to the tank in 1956, but sludge level data show no solids increase. The OWW liquid was subsequently pumped out of the tank. The OWW stream from Purex was a low level stream, containing less than 1% of the fission products in the dissolved fuel. It was a combination of two waste streams, both dilute Na<sub>2</sub>CO<sub>3</sub>-KMnO<sub>4</sub> mixtures used to wash the two plant organic systems, one of which was contained in a cell routinely entered by personnel. Thus, the heat generating potential of this stream was low.</p> <p>The heat load in C-110 has been low in this tank compared to tanks that received more concentrated first cycle wastes.</p>	
9)	Section 3.1.1 Page 3-2 Table 3-1	Explain the planned uses for risers #8 and 5.		The use of these risers is shown in revised Table 3-1 in RPP-33116 Revision 1.	Closed
10)	Section 3.1.1	State how the associated ancillary DST System equipment, including such elements as the C-110 corrugated caisson and associated risers, will be certified as compliant as a secondary containment structures.			
11)	Section 3.1.1	Provide the timeline for the required shut down of the C-110 transfer pump and the receiver DST pump and how that will ensure that the portable valve box or any other piece of ancillary transfer equipment will not overflow the secondary containment structure. This is a performance measure and needs to be part of the work plan.			
12)	Section 3.1.1 Page 3-1	According to the regulations, any new piece of equipment requires an IA assessment and must address the impacts that the piece of equipment will have on the existing tank system. Therefore, provide all past		See revised wording in section 3.8. All new or used transfer SSCs, including secondary containment and LD equipment will be included with the design provided to the	Closed

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		integrity assessments done to certify that the center corrugated caisson can be used for secondary-containment consistent with 40 CFR 265.192.		IQRPE for review.	
13)	Section 3.1.2	<p>First paragraph on page 3-5. Level measurement has not been found to be the best measurement. It is easiest and readily available, but not proven to be the best. Remove the word "best."</p> <p>Requested editorial change.</p>			
14)	Section 3.1.2 Page 3-6	Provide a discussion of HFFACO Appendix I requirement (page I-6) for completing retrieval within 12 months of start date. Please include a timeline that indicates how the operator will meet the requirement to complete retrieval, and what process will be used to inform Ecology that this date and timeline will need change. Appendix I, section 2.1.5, Waste retrieval, page I-6 "...DOE will complete SST waste retrieval activities meeting Agreement criteria of ..M-45... and ancillary equipment waste retrieval activities meeting regulatory requirements, within 12 months of the retrieval start date(s) approved in the TWRWP."		Accepted. Added words to 2.1.1 stating retrieval will be completed within the time specified in the work plan or the work plan will be modified to provide an estimated completion date for the process.	Closed
15)	Section 3.2 Page 3-6 Table 3-2	Provide the document/calculation reference for information provided in the table		<p>There are 3 references given for the 4 numbers stated in the table.</p> <p>Ref (a) says the 178 kgal value is from Table 2-3. Going to Table 2-3 the reference for 177,000 gal of solids and 1,060 gal of supernate is stated at the bottom of the table with the TWINS download reference. There is no calculation to reference, <math>177,000+1,060=178,060</math> which is rounded off to 178 kgal in Table 3-2.</p> <p>References are added for the Ref (b) statement that the 105 kgal flush is the same as other 100 series modified sluicing tanks.</p>	Closed

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				Ref (c) is for the estimated supernate volume and operating duration days. There is no formal calc note for these numbers, they are estimates only, the basis for which is explained in the footnote to Table 3-2. For clarity, Attachment #3 to this RCR provides the calculations supporting the Table 3-2 values. Minor change made to the supernate value in Table 3-2.	
16)	Section 3.4 Page 3-10	HFFACO Milestone M-45-00 states that "...as much tank waste as technically possible..." Not technically practical. Please correct this statement.		Change made as requested.	Closed
17)	Section 3.7 Page 3-17	A performance measure for the potential intrusion of rainwater or snowfall will need to be considered and discussed. With closure delays of more than 10 years, additional monitoring may be necessary. Please include the plans and basis for additional monitoring.		See wording at the end of Section 6.3, which addresses post retrieval intrusion monitoring.	Closed
18)	Section 3.8 Page 3-17	IQRPE integrity assessment must also address potential impacts on existing tank systems used as secondary containment (as an example the corrugated caissons, portable valve boxes). Please provide that assessment.		Partially accepted. See revised wording in section 3.8. All new or used transfer SSCs, including secondary containment and LD equipment will be included with the design provided to the IQRPE for review.	Closed
19)	Section 3.9.1	Provide such information in the form of "in accordance with the HIHTL Management Plan" or some other specific performance measure.		Provision of a timeline for removal of above grade equipment is not possible at this time because design has not been initiated for all future retrievals nor is there an agreed to closure plan for C-Farm. Equipment that needs to be removed, excluding HIHTLs, and is not suitable for reuse will be packaged and disposed of onsite in accordance with the approved waste acceptance criteria for the Hanford Site burial grounds.	Closed
20)	Section 3.9.1	State how the HIHTL will be managed. Ecology expects the current HIHTL Management Plan will be used to manage all HIHTLs. Address this in this section.		Accepted. Wording added to Section 3.9.1 stating the HIHTLs will be managed in accordance with RPP-12711.	Closed
21)	Section 3.9.1 Page 3-18	<b>Numbers in bold added by CH2M HILL for clarity.</b> Description does not clearly indicate the disposition of			Not closed

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		<p>the new WRS components. Provide a timeline for when above ground equipment is to be removed, or if to be reused, transitioned.</p> <ol style="list-style-type: none"> <li>1) Please provide sufficient detail to allow us to understand what the major disposal disposition categories of equipment,</li> <li>2) what Hanford Site burial grounds are being used,</li> <li>3) what process will be used for the management of the HIHTLs,</li> <li>4) If any above ground equipment is anticipated to be left in place.</li> <li>5) Provide a plan within 30 days from the end of retrieval that indicates the date of removal for all recently installed above ground equipment not planned for reuse, and a list and plan for</li> </ol>		<ol style="list-style-type: none"> <li>1) Accepted. Added words to 3.9.1 that contaminated retrieval process equipment not reused will be disposed of as mixed waste.</li> <li>2) Partially accepted. Once the waste is packaged to meet land disposal restrictions it will be disposed of in a mixed waste trench in the 200 West Area, possibly Trench #34, but this cannot be determined at this time.</li> <li>3) Accepted. See response to Comment above for wording change on HIHTL handling.</li> <li>4) Partially accepted. Most all above ground equipment will be left in place to be used either for future tank retrievals or for use during closure. This includes, but isn't limited to, aboveground diversion boxes, exhausters, skids, hydraulic equipment, and exhaust ducting. HIHTLs will be left in place to the limits established in RPP-12711. Most major aboveground equipment won't be removed until a final closure plan is agreed to for the C-Farm tanks.</li> </ol>	

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		equipment for that is scheduled for future use. For the recently installed above ground equipment that does not have a use within this farm, the equipment must be removed within 1 year after the end of retrieval.			
22)	Section 4.0	<p>HRR must be fully implemented before retrieval operations can be initiated. USDOE must re-write and propose modifications to LDMM conditions in Chapter 4 within 90 days. These changes must be approved and implemented prior to initiation of waste removal.</p> <p>The TWRWP must list the HRR system as fully implemented [including administratively and training-wise] when C-110 retrieval starts</p> <p>When HRR is fully administratively and physically implemented, the following will also occur:</p> <ol style="list-style-type: none"> <li>1) Groundwater wells will be sampled quarterly</li> <li>2) Dry well monitoring pre-retrieval will be with gamma and moisture measurements</li> <li>3) Dry Well monitoring post-retrieval will be gamma measurements</li> <li>4) Dry Well monitoring with moisture measurements will be conducted as a backup means of leak detection if the HRR system becomes inoperable.</li> </ol>			
23)	Section 4.1.2.2 Page 4-3	Drywells extend only into a part of the vadose zone, not to the water table. Therefore, groundwater samples can not be collected from drywells. Please correct.		Changed "drywells" to "groundwater monitoring wells"	Closed
24)	Section 4.2.1.1	<p><b>Numbers in bold added by CH2M HILL for clarity.</b></p> <p>In this section, you discuss the capabilities of the measurement systems for leak detection and their detection limits.</p> <ol style="list-style-type: none"> <li>1) Please discuss the minimum tank volume and</li> </ol>		1) Not accepted.	Closed

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		<p>2) Cesium concentration required to show an increase in counts above background.</p> <p>3) Please discuss the calculated travel time for a leak of this size to show up in the drywell.</p>		<p>2) There is no minimum calculated tank volume available that will show an increase in drywell counts above background outside this 300-18,000 gal (or above) range.</p> <p>3) Section 4.2.1.1 discusses drywell monitoring and how it is used for leak detection. The performance capability of drywell monitoring is discussed in Section 4.5.1, in accordance with the August 2004 TWRWP outline.</p> <p>4) Excerpts from RPP-10413 on drywell monitoring performance have been added to 4.5.1 following discussion with Ecology on 12/5/07 concerning the performance of drywell monitoring.</p> <p>No minimum <sup>137</sup>Cs concentration can be stated to ensure a leak is detected in a drywell. Moisture logging doesn't use the gamma concentration in the waste to spot a leak, only the moisture level. An unexplained increase in the moisture level would then be evaluated by gamma logging. A leak would likely have to get within 2-3 feet of the drywell before an increase in radiation was noted. To estimate a specific <sup>137</sup>Cs concentration required to show an increase would require making too many assumptions and provide no useful information. A</p>	

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				<p>major complication is some of the <sup>137</sup>Cs in the waste will be absorbed in the soil around the tank, depending upon the ion exchange properties of the soil. Thus regardless of the initial waste concentration, the <sup>137</sup>Cs concentration will be reduced as it travels toward the drywell.</p> <p>Provided to Ecology with this RCR response is Attachment #4, a copy of RPP-10413, (provided on 10/18/07) which provided a Monte Carlo analysis of numerous variables and their impact on drywell monitoring. The travel time to detection will vary widely dependent upon the variables assumed, including the tank leak rate.</p> <p>5) Key excerpts from RPP-10413 have been included in Section 4.5.1 in response to Ecology comments on drywell monitoring performance in a meeting on 12/5/07.</p>	
25)	Section 4.2.1.1 Page 4-7 Paragraph 7	Reporting of the drywell logging data in the RDR is not timely and therefore not useful for LDMM. State the timing for analysis and availability of the data via HLAN. While it is valuable information, timelier reporting is needed if there are unexplained anomalies detected. Please correct.		<p>This paragraph was put in previous TWRWPs at the request of Ecology. It repeats wording in Appendix I as to what goes in the RDR.</p> <p>There is no statement in the TWRWP that the reporting of drywell logging in the RDR is used for LDMM. The timeliness of drywell logging data for LDMM is discussed in the last paragraph of Section 4.5.1. This information is recorded, reviewed, and plotted and the data are available on a share drive, it is not directly accessible to everyone on HLAN.</p>	Closed

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26)	Section 4.2.1.2 Page 4-8 Paragraph 5	The timing of notification to Ecology needs to be specified. Ecology expects notification within a 72 hour time period or sooner. Please clarify.		Not accepted. The paragraph commented on discusses "informing" Ecology of an unexplained HRR anomaly. This paragraph was put in previous TWRWPs at the request of Ecology, as they desired to be made aware of the fact that a review may be underway for a potential leak resulting from HRR data. Ecology will be notified of a confirmed leak in accordance with Section 4.6.	Closed
27)	Section 4.4, Table 4.1	While the tanks are using interim status requirements, they are considered part of the Hanford Site Wide Permit as units undergoing closure. Under the current set of circumstances, portions of the SST system will be non-compliant. Retrieval is considered part of the closure actions. It is also acknowledged that the new installations will be compliant with final status regulations. For table 4.1 and any other references related to this issue, please indicate that the above ground systems and any other new systems installed as part of the WRS, will comply with WAC 173-303-640. Any below grade existing system may operate under 40 CFR 265.193, DOE Order 435.1, and the basis provided.			
28)	Section 4.6.1	Please state the maximum current waste level and the maximum benchmark level for controlling liquid additions. Define the meaning of "as close to."		Partially accepted. See revised wording in Section 4.6.1.e. Following discussion with Ecology on 12/19/07 the wording has again been revised to state the benchmark is provided in the PCP, with added words that it is based upon minimizing liquid in the tank.	Not closed  Ecology is concerned that the TWRWP no longer has identified limitations on liquid levels within the tank undergoing retrieval. We believe that these should be identified and subject to our approval. Currently USDOE has deferred these limitations to a document which we do not approve.  Delete the 8 <sup>th</sup> bullet in the

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					first set of bullets and replace with the appropriate wording that was used in Rev 0. Include the maximum, the goal, the benchmark definition in the PCP, and on minimizing the liquid in the tank.
29)	Section 5 Page 5-5	<p>Add the following text under the Compliance Method column for 265.191 – “Assessment of existing tank systems.”</p> <p>The SST Integrity Assessment Report concluded that the reinforced concrete tank structures have adequate collapse margin and justify safe storage of interim stabilized waste. However, given the tank leak history and current conditions of tank liners, long-term leak integrity, for the liquids remaining in tanks, cannot be proven for any SSTs. Therefore,</p> <p>The SSTs are not compliant with RCRA 40 CFR 265.191. The SSTs are currently authorized to continue operations pending closure under the authority of the HFFACO milestone M-45-00.</p>		Partially accepted. The following change has been made to item “d.” in the table: “Because the SSTs are not compliant with RCRA 40 CFR 265.191, the SSTs are currently authorized to continue operations pending closure under the authority of the HFFACO milestone M-45-00.”	Closed
30)	Section 6.3	Provide a timeline for when the transfer lines are to be disconnected and capped; as well as the previously isolated intrusion routes, etc.		Accepted. The wording in Section 6.3 has been modified to clarify the timing for disconnection and capping of joints and previously isolated intrusion routes, and that HIHTLs are handled as stated in 3.9.1.	Closed
31)	Section 7.1.1.3 Page 7-9 1 <sup>st</sup> paragraph of section	A statement in previous TWRWPs has been omitted here. The statement was “The groundwater contaminant concentrations used for retrieval leak impact graphs were derived directly from the modeling output data from RPP-13774 analysis.” Has this condition changed? If so, please explain the source of the groundwater contaminant concentrations used in the retrieval leak impact graphs. If it has not changed, please include the statement.		Accepted.  Yes, the concentration source for the C-110 values is changed. The last paragraph in section 7.1.1.2 gives the reference, it is RPP-22521. This change was necessary due to the change from vacuum/MRS retrieval to modified sluicing retrieval for C-110. RPP-	Not closed The disposition needs to be changed to cite Revision 3 of RPP-22521.

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				22521, Appendix A estimates the DST supernate concentrations based upon the addition of retrieved waste from all other SSTs scheduled to be added to the DST before, and including, the C-110 waste.  Additional explanatory wording has been added to 7.1.1.3.	
32)	Section 7 Page 7-2 2 <sup>nd</sup> to last paragraph	This is new text not used in previous TWRWPs. Please delete "Use of RPP-13774 in this document was discussed with, and agreed to informally, by Ecology prior to developing this TWRWP." Ecology still has unresolved comments from the original review of RPP-13774 and continues to expect additional data that have not been included in this document (for instance, nearby unplanned release inventories, direct contact evaluations, ecological risk assessment results, etc).		Sentence deleted as requested.	Closed
33)	Appendix B, p. B-4, Table B-1 and Section B2.3, 3rd paragraph	Please add text in section B2.2 indicating that the supernatant concentrations of the contaminants in Table B-1 have been revised since Revision 0 as a result of new supernatant sample results from AN-106. Also, mention in the text any changes in retrieval sequence that may have occurred after the release of Rev. 0 of RPP-33116.			