



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Richland Field Office

3100 Port of Benton Blvd., Richland, WA 99354 • 509-372-7950

July 17, 2025

25-NWP-111

Anders J. Wiborg, Director
Tank Farms Program Division
Hanford Field Office
United States Department of Energy
PO Box 550
Richland, Washington 99352

Re: The Department of Ecology's Response to the United States Department of Energy Letter
25-TWO-0067

References: See page 2

Dear Anders J. Wiborg:

The Department of Ecology (Ecology) acknowledges the comments received for the following documents that were transmitted by the United States Department of Energy (USDOE) in letter 25-TWO-0067 (Reference 1):

- *Retrieval Data Report for Single-Shell Tank 241-AX-102*, RPP-RPT-63489, Rev. 1
- *Retrieval Data Report for Single-Shell Tank 241-AX-103*, RPP-RPT-64284, Rev. 0
- *Sampling and Analysis Plan for Single-Shell Tank Component Closure*, RPP-PLAN-23827, Rev. 4
- *Single-Shell Tank Component Closure Data Quality Objectives*, RPP-23403, Rev. 8

Ecology reviewed USDOE's Sampling and Analysis Plan (SAP) and Data Quality Objective (DQO) comment dispositions in accordance with Section 9.2 of the *Hanford Federal Facility Agreement and Consent Order*, 89-10, Revision 9. Enclosed are Ecology's responses.

Ecology reviewed USDOE's Retrieval Data Report (RDR) comment dispositions for AX-102 and AX-103 and understands USDOE's intention of incorporating comments into future RDR reports.

Ecology acknowledges we required additional time to complete our review and transmitted an extension letter on June 23, 2025 to extend our review (Reference 2).

Ecology looks forward to continued collaboration with USDOE.

Anders J. Wiborg
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If you have any questions, please contact Luissa Johnston, Tank System Operations and Closure Coordinator, at luissa.johnston@ecy.wa.gov or (509) 975-1285 or Jackson Davis, Single-Shell Tank Chemist, at jackson.davis@ecy.wa.gov or (509) 303-5558.

Sincerely,



Digitally signed by Rochette,
Beth (ECY)
Date: 2025.07.17 10:04:14
-07'00'

Elizabeth A. Rochette
Cleanup Section Manager
Nuclear Waste Program

lj/bp
Enclosures (2)

cc: See page 3

References:

1. Letter 25-TWO-0067, dated May 19, 2025, "The U.S. Department of Energy, Hanford Field Office Response to Letter 25-NWP-038 from the Washington State Department of Ecology"
2. Letter 25-NWP-093, dated June 23, 2025, "Extension of the Department of Ecology's Response to the United States Department of Energy Letter 25-TWO-0067"

cc electronic w/enc:

Laura Buelow, EPA
Benjamin Leake, EPA
Michelle Mullin, EPA
Ricky Bang, USDOE
Katherine Wong, USDOE
Holly Bowers, H2C
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John Temple, Ecology
Environmental Portal
Hanford Administrative Record
Hanford Facility Operating Record
H2C Correspondence Control
HAB Correspondence Control
HMIS Correspondence Control
USDOE Correspondence Control

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Document Title(s)/Number(s): *Single-Shell Tank Component Closure Data Quality Objectives, RPP-23403, Rev. 8*

Document Manager		Telephone Number	Project Manager		Telephone Number	Facility Site ID	Cleanup Site ID	
						NA	NA	
Item No.	Pg. # Sec. # Para./Sent.	Comment or Question	Modification Needed	Basis/Justification	Permittee Response	Ecology Response	Open/Close	Reviewer Initials
1	Table 4-1	The table states that there is no toxicity value for isobutanol. However, information in the PPRTV database states "IRIS (U.S. EPA, 2001) lists an oral RfD for isobutanol of 3E-01 mg/kg-day based on an NOEL for hypoactivity and ataxia in rats in a subchronic study (U.S. EPA, 1986c)." PPRTV (Provisional Peer-Reviewed Toxicity Values) database is a Tier 2 database using OSWER Directive 9285.7-53. This database is applicable when no information is given in IRIS for a constituent, as is the case with TBP. From the PPRTV database: "A PPRTV is defined as a toxicity value derived for use in the Superfund Program when such a value is not available in EPA's Integrated Risk Information System (IRIS)." Ecology's CLARC database also references IRIS for an oral reference dose of 3E-01 mg/kg-day. The PPRTV database	Please revise the table by removing "No toxicity value" and use the oral reference dose from IRIS of (3E-01 mg/kg-day).	https://iris.epa.gov/ChemicalLanding/&substance_nmbr=169	Table 4-1 will remove "No toxicity value" as requested. DQO does not include oral reference dose from IRIS in the constituent tables, which identify reason for inclusion as Part A, UHC, or risk assessment constituents along with if constituent was identified in the 1998 RDQO (PNNL-12040). Will remove "No toxicity value" from other constituent comments as not relevant to reason for inclusion. Response also applies to Item No. 2, 3, 4, and 5.	Accept	Close	BR
2	Table 4-1	IRIS has an oral reference does of 1E-01 mg/kg for n-butyl alcohol (1-butanol).	Please revise the table by removing "No toxicity value" and use the oral reference dose from IRIS of (1E-01 mg/kg-day).	https://iris.epa.gov/AdvancedSearch/?keyword=71-36-3	See response to Item No. 1	Accept	Close	BR
3	Table 4-2	Acenaphthene has a toxicity value: "A chronic RfD of 0.06 mg/kg-day for acenaphthene is included in the EPA's IRIS database (U.S. EPA, 1994a). This RfD value is based on increased liver weights accompanied by cellular hypertrophy and increased cholesterol levels observed in the 350- and 700-mg/kg-day dose groups of male and female CD-1 mice administered acenaphthene by gavage. An uncertainty factor (UF) of 3000 has been applied to the NOAEL of 175 mg/kg-day from this study to derive the RfD value. No RfC or cancer assessment for acenaphthene is included in the IRIS database (U.S. EPA, 1994a)." PPRTV	Please revise the table by removing "No toxicity value" and use the oral reference dose from IRIS of (6E-02 mg/kg-day).	https://iris.epa.gov/ChemicalLanding/&substance_nmbr=442	See response to Item No. 1	Accept	Close	BR
4	Table 4-2	Table 4-2 gives "No toxicity value" for tributyl phosphate (TBP). However, TBP is a likely human carcinogen, and is given in the Provisional Peer-Reviewed Toxicity Values database (PPRTV). The PPRTV database is a Tier 2 database using OSWER Directive 9285.7-53. For TBP, bladder tumors are the	Please revise the table by removing "No toxicity value" and use the slope factor information in the PPRTV database for TBP (9E-03(mg/kg-day) ⁻¹).	https://cfpub.epa.gov/ncea/pprtv/recorddisplay.cfm?deid=339185	See response to Item No. 1	Accept	Close	BR

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		basis for the oral slope factor: “The p-OSF of 0.009 or 9×10^{-3} (mg/kg-day) ⁻¹ is calculated by dividing 0.1 (10%) by the BMDL10HED of 11 mg/kg-day.” (see link in Basis/Justification column).						
5	Table 4-2	For 2,6-Bis (tert-butyl)-4-methylphenol (butylated hydroxy toluene, BHT) PPRTV gives a cancer slope factor of $3.6E-03$ (mg/kg-day) ⁻¹ and a chronic RfD of $3E-01$ mg/kg/day.	Please revise the table by removing “No toxicity value” and use the slope factor information in the PPRTV database for BHT.	https://cfpub.epa.gov/ncea/pprtv/documents/Butylatedhydroxytoluene.pdf	See response to Item No. 1	Accept	Close	BR
6	Figure 4-3	Figure 4-3 applies to primary constituents analyzed by a single constituent analytical method. The final oval on the figure has been revised to: “Accept results if appropriate, otherwise reject data.” Previously this just stated, “Accept results.” There is no basis given for the new text “if appropriate, otherwise reject data.”	Please add text that explains the new text “if appropriate, otherwise reject data.”		Figure 4-3 will delete figure and combine primary and secondary inorganic constituents into one table. Former secondary constituents that meet reason for inclusion will now be treated as primary. Will incorporate necessary information in the text. The figure is no longer relevant. Sec. 4.2 will add text to explain data qualification.	Accept pending edit confirmation in redline	Close pending redline confirmation of changes	BR
7	Figures 4-4 and 4-5	The final ovals on these figures have been revised to: “Accept results if appropriate, otherwise reject data.” Previously this just stated, “Accept results.” There is no basis given for the new text “if appropriate, otherwise reject data.”	Please add text that explains the new text “if appropriate, otherwise reject data.”		Figures 4-4 and 4-5 will delete figures and combine primary and secondary inorganic constituents into one table. Former secondary constituents with reason for inclusion will now be treated as primary. Will incorporate necessary information in the text. The figures are no longer relevant. Sec. 4.2 will add text to explain data qualification.	Accept pending edit confirmation in redline	Close pending redline confirmation of changes	BR
8	Section 4.3, General	Previous text regarding the use of WAC 173-340 limits for comparison with MDLs has been struck from the document, and new text has been added at the end of Section 4.3 “The potential impacts to human health posed by the residual waste will be calculated using the model developed for the Waste Management Area A-AX performance assessment (RPP-ENV-61497, <i>Preliminary Performance Assessment of Waste Management Area A-AX, Hanford Site, Washington</i>).” Ecology does not accept this change and the sole use of RPP-ENV-61497 as the basis for determining potential impacts to human health and the environment. Ecology considers all pathways (including ecological, direct contact, groundwater ingestion, inhalation of dust and vapors) for all contaminants including nonradiological	Please retain the comparisons with WAC 173-340 values in the DQO document, and delete the final sentence in Section 4.3.	Ecology will continue to use WAC 173-340 (sections 700-760) values to determine if MDLs are low enough to be protective to ensure consistency with our regulations and to have a readily-available means to evaluate MDLs. Furthermore, letter 20-NWP-132 gave a table of values to use as cleanup levels for tank farm soils and it will support the tank system portions of the Hanford site-wide permit, to be issued in the coming year.	Sec. 4.3 will restore and update estimated MDL tables for chemical constituents and MDA table for radionuclides for reference. Sec. 4.3 will delete final sentence in and add description of current approach to risk assessment previously agreed to by Ecology. The reference to MTCA Method B values (clean closure values) were removed because clean closure is not consistent with landfill closure for the WMA. Since Ecology has recently gone on record to say they are only	Reject	Open	BR

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		hazardous chemicals. We use WAC 173-340 (sections 700-760) values for comparison with MDLs to determine if MDLs are low enough to be protective.			agreeing to landfill closure for WMA C and not the other WMAs, it would be inconsistent for the SST DQO to continue to use a clean closure standard as a detection limit basis. Instead, the DQO is requiring the laboratory to achieve the lowest detection limits possible for post retrieval residuals without citing a regulatory basis. WAC 173-303-610(2)(b)(i) calls out Method B for clean closure.			
9	Section 8, final paragraph	Ecology does not consider the following sentences to capture all possible closure configurations for the tank farms or to consider the long time period between past releases and closure (pushed out to 2050 or beyond, with high recharge in the interim for some tank farms, especially WMA C and A/AX): “However, RPP-ENV-61497 showed that contaminants in residual waste in an intact, retrieved tank with a soil-water partition coefficient (Kd) greater than 0.6 mL/g did not reach the groundwater within 10,000 years. Similarly, RPP-RPT-59197, <i>Analysis of Impacts of Past Tank Waste Leaks and Losses in the Vicinity of Waste Management Area C at the Hanford Site, Southeast Washington</i> , showed that chemicals with Kd values greater than 2 mL/g would not reach groundwater within 10,000 years post-closure.” These statements have minimal bearing on the laboratory analyses of constituents in media samples from the tank farms. We will continue to use WAC 173-340 (sections 700-760) values for comparison with MDLs to determine if MDLs are low enough to be protective.	Please delete the quoted statements from Section 8 as the statements have minimal bearing on a DQO to address the quality of tank farm constituent laboratory analyses for media samples.		Sec. 8 will delete quoted statements.	Accept	Close	BR
10	Appendix A, General	It appears that Appendix A is being deleted from the SST DQO without sufficient justification. This change is not acceptable to Ecology. We can provide updated values for the table.	Ecology requests that Appendix A be maintained as a readily-available means to evaluate MDLs.	An updated Appendix A would be consistent with letter 20-NWP-132 for tank farm soils and the tank system portions of the Hanford site-wide permit, to be released in the coming year.	Appendix A and reference to MTCA Method B values (clean closure values) were removed because clean closure is not consistent with landfill closure for the WMA. Since Ecology has recently gone on record to say they are only agreeing to landfill closure for WMA C and not the other WMAs, it would be inconsistent for	Reject	Open	BR

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					<p>the SST DQO to continue to use a clean closure standard as a detection limit basis. Instead, the DQO is requiring the laboratory to achieve the lowest detection limits possible for post retrieval residuals without citing a regulatory basis.</p> <p>WAC 173-303-610(2)(b)(i) calls out Method B for clean closure.</p>			
11	Appendix A (General comment, editorial suggestion)	Appendix A (WAC 173-340 Method B) is removed from the document.	Consider keeping Appendix A (WAC 173-340 Method B) in the document.		<p>Appendix A and reference to MTCA Method B values (clean closure values) were removed because clean closure is not consistent with landfill closure for the WMA. Since Ecology has recently gone on record to say they are only agreeing to landfill closure for WMA C and not the other WMAs, it would be inconsistent for the SST DQO to continue to use a clean closure standard as a detection limit basis. Instead, the DQO is requiring the laboratory to achieve the lowest detection limits possible for post retrieval residuals without citing a regulatory basis.</p> <p>WAC 173-303-610(2)(b)(i) calls out Method B for clean closure.</p>	Reject	Open	JR
12	Figures 4-3, 4-4, and 4-5	Figures 4-3, 4-4, and 4-5 state “accept results if appropriate, otherwise reject data”.	<p>Explain further in the text how data will be evaluated in order to make a decision to accept or reject data.</p> <p>Section 4.2 says QC Acceptance Criteria are specified in Table 4-8. However, in Table 4-8, QC Acceptance Criteria is struck from the third column header and is replaced with Data Quality Indicators.</p>		<p>Figures 4-3, 4-4, and 4-5 will delete figures and combine primary and secondary inorganic constituents into one table. Former secondary constituents with reason for inclusion will now be treated as primary. Will incorporate necessary information in the text. The figures are no longer relevant.</p> <p>Sec. 4.2 will include discussion of data quality indicators, data evaluation, and end user decisions.</p>	Accept – pending redline confirmation of changes.	Closed – pending redline confirmation.	JR
13	Page: iii Section: List of Terms	Include HASQARD in the list of terms: <i>Hanford Analytical Services Quality Assurance Requirements Documents</i>	See comment.		List of Terms will add HASQARD to Acronyms.	Accept	Close	NSJ

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14	Page:10 Section: 4.1.1.1 Paragraph: 2 nd	<p>The text states: “These analytes may be analyzed using SW-846 method 8270. However, for polynuclear aromatic hydrocarbons (PAHs), SW-846 method 8310 is preferred, but not yet available. When available, method 8310 will be specified for PAHs in associated sampling plans.”</p> <p>This additional specification was made per the instruction of Ecology when reviewing revision 6 of this DQO. SW-846 method 8310 is still accurate for the analysis of PAHs, however, in recent times, many laboratories have transitioned to using SW-846 method 8270 SIM (Selected Ion Monitoring) for the analysis of PAHs. Methods 8310 and 8270 SIM are equivalent in their analytical abilities. Therefore, please edit the text to replace method 8310 with 8270 SIM.</p> <p>In addition, communicate with the laboratory that will be analyzing the samples (i.e.; 222-S) to obtain their current method capabilities in relation to using SW-846 method 8270 SIM. Please provide an update of this status to Ecology.</p>	Revise the text to replace SW-846 method 8310 with SW-846 method 8270 SIM.		Sec. 4.1.1.1 will revise text as recommended.	Accept	Close	NSJ
15	Page:11 Section: 4.1.1.1 Table: 4-2	<p>Edit footnote ‡ as follows: ‡ Constituent may be analyzed by the SVOC (8270) <u>Standard</u> method or the PAH method (8310 <u>8270 SIM</u> preferred method, requires development).</p>	See comment.		Sec. 4.1.1.1 will revise text as recommended.	Accept	Close	NSJ
16	Page:12 Section: 4.1.1.1 Paragraph: 4 th Sentence: last	<p>Edit the sentence as follows: “When available, method 8310 <u>8270 SIM</u> will be specified for PAHs.”</p>	See comment.		Sec. 4.1.1.1 will revise text as recommended.	Accept	Close	NSJ
17	Page:13 Section: 4.1.1.1 Table: 4-3	<p>Edit footnote ‡ as follows: ‡ Constituent may be analyzed by the SVOC (8270) <u>Standard</u> method or the PAH method (8310 <u>8270 SIM</u> preferred method, requires development).</p>	See comment.		Sec. 4.1.1.1 will revise text as recommended.	Accept	Close	NSJ
18	Page:16 Section: 4.1.2 Figure: 4-2	<p>It is unclear what the capital A in the circle represents. Please explain.</p>	See comment.		Figure 4-2 will delete figure and combine primary and secondary inorganic constituents into one table. Former secondary constituents with reason for inclusion will now be treated as	Accept	Close	NSJ

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					primary. Will incorporate necessary information in the text. The figure is no longer relevant.			
19	Page:17 Section: 4.1.2 Figure: 4-3	Since this flow chart is depicting the strategy for a single constituent analytical method, the second step needs to be revised to read as follows: “Analyze sample for inorganic constituent.” The current box is listing an analytical method that is used for a suite analysis.	Edit text as shown.		Figure 4-2 will delete figure and combine primary and secondary inorganic constituents into one table. Former secondary constituents with reason for inclusion will now be treated as primary. Will incorporate necessary information in the text. The figure is no longer relevant.	Accept	Close	NSJ
20	Page:18 Section: 4.1.2 Paragraph: 1 st Sentence: 2 nd and 3 rd	The text has neglected to state that hexavalent chromium is also a metal that is determined by a single constituent method. Therefore, edit the sentences as follows: “As shown in Table 4-5, with the exception of mercury <u>and hexavalent chromium</u> , metals are determined by ICP/AES. Mercury is determined by cold vapor atomic absorption (CVAA) method [SW-846 7470 (for liquids) and SW-846 7471 (for solids)], <u>and hexavalent chromium is determined by spectrophotometer method [SW-846 7196].</u> ”	Edit text as shown.		Sec. 4.1.2 will revise text as recommended.	Accept	Close	NSJ
21	Page: 25 Section: 4.1.3 Figure: 4-4	It is unclear what the capital A in the circle represents. Please explain.	See comment.		Figure 4-4 will delete figure and combine primary and secondary inorganic constituents into one table. Former secondary constituents with reason for inclusion will now be treated as primary. Will incorporate necessary information in the text. The figure is no longer relevant.	Accept	Close	NSJ
22	Page:28 Section: 4.2 Table 4-8	The table is missing hexavalent chromium. Please edit to include Cr(VI) and the appropriate QA/QC information for this constituent.	Edit table to include Cr(VI).		Table 4-8 will revise table as recommended.	Accept	Close	NSJ
23	Page: 31 Section: 4.2 Paragraph: 4 th	The text states, “The data report from the 222-S Laboratory will be a format IV data package. A format IV data package, as defined in ATL-MP-1011, <i>ATL Quality Assurance Plan for 222-S Laboratory,</i> ” The current contractor for the 222-S Laboratory is named Hanford Laboratory Management and	See comment.		Sec. 4.2 will revise reference to HLMI-PLN-ASYS-50094, <i>222-S Laboratory Quality Assurance Program Plan.</i>	Accept	Close	NSJ

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		Integration (HLMI). In light of this, please confirm that the QA plan is still an ATL document.						
24	Page: 32 Section: 4.3	<p>The 222-S Laboratory method detection limits (MDLs) must be included within this DQO for the following constituents to demonstrate that the methods are able to achieve the required regulatory limits:</p> <ul style="list-style-type: none"> • Primary Organics • Secondary Organics • Primary Inorganics • Secondary Inorganics • Primary Radionuclides <p>It is noted that revision 6 of the DQO included tables for all of these constituents. Revision 7 included tables for organics and inorganics, but omitted the table of MDLs for the radionuclides.</p>	Include tables with the method detection limits that are able to be achieved by analyzing laboratory (222-S).		Sec. 4.3 will restore and update estimated MDL tables for chemical constituents and MDA table for radionuclides for reference as recommended.	Accept	Close	NSJ
25	Page: 54 Section: 8.2.2 Paragraph: 3 rd	The third paragraph has been deleted without explanation. Explain why this information is no longer relevant for describing the sampling design for solid samples.	See comment.		Requested explanation. Sector sampling approach is not practicable. As discussed in the text, experience with tank waste retrieval demonstrated residual solids are not “distributed evenly and thinly on the tank floor.” Sample locations are selected based on riser availability, location of the remaining waste, and accessibility to the waste with available sample collection techniques as described in Sec. 8.0 and 8.2.2 to collect a minimum of one sample from one riser and two samples from a second riser.	Accept	Close	NSJ
26	Page: 54 Section: 8.2.2 Paragraph: 4 th and 5 th	The text has been revised to remove that ORP and Ecology will provide concurrence for a tank-specific sampling designs. Explain why this concurrence is no longer deemed necessary by WRPS.	See comment.		Requested explanation. Tank-specific sampling designs do not require regulatory approval. DQO & SAP are identified as secondary documents (interim step in a decision-making process) per the TPA Action Plan, Appendix I, “Single Shell Tank System Waste Retrieval and Closure Process.” Figure I-1 identifies documents requiring regulator approval. Section 9 describes the review and comment on secondary documents, which is summarized in Figure 9-3.	Internal discussion needed for consensus	Open	NSJ

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27	Appendix A	<p>The DQO has been revised to remove the information that was included in Appendix A (WAC 173-340 Method B Cleanup Levels for Chemicals in Order by Chemical Abstract Number). Explain the basis for removal.</p>	See comment.		<p>Appendix A and reference to MTCA Method B values (clean closure values) were removed because clean closure is not consistent with landfill closure for the WMA. Since Ecology has recently gone on record to say they are only agreeing to landfill closure for WMA C and not the other WMAs, it would be inconsistent for the SST DQO to continue to use a clean closure standard as a detection limit basis. Instead, the DQO is requiring the laboratory to achieve the lowest detection limits possible for post retrieval residuals without citing a regulatory basis.</p> <p>WAC 173-303-610(2)(b)(i) calls out Method B for clean closure.</p>	Internal discussion needed for consensus	Open	NSJ																										
28	Table 4-1 And Table 4-3	<p>In the intervening years since this DQO was first written Method 8260 has been updated to include many constituents which were previously identified as TICs. The following constituents from Table 4-3 should be promoted from secondary constituents to 8260d primary constituents under Table 4-1:</p> <table border="1" data-bbox="344 1310 975 1836"> <thead> <tr> <th>Constituent</th> <th>CAS</th> </tr> </thead> <tbody> <tr> <td>cis-1,3-Dichloropropene</td> <td>10061-01-5</td> </tr> <tr> <td>Ethylene dibromide (1,2, Dibromoethane)</td> <td>106-93-4</td> </tr> <tr> <td>Acrolein (propenal)</td> <td>107-02-8</td> </tr> <tr> <td>3-Chloropropene (Allyl chloride)</td> <td>107-05-1</td> </tr> <tr> <td>Propionitrile (Ethyl cyanide)</td> <td>107-12-0</td> </tr> <tr> <td>Acrylonitrile</td> <td>107-13-1</td> </tr> <tr> <td>2-Pentanone</td> <td>107-87-9</td> </tr> <tr> <td>Methylcyclohexane</td> <td>108-87-2</td> </tr> <tr> <td>Cyclohexane</td> <td>110-82-7</td> </tr> <tr> <td>1,4-Dioxane</td> <td>123-91-1</td> </tr> <tr> <td>Ethyl alcohol</td> <td>64-17-5</td> </tr> <tr> <td>2-Propyl alcohol</td> <td>67-63-0</td> </tr> </tbody> </table>	Constituent	CAS	cis-1,3-Dichloropropene	10061-01-5	Ethylene dibromide (1,2, Dibromoethane)	106-93-4	Acrolein (propenal)	107-02-8	3-Chloropropene (Allyl chloride)	107-05-1	Propionitrile (Ethyl cyanide)	107-12-0	Acrylonitrile	107-13-1	2-Pentanone	107-87-9	Methylcyclohexane	108-87-2	Cyclohexane	110-82-7	1,4-Dioxane	123-91-1	Ethyl alcohol	64-17-5	2-Propyl alcohol	67-63-0	Update Tables 4-1 and 4-3	METHOD 8260D VOLATILE ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY, Rev. 4, June 2018, Section 1.0, "Scope and Application	Tables 4-1 and 4-3 will combine primary and secondary inorganic constituents into one table. Former secondary constituents with reason for inclusion will now be treated as primary, including the listed VOCs.	Accept	Close	
Constituent	CAS																																	
cis-1,3-Dichloropropene	10061-01-5																																	
Ethylene dibromide (1,2, Dibromoethane)	106-93-4																																	
Acrolein (propenal)	107-02-8																																	
3-Chloropropene (Allyl chloride)	107-05-1																																	
Propionitrile (Ethyl cyanide)	107-12-0																																	
Acrylonitrile	107-13-1																																	
2-Pentanone	107-87-9																																	
Methylcyclohexane	108-87-2																																	
Cyclohexane	110-82-7																																	
1,4-Dioxane	123-91-1																																	
Ethyl alcohol	64-17-5																																	
2-Propyl alcohol	67-63-0																																	

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n-propyl alcohol (1-propanol)	71-23-8
Bromomethane	74-83-9
Chloroethane	75-00-3
1,1 Dichloroethane	75-34-3
2-Butenaldehyde (2-Butenal)	4170-30-3
Chloromethane	74-87-3
Styrene	100-42-5
2-Methyl-2-propenenitrile	126-98-7
2-Hexanone	591-78-6
Oxirane	75-21-8
2-Methyl-2-propanol	75-65-0
Dichlorodifluoromethane	75-71-8
1,2-Dichloropropane	78-87-5
1,4-Dichlorobenzene	106-46-7
1,3-Dichlorobenzene	541-73-1
n-Nitrosodi-n-butylamine	924-16-3

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In the intervening years since this DQO was first written Method 8270 has been updated to include many constituents which were previously identified as TICs. The following constituents from Table 4-3 should be promoted from secondary constituents to 8270e primary constituents under Table 4-2:

Constituent Name	CAS
1,4-Dioxane	123-91-1
Heptachlor	76-44-8
1,4-Dinitrobenzene	100-25-4
1,4-Dichlorobenzene	106-46-7
Phenol	108-95-2
Hexachlorobenzene	118-74-1
N,N-Diphenylamine	122-39-4
Isodrin*	465-73-6
Benzo[a]pyrene*	50-32-8
Dibenz[a,h]anthracene*	53-70-3
1,3-Dichlorobenzene	541-73-1
N-Nitroso-N,N-dimethylamine	62-75-9
Pentachloronitrobenzene (PCNB)	82-68-8
Pentachlorophenol	87-86-5
2-sec-Butyl-4,6-dinitrophenol	88-85-7

Table 4-1
And
Table 4-3

Update Tables 4-2 and 4-3

METHOD 8270E SEMIVOLATILE ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY, Section 1.0, "Scope and Application"

Tables 4-1 and 4-3 will combine primary and secondary inorganic constituents into one table. Former secondary constituents with reason for inclusion will now be treated as primary, including the listed SVOCs.

Accept

Close

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(Dinoseb)	
1,1'-Biphenyl	92-52-4
Acetophenone	98-86-2
Toxaphene*	8001-35-2
Aldrin*	309-00-2
alpha-BHC*	319-84-6
beta-BHC*	319-85-7
gamma-BHC (Lindane)*	58-89-9
Dieldrin*	60-57-1
Endrin*	72-20-8
n-Nitrosomethylethylamine	10595-95-6
n-Nitrosodi-n-butylamine	924-16-3

30

Table 4-1

The regulatory DQO (PNNL-12040) is the source for constituents with human health or environmental impact which have been detected in SST even if they do not appear on the Part A form. This DQO has not been maintained and iteratively updated. The list from PNNL-12040 should be supplemented with constituents based on sample data in order to support clean closure and performance assessment. Table 4-1 should include constituents with potential for human health or environmental impact which have been confirmed to be present in the SST system by sampling and analysis post PNNL-12040. Current Method 8260d Constituents detected in the SST system which also appear on the CLARC table include:

CAS No.	Chemical Data	Chemical Data	Chemical Name
75-05-8	VOCs	Non-Halogenated (Solvent)	acetonitrile
75-27-4	VOCs (trihalomethanes)	Halogenated	BROMODICHLOROMETHANE
75-25-2	VOCs (trihalomethanes)	Halogenated (Solvent)	BROMOFORM
98-82-8	VOCs	Non-Halogenated (Solvent)	cumene
124-48-1	VOCs (trihalomethanes)	Halogenated	DIBROMOCHLOROMETHANE
156-59-2	VOCs	Halogenated (Solvent)	dichloroethylene;1,2-,cis
156-60-5	VOCs	Halogenated (Solvent)	dichloroethylene;1,2-,trans
79-20-9	VOCs	Non-Halogenated (Solvent)	methyl acetate
1634-04-4	VOCs	Non-Halogenated (Solvent)	methyl tert-butyl ether (MTBE)
75-09-2	VOCs	Halogenated (Solvent)	methylene chloride
104-51-8	VOCs	Non-Halogenated	n-butylbenzene
79-01-6	VOCs	Halogenated (Solvent)	TRICHLOROETHYLENE (TCE)
75-01-4	VOCs	Halogenated (Solvent)	VINYL CHLORIDE

TWINS, CLARC Master and Method 8260d

Table 4-1 will combine primary and secondary inorganic constituents into one table. Former secondary constituents with reason for inclusion will now be treated as primary.

Four of the listed VOCs are in the current Table 4-1:
75-05-8
75-09-2
79-01-6
75-01-4

Will add four of the listed VOCs to Table 4-1 with reason for inclusion:
75-27-4, UHC
75-25-2, UHC
124-48-1, UHC
156-60-5, UHC

Five of the listed VOCs will not be added to Table 4-1 because they are not identified in PART A (A), UHC (U), or risk assessment (R) and not included in the RDQO (W):
98-82-8
156-59-2
79-20-9
1634-04-4

Reject pending discussion

Open for discussion

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				104-51-8 Table 4-1 will remove VOC constituents from combined table when reason for inclusion is not identified as A, U, or R. Constituents to be removed are former secondary constituents, which are not included in the VOC method calibration. Constituent will be included in the laboratory report when identified as a tentatively identified compound (TIC). Will also apply changes to Table 4-6.			
31	Table 4-2	Table 4-2 should be renamed “SVOC Analysis for Primary Constituents” since it includes SVOC which would better be evaluated by multiple methods (8310, 8270 SIM)	Section 4.1.1.1 Page 10 Paragraph 2	Table 4-2 will revise title to “SVOC Constituents” and combine primary and secondary inorganic constituents into one table. Former secondary constituents with reason for inclusion will now be treated as primary.	Accept	Close	
32	Table 4-2	The regulatory DQO (PNNL-12040) is the source for constituents with human health or environmental impact which have been detected in SST even if they do not appear on the Part A form. This DQO has not been maintained and iteratively updated. The list from PNNL-12040 should be supplemented with constituents based on sample data in order to support clean closure and performance assessment. Table 4-1 should include constituents with potential for human health or environmental impact which have been confirmed to be present in the SST system by sampling and analysis post PNNL-12040. Current Method 8270e Constituents detected in the SST system which also appear on the CLARC table include:	TWINS, CLARC Master, Method 8260d	Table 4-2 will combine primary and secondary inorganic constituents into one table. Former secondary constituents with reason for inclusion will now be treated as primary. One of the listed SVOCs is in the current Table 4-2: 88-06-2 Will add twenty-one of the SVOCs to Table 4-2 when reason for inclusion was A, U, or R. CAS No. is highlighted in yellow in the comment table. Compounds are included in current SVOC method calibration.	Reject waiting on redline	Open for discussion	

CAS No.	Chemical Data Group	Chemical Data Subgroup	Chemical Name
120-12-7	PAHs	Non-Halogenated	anthracene
56-55-3	cPAHs	Non-Halogenated	BENZO[a]ANTHRACENE
205-99-2	cPAHs	Non-Halogenated	BENZO[b]FLUORANTHENE
207-08-9	cPAHs	Non-Halogenated	BENZO[k]FLUORANTHENE
91-58-7	PAHs	Halogenated	beta-chloronaphthalene
108-60-1	VOCs	Halogenated	bis(2-chloro-1-methyl-ethyl)ether
111-91-1	SVOCs	Halogenated	bis(2-chloroethoxy)methane
111-44-4	SVOCs	Halogenated	bis(2-chloroethyl)ether
117-81-7	Phthalates (ortho)	Non-Halogenated	bis(2-ethylhexyl) phthalate (DEHP)
106-47-8	SVOCs	Halogenated	chloroaniline;p-
218-01-9	cPAHs	Non-Halogenated	CHRYSENE
132-64-9	Furans	Non-Halogenated	dibenzofuran
120-83-2	Phenols	Halogenated	DICHLOROPHENOL;2,4-
84-66-2	Phthalates (ortho)	Non-Halogenated	diethyl phthalate
131-11-3	Phthalates (ortho)	Non-Halogenated	dimethyl phthalate
105-67-9	Phenols	Non-Halogenated	dimethylphenol;2,4-
51-28-5	Phenols	Non-Halogenated	DINITROPHENOL;2,4-
606-20-2	Explosives	Non-Halogenated	dinitrotoluene;2,6-
534-52-1	Phenols	Non-Halogenated	DNOC
86-73-7	PAHs	Non-Halogenated	fluorene
193-39-5	cPAHs	Non-Halogenated	INDENO[1,2,3-cd]PYRENE
78-59-1	SVOCs	Non-Halogenated (Solvent)	isophorone
91-57-6	PAHs	Non-Halogenated	methyl naphthalene;2-
88-74-4	SVOCs	Non-Halogenated	nitroaniline, 2-
100-01-6	SVOCs	Non-Halogenated	nitroaniline, 4-
88-06-2	Phenols	Halogenated	TRICHLOROPHENOL;2,4,6-

PAH and carcinogenic PAH identified under “Chemical Data Group” should be evaluated using method 8270 SIM or 8310.

Four of the listed SVOCs will not be added to Table 4-2 because they were not identified in A, U, or R and not included in the RDQO (W). Constituent will be included in the laboratory report when identified as a TIC:
108-60-1
132-64-9
78-59-1
91-57-6

Will remove SVOC TICs from Table 4-1 when reason for inclusion was not identified as A, U, or R and no toxicity value. Removed constituents are former secondary constituents identified as TICs, which are not included in the SVOC method calibration. Constituent will be included in the laboratory report when identified as a TIC.

Will also apply changes to Table 4-6.

33

Table 4-3

Table 4-3 should be updated to include the following two constituents which were detected (in Tank C-106), and have cleanup levels under CLARC Master table, but do not appear in scope of Methods 8260 or 8270:

CAS No.	Chemical Data Group	Chemical Name
103-23-1	SVOCs	di(2-ethylhexyl)adipate
98-01-1	VOCs	furfural

TWINS, CLARC Master Table

Constituents are not identified as A, U, or R and not included in the RDQO (W). Constituent will be included in the laboratory report when identified as a TIC.

Reject pending discussion

Open for discussion

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34	Page 12, Section 4.1.1.1, Paragraph 2	<p>DQO states “The policy of determining total PCB concentrations, as described above, is the policy of the EPA Manchester Laboratory for determining total PCB concentrations in a sample. In addition, this method was specified by agreement in a meeting with representatives from EPA Region 10, EPA Manchester Laboratory, Ecology, DOE, Pacific Northwest National Laboratory (PNNL), and CH2M HILL.”</p> <p>It is unclear what agreement is being referenced. The 8/31/00 Hanford PCB framework does not specify test methods.</p>	<p>If there is an applicable agreement, it should be identified and referenced. If no agreement on methods exists, reference “Ecological Risk Calculation Methodology for Upland Soil, Implementation Memorandum No. 13” and perform according analysis.</p> <p>We should also ensure we are keeping up with current practices. Please explain whether or not dioxin-like congeners are suspected at the site. If dioxin-like congeners are not suspected, method 8082 is correct, but the procedure from the method for calculating total PCB should be used (see also #35). If dioxin-like congeners are suspected, or it is unknown, Method 1668 should be used.</p>	<p>https://apps.ecology.wa.gov/publications/documents/1609044.pdf</p>	<p>Sec. 4.1.1.1 will delete reference to EPA Manchester Laboratory and the meeting with representatives from EPA Region 10, EPA Manchester Laboratory, Ecology, DOE, PNNL, and CH2M Hill.</p> <p>Will add reference to DOE/RL-2001-50, <i>Toxic Substances Control Act Polychlorinated Biphenyls Hanford Site Users Guide</i> as policy to determine total PCB concentration.</p> <p>Will add discussion of Aroclor weathering and reference SW-846 Method 8082 technical guidance for quantitation of PCB quantitation. Will add requirement for laboratory report to fully describe the problem when encountered for the data user and document specific procedures employed.</p> <p>Will add description of PCB congeners and statement “The 222-S laboratory does not have the capability to characterize tank waste for individual PCB congeners.”</p> <p>Verified 222-S Laboratory has experience interpreting weathered Aroclors in tank waste consistent with SW-846 Method 8082 guidance. This condition is discussed in the laboratory report when encountered.</p>			
35	Page 12, Section 4.1.1.1, Paragraph 2	<p>DQO states:</p> <p>Total PCB concentrations are calculated by summing the concentrations of seven Aroclors (1016, 1221, 1232, 1242, 1248, 1254, and 1260) found in a</p>	<p>Discuss weathering and any relevant observations made in past Data Quality Analysis and update totaling method if needed. If DQAs have not looked at detections of congeners, a</p>	<p>https://www.epa.gov/sites/default/files/2015-12/documents/8082a.pdf</p>	<p>Sec. 4.1.1.1 will delete reference to EPA Manchester Laboratory and the meeting</p>	<p>Discuss. On the one hand we have this Fluor report</p>	Open	JHD

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sample. The total PCBs in a sample are calculated by summing only detected Aroclors. If no Aroclors are detected, the total PCB concentration is considered the detection limit for the single most common Aroclor expected in the sample. Tank results indicate Aroclor 1254 is by far the most common Aroclor in Hanford Site tank waste.

Method 8082 states:

“Weathering of PCBs in the environment and changes resulting from waste treatment processes may alter the PCBs to the point that the pattern of a specific Aroclor is no longer recognizable. Samples containing more than one Aroclor present similar problems. If the purpose of the analysis is not regulatory compliance monitoring on the basis of Aroclor concentrations, then it may be more appropriate to perform the analyses using the PCB congener approach described in this method.”

Both weathering and mixing of Aroclors are likely to have occurred and we are working with a regulatory threshold in terms of Total PCB, not one specific Aroclors. According to Method 8082 we should be calculating a total by summing the 19 Method 8082 PCB congeners instead of looking for aroclor patterns that are likely not to be present. Currently congener results are not reported in TWINS even if they are being reported by laboratories.

more detailed review by Ecology and DOE may be needed.

with representatives from EPA Region 10, EPA Manchester Laboratory, Ecology, DOE, PNNL, and CH2M Hill.

Will add reference to DOE/RL-2001-50, *Toxic Substances Control Act Polychlorinated Biphenyls Hanford Site Users Guide* as policy to determine total PCB concentration.

Will add discussion of Aroclor weathering and referenced SW-846 Method 8082 technical guidance for quantitation of PCB quantitation. Will add requirement for laboratory report to fully describe the problem when encountered for the data user and document specific procedures employed.

Will add description of PCB congeners and statement “The 222-S laboratory does not have the capability to characterize tank waste for individual PCB congeners.”

Verified 222-S Laboratory has experience interpreting weathered Aroclors in tank waste consistent with SW-846 Method 8082 guidance. This condition is discussed in the laboratory report when encountered.

(circulated by EPA) recommending using congeners for total PCB... [Generating the Right PCB Data: Determination of Aroclors Versus PCB Congeners.](#)

On the other the lab accreditation unit confirmed HLMI is not accredited for individual congeners and in fact no labs currently have 8082 congener accreditation and there may be legitimate concerns about instrument capability.

We should accept pending redline.

36

Table 4-4

The following VOC and SVOC have been detected in C farm sample results (including duplicates) and should appear in Table 4-4, but do not:

Constituent Name	CAS Number	Detections	Times analyzed
1,1,1-Trichloroethane	71-55-6	7	66
1,1,2,2-Tetrachloroethane	79-34-5	3	61
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	3	54
1,1,2-Trichloroethane	79-00-5	4	66
1,1-Dichloroethane	75-34-3	3	32

TWINS, CLARC Master, Method 8260d and Method 8270e

Table 4-4 will combine primary and secondary organic constituents into one table. Former secondary constituents with reason for inclusion will now be treated as primary.

The identified constituents are included in

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1,1-Dichloroethene	75-35-4	4	66
1,2,4-Trichlorobenzene	120-82-1	12	133
1,2-Dibromo-3-Chloropropane	96-12-8	3	13
1,2-Dichlorobenzene	95-50-1	5	97
1,2-Dichloroethane	107-06-2	4	66
1,2-Dichloropropane	78-87-5	3	27
1,3-Dichlorobenzene	541-73-1	5	37
1,4-Dichlorobenzene	106-46-7	7	113
1-Butanol	71-36-3	27	94
2,4,5-Trichlorophenol	95-95-4	1	82
2,4,6-Trichlorophenol	88-06-2	1	82
2,4-Dichlorophenol	120-83-2	1	41
2,4-Dimethylphenol	105-67-9	1	41
2,4-Dinitrophenol	51-28-5	1	41
2,4-Dinitrotoluene	121-14-2	1	82
2,6-Dinitrotoluene	606-20-2	1	41
2-Chloronaphthalene	91-58-7	1	41
2-Chlorophenol	95-57-8	1	82
2-Hexanone	591-78-6	6	31
2-Methylnaphthalene	91-57-6	1	41
2-Methylphenol	95-48-7	1	82
2-Nitroaniline	88-74-4	1	41
2-Nitropropane	79-46-9	3	53
4,6-Dinitro-o-cresol	534-52-1	1	41
4-Chloro-3-methylphenol	59-50-7	1	82
4-Chloroaniline	106-47-8	1	41
4-Nitroaniline	100-01-6	1	41
Acenaphthene	83-32-9	1	82
Anthracene	120-12-7	1	41
Benzene	71-43-2	11	71
Benzo(a)anthracene	56-55-3	1	41
Benzo(a)pyrene	50-32-8	1	49
Benzo(b)fluoranthene	205-99-2	1	41
Benzo(k)fluoranthene	207-08-9	1	41
Bis(2-Chloroethoxy)methane	111-91-1	1	41
Bis(2-Chloroisopropyl) ether	108-60-1	1	41
Bis(2-chloroethyl) ether	111-44-4	1	41
Bis(2-ethylhexyl)phthalate	117-81-7	41	63
Bromodichloromethane	75-27-4	3	25
Bromoform	75-25-2	3	25
Bromomethane	74-83-9	3	31
Butylbenzylphthalate	85-68-7	31	99
Carbon disulfide	75-15-0	3	66

the VOC Table 4-1 and SVOC Table 4-2, which are applicable for each WMA.

Will remove Table 4-4 and other requirements specific to C Farm retrieval objectives, since C Farm 100 and 200 series tanks were declared retrieval complete in 2018.

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Carbon tetrachloride	56-23-5	4	66
Chlorobenzene	108-90-7	3	66
Chloroethane	75-00-3	3	31
Chloroform	67-66-3	3	66
Chloromethane	74-87-3	4	31
Chrysene	218-01-9	1	41
Cyclohexane	110-82-7	23	39
Di-n-butylphthalate	84-74-2	25	87
Di-n-octylphthalate	117-84-0	3	86
Dibenz[a,h]anthracene	53-70-3	1	50
Dibenzofuran	132-64-9	1	41
Dibromochloromethane	124-48-1	3	25
Dichlorodifluoromethane	75-71-8	3	19
Diethylphthalate	84-66-2	15	61
Dimethyl phthalate	131-11-3	1	41
Diphenyl amine	122-39-4	5	30
Ethyl acetate	141-78-6	3	54
Ethyl ether	60-29-7	3	53
Ethylbenzene	100-41-4	6	72
Ethylene Dibromide	106-93-4	3	19
Fluoranthene	206-44-0	1	82
Fluorene	86-73-7	1	41
Hexachlorobenzene	118-74-1	1	54
Hexachlorobutadiene	87-68-3	1	82
Hexachlorocyclopentadiene	77-47-4	1	41
Hexachloroethane	67-72-1	4	122
Indeno(1,2,3-cd)pyrene	193-39-5	1	41
Isobutanol	78-83-1	1	58
Isophorone	78-59-1	6	41
Isopropylbenzene	98-82-8	3	13
Methyl Acetate	79-20-9	4	8
Methylenechloride	75-09-2	15	74
N-Nitroso-di-n-propylamine	621-64-7	1	82
N-Nitrosodimethylamine	62-75-9	1	26
Naphthalene	91-20-3	1	82
Nitrobenzene	98-95-3	1	82
Pentachlorophenol	87-86-5	2	91
Phenol	108-95-2	6	95
Pyrene	129-00-0	1	82
Pyridine	110-86-1	1	58
Styrene	100-42-5	16	37
Tetrachloroethene	127-18-4	3	65
Toluene	108-88-3	22	77

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Trans-1,2-Dichloroethene	156-60-5	3	13
Trichlorofluoromethane	75-69-4	3	52
Vinyl chloride	75-01-4	3	65
cis-1,2-Dichloroethene	156-59-2	3	13
n-Butylbenzene	104-51-8	5	14
tert-Butyl methyl ether	1634-04-4	3	13

37 Table 4-5

The regulatory DQO (PNNL-12040) has not been updated since it was authored in 1998. Table 4-5 should include constituents with potential for human health or environmental impact which have been confirmed to be present in the SST system by sampling and analysis post PNNL-12040. Inorganic (and glycol) Constituents detected in the SST system which also appear on the CLARC table include:

CAS No.	Chemical Data Group	Chemical Data Subgroup	Chemical Name
7664-41-7	Nonmetal inorganics	Corrosive	AMMONIA
7440-42-8	Metals		boron
16887-00	Nonmetal inorganics		chloride
111-76-2	Glycols	Non-Halogenated (Solvent)	ethylene glycol monobutyl ether (E
7439-93-7	Metals		lithium
7439-98-7	Metals		molybdenum
7723-14-0	Nonmetal inorganics	Reactive Wastes	phosphorus
7440-31-1	Metals		tin

Ecology notes that Chromium VI has been added to Table 4-5 in this revision and Ecology would have suggested to do so if it had not. Text on Page 18 suggests this chloride was intended to be added to the primary constituent list and it should be, but that edit was not made in Table 4-5 and chloride still appears as a secondary constituent in Table 4-6. Phosphorus appears on the secondary constituent table, but it is suggested here due to appearance on CLARC Master. A delineation between primary and secondary inorganics due to minimal toxicity is mentioned in the text, but no cut off is specified.

TWINS and CLARC Master

Table 4-5 will combine primary and secondary inorganic constituents into one table. Former secondary constituents with reason for inclusion will now be treated as primary.

Ammonia, boron, chloride, lithium, molybdenum, phosphorus, and tin will now be treated as primary constituents.

CAS 111-76-2 will not be included in SVOC Table 4-2 because constituent is not identified as A, U, or R and not included in the RDQO (W).

Accept

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38 Page 4, Figure 3-1 And Section 6, Page 43, Paragraph 4 And Appendix A

Figure 3-1 States “Do residual waste inventories support compliance with WAC 173-303-610(2).” Concentration based threshold values for WAC 173-303-610(2) are not specified, or described and MTCA tables have been removed from appendix.

Inventory calculation should be required for risk assessment, but closure under WAC 173-303-610(2) is concentration based and the DQO should specify concentration thresholds. Section 6, Page 43, Paragraph 4 should state that the concentration based decision thresholds for compliance with WAC 173-303-610(2) are those specified in 20-NWP-132 for existing constituents, or those specified in 173-340 for new constituents identified in this RCR, Primarily method B, although Method A may be used as appropriate.

20-NWP-132, WAC 173-303-610

Risk assessment requirements are beyond the scope of this DQO. Risk assessment is performed as described in HFFACO Appendix I and subject to Ecology review.

Reject pending discussion

Open for discussion

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39	Page 4, Figure 3-1 And Section 7, Entire Section	Figure 3-1 States “Do residual waste inventories support compliance with WAC 173-303-610(2).” Concentration based threshold values for WAC 173-303-610(2), but neither calculation of 95% UCL for concentration nor the resultant calculation of waste inventories are described in this DQO.	<p>Section 7.0 should be expanded from “error tolerance” to a more robust discussion of population parameters and if then else statements per EPA QA/G-4, Chapter 5, “Develop Analytical Approach”.</p> <p>Calculating the population parameter 95% UCL for constituent concentration should be described, and is a necessary comparison to concentration thresholds for clean closure (see #38). Even though this calculation is not described in a DQO it is performed in Retrieval Data Reports using a student t. This is probably not an acceptable method since concentration measurements often involve censorship (which would require something like a Kaplan-Meyer estimator to address), and real life concentration values are likely not normally distribution (which may require a normality test like Shapiro-Wilk, and either a Box-Cox transformation, or a different method for UCL calculation, like Chebychev or Land’s). An approach should be developed as described in <i>RCRA Waste Sampling Draft Technical Guidance</i>, or OSWER 9285.6-10. I would suggest the OSWER guidance as calculating a UCL for concentration can be done very easily under this guidance using EPA’s free ProUCL software.</p> <p>As written the decision problem is in terms of total inventory so calculating an upper 95% UCL of the inventory should be described. Calculating a 95% UCL for total inventory should also be described as it is done in Retrieval Data Reports referencing this DQO. This is a problematic calculation that is much more complex than just calculating an 95% UCL for measured concentrations. Inventory calculation would likely involve propagation of uncertainty using concentration, and volume, and sometimes (when concentrations are reported in units/mass) a density conversion. I can’t recommend a specific UCL method that would work for this, maybe jackknife or bootstrap if there was enough data. Note: RPP-RPT-64284 attempted this calculation, without a DQO to help, using something like a root sum squared estimation of standard deviation and a student-t calculation (at least I think that’s what they were trying to</p>	Guidance on Systematic Planning Using the Data Quality Objectives Process EPA QA/G-4, Chapter 5, “Develop Analytical Approach”, <i>RCRA Waste Sampling Draft Technical Guidance</i> , and OSWER 9285.6-10	Sec. 7 will add discussion of uncertainty associated with inventory estimate, concentration, and density of residual waste. Will also update and expand discussion of residual waste volume estimates.	Reject pending discussion	Open for discussion	
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			do, it wasn't fully explained), but both steps rely on assumptions that probably don't hold up (such as normal distribution, no non-detects, and infinite degrees of freedom for the student-t and independence of concentration and density for the estimated standard deviation).					
40	Section 8	I don't see a discussion of number of samples required to ensure sampling is representative.	Add a discussion of number of samples required to obtain representative data as described in Chapter 9 of SW-846. The focus should be on whether n is large enough to calculate a UCL below regulatory thresholds.		Sec. 8.2.2 will revise to require a minimum of one sample from one riser and two samples from a second riser to calculate the means and confidence intervals as described in RPP-7625 for best basis inventory.	Internal review – TPA	Open	
41	Section 8.2, Page 54	The only two sample types described in Section 8.2 are "solid" and "liquid" although some sampling equipment is named (e.g. fingertrap, clamshell, drag sampler). TWINS describes samples with 36 different "aggregation levels": Core Composite Drainable Liquid Segment Solids Segment Upper Half Segment Lower Half Liner Liquid Grab Sample DL Tank Composite Sol Core Composite Auger Sample Sol Tank Composite Tank Composite Subsegment B Subsegment A Subsegment C Segment Subpart A Auger Subsample C Auger Subsample A Auger Subsample B Subsegment D Segment Subpart B Segment Auger Upper Half Auger Lower Half DL Core Composite QA Sample Liq Core Composite Liq Tank Composite Segment Subpart C Auger Subpart A grab sample tank composite Auger Subsample D	Ensure all the sampling methods and equipment used, as well as composite techniques and limitations are described. Compositing should not be used on VOA samples. How do the aggregation levels in TWINS relate to the sample strategies in the DQO?	Guidance on Systematic Planning Using the Data Quality Objectives Process EPA QA/G-4, Chapter 4 and Chapter 7.	Sec. 8.2 will ensure all sampling methods and equipment used are described. Sec. 8.2.2 will add discussion of composites: "Compositing should not be used on VOA samples to minimize potential loss of VOA constituents." Explanation requested. Identified sample aggregation levels identified from TWINS are associated with previous core sampling activities. SST component closure samples are typically described as grab samples. Detailed sampling and analysis design is described in the associated tank sampling and analysis plan.	Accepting pending redline	Close	

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		Riser Composite Segment Subpart D Special Sample							
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Document Title(s)/Number(s): Sample and Analysis Plan for Single-Shell Tanks Component Closure (RPP-Plan-23827, Rev. 4)

Document Manager	Telephone Number	Project Manager	Telephone Number	Facility Site ID	Cleanup Site ID
				NA	NA

Item No.	Pg. # Sec. # Para./Sent.	Comment or Question	Modification Needed	Basis/Justification	Permittee Response	Ecology Response	Open/Close	Reviewer Initials
1	Item 1 General Comment	Some elements of a QAPP that were missing were: Organization, comparability and completeness, corrective actions, audits and reports, data verification and validation data quality (usability) assessment. Not all MQOs for a project were shown....MS, MSD.	If these elements are specified in the TSAP's this should be explained.		<p>Will update the SAP to align with current TSAP QAPP elements.</p> <p>Section 5: QA/QC</p> <ul style="list-style-type: none"> Will add reference to RPP-PLAN-62100, Quality Assurance Project Plan for Tank Waste Sampling and Analysis for general QA/QC requirements for conducting tank sampling and analysis. Will add section for Exceptions, Clarifications, and Assumptions. <p>Section 6: Data Reporting</p> <ul style="list-style-type: none"> Will add a description of Data Management 	Pending redline	Open pending redline review	JWY
2	Item 2 P: 5 S: 3.1.1	The last paragraph states, "Additional solid sample material will be collected from certain tanks to allow testing to support development and refinement of the closure risk assessment model." Explain how certain tanks are selected for this additional leachability testing. For instance, are the tanks pre-selected prior to sampling or are the tank selections a result of what has been found in initial sampling efforts?	See comment.		<p>Requested explanation. Additional sample material was collected for release rate testing in 241-C Tank Farm. Current approach is to archive remaining sample material for future research, testing, and development, which may include release rate testing when requested and authorized based on availability of archived material.</p> <p>Sec. 3.1.1 for clarification will delete last paragraph as no longer relevant.</p> <p>Sec. 4.1 will add direction to archive remaining sample material from the parent samples until directed for disposition.</p>	Accept	Close	NSJ

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3	Item 3 P: 10 S: 3.2.1	The first paragraph states, "Inorganic and radionuclide analyses will be performed on material after the VOC and SVOC samples are taken." The DQO (RPP-23403, Rev. 6) states, "If insufficient sample material is available for the rest of the required analyses, the contents of each pair of bottles may be combined after the VOC, SVOC and ammonia subsamples are taken." The SAP needs to correspond with the DQO in regards to ammonia analysis prioritization.	Revise the SAP text to correspond with the DQO.		Sec. 3.2.1 will add "...may be combined after VOC, SVOC, and ammonia subsamples are taken" to align with the DQO.	Accept	Close	NSJ
4	Item 4 P: 11 S: 3.3	The temperature cannot be maintained but could OC be maintained by freezing the samples?			Sec. 3.3 will add clarification, "The laboratory does not refrigerate or freeze tank waste samples due to dose and bias introduced by potential precipitation of liquids."	Accept	Close	JWY
5	Item 5 P: 12 S: 3.4	The chain-of custody-form should include the requested analyses for the individual samples. It is noted in this SAP that this is not done for tank waste samples because the list of analyses is too long to include on the form, and the laboratory generally uses the requested analyses in the TSAP to perform work. Listing the requested analyses on the chain-of-custody form is a standard requirement; therefore, a notation stating "Requested Analyses per TSAP" with the specific TSAP document reference number should be listed on the chain-of-custody form.	State that the chain-of-custody form will include a notation reading "Requested Analyses per TSAP" and the specific TSAP document number will be listed.		Sec. 3.4 will add a bullet to analyze per TSAP document number to the list as a requirement. As stated in Section 3.4, "The laboratory generally uses the requested analyses in the TSAP to perform work." For clarification, will add additional research, testing, or development when requested and authorized is performed per the approved procedure or test plan.	Accept	Close	NSJ
6	Item 6 P: 17 S: 4.1	The last paragraph of the section states, "Therefore, if the total amount of settled solids in all bottles from each sample...is estimated to be 10 g or more, the phases will be separated and the solids subsampled for analysis; otherwise, no solids analyses will be performed." This statement is contradictory to what was presented in Section 3.1.1, which stated, "If sample material collected by finger trap is insufficient, a second sampling event using finger trap or a different sampling technique may be needed." Please address the discrepancy.	See comment.		Sec. 4.1 will clarify sample handling direction as requested. In addition, will rename Sec. 4.3 to "Insufficient Sample Recovery" and provide direction for analytical priority and notifications.	Accept	Close	NSJ

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7	Item 7 P: 18-21 S: 4.2 Tables: 4-1 and 4-2	Based on the MDLs listed in the DQO (RPP-23403), the analytical techniques for antimony, arsenic and selenium should be changed to Method 6020 ICP/MS. The MDLs for these constituents via Method 6010 ICP/AES exceed the WAC 173-340 limits.	Revise tables to include antimony, arsenic and selenium within the ICP/MS analytical technique.		Table 4-1 and 4-2 will revise tables to include Sb, As, and Se by ICP/MS as recommended.	Accept	Close	NSJ
8	Item 8 P: 18-21 S: 4.2 Tables: 4-1 and 4-2	The listed MDLs in the DQO (RPP-23403) for nitrate and nitrite achieved by Method 9056 greatly exceed the WAC 173-340 limits. Furthermore, there is no alternate method listed for these constituents even though Method 353.2 is a viable choice and may provide lower MDLs, depending on the laboratory's capabilities. Provide 222-S laboratory's MDLs for nitrate and nitrite via method 353.2. If the achievable MDLs are lower, revise the table to show Method 353.2 as the analytical technique for nitrite and nitrate.	Provide 222-S laboratory's MDLs for nitrate and nitrite via method 353.2. If the achievable MDLs are lower, revise the tables to show Method 353.2 as the analytical technique for nitrite and nitrate.		Estimated MDL in the DQO is a function of the dilution factor necessary for contact-handled sample material and matrix effects. In the case of nitrate and nitrite, tank farm residual waste samples are typically present more than 1,000 mg/kg for each constituent. The estimated MDL is higher due to sample dilution factor necessary to obtain a sample result within the instrument calibration range. For consistency and comparison to historical results, the 222-S Laboratory will continue to use SW-846 Method 9056 as the preferred IC method for tank waste solids and EPA Method 300.0 for tank waste liquids.	Accept	Close	NSJ
9	Item 9 P: 18-21 S: 4.2 Table: 4-1 and 4-2	The tables show that the SVOAs will be analyzed via Method 8270. However, all SVOAs that are categorized as polynuclear aromatic hydrocarbons (PAHs) should be analyze via SW-846 Method 8310 because this method is specifically meant to analyze PAHs, and is preferential to Method 8270 for that purpose. Please include the HPLC Method 8310 into the table for PAHs.	Revise the tables to include method 8310 for the SVOAs that are categorized as PAHs.		The 222-S Laboratory does not have the capability to perform method 8310 for PAHs by HPLC. For clarification, will identify PAH compounds in Table 4-3, Organic Analytes, and add clarifying footnote constituent is a PAH and may be analyzed by 8270 or preferred 8270 SIM when available.	Accept. I concur that EPA Method 8270 SIM is a suitable alternative to the method that was requested in comment (e.g. Method 8310).	Close	NSJ
10	Item 10 P: 27 S: 5.2	The text states that laboratories performing analyses in support of this SAP will have QA plans that will meet minimum requirements of DOE/RI-96-68. It is also necessary to state the laboratories will be accredited by the Department of Ecology.	Include that the laboratories performing analyses in support of this SAP will be accredited by the Department of Ecology.		Sec. 5.2 will add requirement for laboratories performing analyses in support of this SAP will be accredited by the State of Washington Department of Ecology.	Accept	Close	NSJ

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11	Item 11 P: 29 S: 5.2.2	The text states, "Action levels are currently under development; therefore, the DQO (RPP-23403) specifies "initial quantitation limits." This statement is in question. The referenced DQO refers to "Estimated MDL", rather than "initial quantitation limits", therefore the SAP requires a correction in this case. Also, the DQO does list action levels that have been established in WAC-173-340. This information is shown in the DQO (RPP-23403) Tables 4-9 to 4-12. Please address the discrepancy of information within this SAP.	See comment.		<p>Sec. 5.2.2 to address the discrepancy will delete two sentences referencing "initial quantitation limits" and replace text with "Where action levels have not been established, the laboratory is to achieve the lowest practicable detection limits for post retrieval residual waste without citing a regulatory basis."</p> <p>This technical approach is to characterize the nature of the residual waste as an input to the SST System Performance Assessment as shown in TPA, AP, Appendix I, Figure I-1.</p>	Accept	Close	NSJ
12	Item 12 P: 31 S: 6.0 3rd par	How is the data stored and managed for future use?	Explain what system is in place and how it is managed.		Sec. 6.0 will add description of data management.	Pending redline	Open pending redline review	JWY