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DEPARTMENT OF ECOLOGY
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August 4, 2016 16-NWP-136

RECEIVED
AUG 10 2016
EDMC

Mr. Michael W. Cline, Federal Project Director
Richland Operations Office
United States Department of Energy
PO Box 550, MSIN: A5-11
Richland, Washington 99352

Re: Department of Ecology's (Ecology) Revised Response to the *Groundwater Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit*, Draft A, DOE/RL-2014-33, received May 11, 2015, for the Initial 45-day Review Comment Record (RCR) Period 1229690

Dear Mr. Cline:

Ecology received the Groundwater Sampling and Analysis Plan for the *200-BP-5 Groundwater Operable Unit*, Draft A, DOE/RL-2014-33 (SAP) for a 45-day review on May 11, 2015. In accordance with the Tri-Party Agreement, Section 9.2.1, Ecology submitted our initial comments to the United States Department of Energy – Richland Operations Office (USDOE-RL) in letter 15-NWP-116, dated June 25, 2015.

However, further work on this SAP was halted due to issues regarding Ecology's review of the related *Remedial Investigation Report for the 200-BP-5 Groundwater Operable Unit*, Draft A, DOE/RL-2009-127 (RI). When discussions on the 200-BP-5 RI resumed, Ecology resent the comments in April 2016, which were originally submitted to USDOE-RL in June 2015.

As agreed to in a meeting with USDOE-RL on July 28, 2016, Ecology has revised our comments and we are submitting these revisions so that the comment resolution process may continue on the SAP.

Ecology has two concerns with the 200-BP-5 SAP that warrant specific consideration:

- Elimination of contaminants of potential concern (COPC) that Ecology considers necessary for inclusion in the 200-BP-5 SAP. The enclosed RCR details Ecology's concerns regarding COPC elimination.

  USDOE-RL must explain the rationale for eliminating these COPCs from the SAP. If an acceptable technical basis is not provided, Ecology will not approve this SAP until review of the 200-BP-5 RI Draft A provides the acceptable rationale for eliminating these COPCs.

- Inadequacies in both the 200-BP-5 SAP and the *Groundwater Sampling and Analysis Plan for the 200-PO-1 Groundwater Operable Unit*, Revision 0, DOE/RL-2014-33, received on April 30, 2015.

  The 200-BP-5 and 200-PO-1 Operable Units will merge during the Comprehensive Environmental Response, Compensation, and Liability Act Feasibility Study. Because these units will merge, we compared the two associated SAPs for similar approach and language. Both SAPs have insufficient language supporting monitoring, plume trending, and data analysis. Our comments in the enclosed RCR address the inadequacies between the two SAPs.

If you have any questions, please contact me at nina.menard@ecy.wa.gov or (509) 372-7941, or Kim Welsch, Environmental Specialist, at kim.welsch@ecy.wa.gov or (509) 372-7882.

Sincerely,

Nina M. Menard
Environmental Restoration Project Manager
Nuclear Waste Program

aa
Enclosure

cc electronic w/enc:
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Hanford Facility Operating Record
USDOE-RL Correspondence Control

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Administrative Record: 200-BP-5
NWP Central File

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Russell Jim, YN

Review Comment Record	Washington State Department of Ecology Nuclear Waste Program Cleanup Section/ER Project	Date July 28, 2016 Page 1 of 22

Document Title(s)/Number(s):
Groundwater Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit (DOE/RL-2014-33, Draft A)

Document Lead/Phone #/email: Kim Welsch/509-372-7882/kiwe461@ecy.wa.gov

Item Page (P) Section (S) Line (L)	Comment and Basis/Justification	Modification Needed	DOE Response	Ecology Response	O/ C
Item 1 General	The Sampling and Analysis Plan (SAP) must contain evidence of how all aspects of compliance monitoring have been performed in accordance with Washington Administrative Code (WAC) 173-340-720(9). Provide text showing that the assumptions, analysis and interpretation of the trending data are in compliance with WAC 173-340-720(9). Basis/Justification: Statistical methods for compliance monitoring WAC 173-340-720.	Provide text showing that the assumptions, analysis and interpretation of the trending data are in compliance with WAC 173-340-720(9).			
Item 2 General	Comment: There is a lack of evidence of how the trending was performed in a defensible manner. Basis/Justification: Statistical methods for compliance monitoring /173-340-720 WAC	Include a section on analysis of monitoring and trending data.			
Item 3 General	Comment: The SAP doesn't state how the information collected is reported to Ecology. Basis/Justification: The data collected as required by this SAP needs to be tracked by Ecology to determine that the SAP does not need revision based on the flow of the identified plumes. Please add how this information will be reported to Ecology.	Add to appropriate section how the gathered information will be reported to Ecology.			
Item 4 P: 1-1 S: 1 L/¶: 8-10	Comment: The last sentence in this first paragraph is not entirely accurate. Basis/Justification: Completeness and clarity.	Change the sentence to read as follows: "The monitoring program defined in this plan supports the post-RI monitoring and sampling period and will be used to direct CERCLA routine groundwater monitoring activities until clarifications are discussed and agreed to following review of the RI or after a remedial action decision through a corresponding Record of Decision (ROD) is made for the OU."			
Item 5 P: 1-1 S: 1 L/¶: 11-12	General Comment: The language of this sentence is not totally accurate. Basis/Justification: Completeness and clarity.	Change the sentence to read as follows: "This SAP supersedes the previous CERCLA groundwater SAP contained in Appendix A of the *Remedial Investigation/Feasibility Study Work Plan for the 200-BP-5 Groundwater Operable Unit* (DOE/RL-2007-18, Rev. 1)."			

O/C = open or closed

Document Title(s)/Number(s):
Groundwater Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit (DOE/RL-2014-33, Draft A)

Item 6 P: 1-3 S: 1 L/¶: 11-19	Comment: Suggest grouping contaminants of potential concern (COPC) into two groups: those compared to the primary drinking water standard (DWS) and those compared to the Model Toxic Control Act (MTCA) Method B groundwater cleanup levels. Basis/Justification: Clarity of regulatory basis.	Add additional bullet and separate all COPC exceedances by primary drinking water standard or the MTCA Method B cleanup level.			
Item 7 P: 1-3 S: 1 L/¶: 26-32	Comment: "Very slow" or "very high" terms for groundwater flow rates are vague. However, the proposed language of sampling frequency does not meet Ecology expectations of applicable COPC trend analysis (e.g. Taking a sample once every two or three years does not support annual trend analysis). Basis/Justification: Completeness and clarity.	Sampling will occur at least once a year, at a minimum for all samples. Revise bullet to provide groundwater flow vectors or linear velocity ranges that qualify as "very slow" and "very high."			
Item 8 P: 1-3 and 1-19 S: 1.1 and 1.5 L: 33-34 and 8-9	Comment: This first sentence to this paragraph is incorrect. This SAP will be implemented until after the Remedial Investigation (RI) and/or Feasibility Study (FS) is completed and Ecology agrees with the path forward for sampling issues. This SAP will not necessarily wait until the associated ROD is issued before it may be modified. This first sentence is also inconsistent with page 1-19, section 1.5, lines 8-9 which states, "This SAP will direct CERCLA and AEA monitoring activities needed for the 200-BP-5 Operable Unit (OU) until a ROD is approved." Again, this SAP may change after approval of the 200-BP-5 RI and/or FS, and not wait for the ROD. Basis/Justification: Completeness, clarity, and accuracy.	Rewrite both sections with a consistent timeframe.			
Item 9 P: 1-3 S: 1.1 L: 5-6	Comment: Trending from the time period 2007 to 2013 needs to be explained. Basis/Justification: Statistical methods for compliance monitoring /173-340-720 WAC	Provide text explaining the referenced time period in context of this SAP.			
Item 10 P:1-3 S: 1.1 L: 42-44	Comment: Water level monitoring is essential for tracking the flow of groundwater and the path of the plumes. The SGW documents listed are not enforceable and the SAP for Groundwater (GW) Surveillance Monitoring only monitors 14 of the approximately 150 wells is not sufficient. Basis/Justification: The water level monitoring provides good data and can be easily accomplished when the sampling is occurring at the well for very little additional cost.	Change document to require water level monitoring whenever a well is being sampled.			
Item 11 P: 1-4 S: 1.1 L: 8-20	Comment: As commented on in the 200-PO-1 SAP, not including wells for monitoring in this SAP because they are also monitored as part of the Resource Conservation and Recovery Act (RCRA) Treatment, Storage, or Disposal Facility Sites is not acceptable. Basis/Justification: The SAP is to justify and describe the sampling that will occur to monitor changing conditions. While it is ok to combine sampling for different	Add all the necessary wells to this SAP and state that one sample will fulfill this SAP requirements and the RCRA SAP requirements			

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	purposes, it does not preclude adding these wells to this SAP and justifying the monitoring of these wells for the purpose of tracking the contaminate plumes				
Item 12 P: 1-5 S: 1.2.1 L: 22-24	Comment: Is this statement based on quantitative decision information concerning characteristics of contamination in BP-5? "Only" denotes a conclusion based on evidence but what evidence? There needs to be drilling data, seismic, or some other form of detailed subsurface investigation. Even though, there are thousands of subsurface monitoring wells (active and inactive) throughout the 200 East area, to definitively state that "only a few COPCs still reside in the saturated Ringold sediments from past discharges to ponds" is an expression of "soft information," but you need to better prove the point. There may be preferential pathways in which a drilling or sampling campaign did not intercept. This information would not be conclusive. Basis/Justification: Clarification	Restate the sentence indicating probability of contamination not being in the Ringold formation at this location, i.e. spatial autocorrelation.			
Item 13 P: 1-6 S: 1.2.3 L:	Comment: The bulleted list is not complete since there are other documents available containing GW data. This SAP cannot reduce the COPCs list from the *Remedial Investigation/Feasibility Study Work Plan for the 200-BP-5 Groundwater Operable Unit* (DOE/RL-2007-18, Rev. 1). At the earliest, only after Ecology reviews and approves the language and logic provided in the 200-BP-5 RI may COPCs be reduced from those listed in the work plan/data quality objectives. Basis/Justification: Completeness and clarity.	Include all of the COPCs listed in the *Remedial Investigation/Feasibility Study Work Plan for the 200-BP-5 Groundwater Operable Unit* (DOE/RL-2007-18, Rev. 1) as listed in Table 1-4 "Master List of 200-BP-5 OU COPC" and Table 1-7 "Final List of COPC for Vadose Zone" from WMP-28945(DQO). In addition, include the following reports/data that provide documentation of waste site data that have/are affecting GW quality in the 200-BP-5 OU: the final *Tank Closure & Waste Management EIS* (DOE/EIS-0391), the 200 Area Composite Analysis, *200-CW-1 OU Remedial Investigation (RI) Report* (DOE/RL-2000-35), *RI Report for the 200-CW-5 U Pond/Z Ditches Cooling Water Group, the 200-CW-2 S Pond and Ditches Cooling Water Group, the 200-CW-4 T Pond Ditches Cooling Water Group, and the 200-SC-1 Steam Condensate Group OU* (DOE/RL-2003-11), *RI Activities at Model Group 5 Large Area Ponds Waste Sites Located within the 200-CW-1 OU* (DOE/RL-2006-57), and any other GW data sources available to support this SAP.			
Item 14 P: 1-6 S: 1.2.3 L:	Comment: There is not discussion or listing for West Lake and its contribution to the contamination the 200-BP-5 OU. Basis/Justification: West Lake had some significant discharges of contamination that contributed to the plumes identified in the 200-BP-5 Groundwater.	Add a description/history on West Lake to the SAP.			

Item 15 P: 1-8 & 1-9 S: 1.2.3 L: Figure 1-3 & 1-4	Comment: These figures provide assumed direction of groundwater flow through southern Gable Gap into B areas with directional flow arrows. The data set identified were between the years of 2011-2013. It has been noted in literature that the range and timing of seasonal water-level fluctuation may vary in different aquifers in the same geographic area, and depending on the source of recharge to the aquifers and the physical and hydraulic properties of each. In other words, two hydrographs in two different groundwater wells in the same area can show two different arrival time and water level measurement. There are no mention of the accuracy of groundwater level data over time. The Nuclear Waste Program recent compliance/inspection events clearly denoted several examples of groundwater wells being neglected due to access, mechanical and lack of timeliness. Basis/Justification: Clarification.	Based on the accumulative data sets from 2011-2013, what changes will be included in the next SAP or ASAP (Adaptive SAP based on field analytical method for a faster turn around of sampling anomalies) that reflect reduction of sampling issues and provide faster data collection to support a revised SAP or ASAP.			
Item 16 P: 1-9 S: 1.2.3 L: Figure 1-4	Comment: Groundwater flow arrow (pointing west) in vicinity of 216-B-3 Pond needs to be qualified as to whether this depicts groundwater flow in an unconfined aquifer, semiconfined, confined aquifer, or flow under multiple regimes. Basis/Justification: Proper representation of groundwater flow conditions.	Provide requested clarification			
Item 17 P: 1-12 to 1-13 Table 1-1	Comment: Table 1-1 lists derived activities, concentrations, and volumes of contaminants. Please give more details on how these quantities were derived (presumably from the Hanford Soil Inventory Model, see Item #10 above). Also, clarify if this table is intended to include all waste sites affecting 200-BP-5 groundwater. Basis: Data derivation methods should be provided.	Please explain how contaminant activities/concentrations and waste volumes in Table 1-1 were derived (presumably with the Hanford Soil Inventory Model) and how complete this table is in terms of waste sites affecting 200-BP-5 groundwater.			
Item 18 P: 1-13 S: 1.2.3 L: Table 1-1	Comment: Explain why 216-B-63 Trench is not included in Table 1-1. Strontium 90 appears to be a radionuclide discharged to the 216-B-63 Trench as identified in RHO-CD-673 (p. 66 of pdf in Administrative Record). Based on the approved 200-BP-5 workplan, verify if Strontium 90 is being sampled for in the vicinity of the 216-B-63 Trench. Basis/Justification: Regulatory process clarity.	Confirm any sampling related to the 216-B-63 Trench in the 200-BP-5 SAP is consistent with approved workplan.			
Item 19 P: 1-15 S: 1.2.4.1 L: 28	Comment: DOE/RL-2011-01 (add Revision 0) is the 2010 Site Groundwater Monitoring Report. Update the SAP to the most recent Site Groundwater Monitoring Report. Basis/Justification: Regulatory process clarity.	Revise citation and references to most recent Site Groundwater Monitoring Report as appropriate.			
Item 20 P: 1-15 to 1-18 S: subsections under 1.2.4	Comment: Most of these subsections reference DOE/RL-2011-01, *Hanford Site GW Monitoring Report for 2010*. This report would report groundwater movement moving north through Gable Gap, which it currently does not. Reflections on nitrate, iodine-129, Tech-99, uranium, etc. must be made referencing more recent monitoring where the general GW movement has switched to moving in the general south east direction and NOT through the Gable Gap.	Rewrite this whole section with updated monitoring information.			

L:	Basis/Justification: Completeness, clarity, and accuracy.				
Item 21 P: 1-15 & 1-19 & A-2-A-3 S: 1.2.4 & 1.4 & A1.5 L/¶: Table 1-3, and Table A-1	Comment: The contaminant list in this SAP is too short. A number of contaminants that exceed levels of concern have been eliminated from the COPC list, and some wells with contaminants that exceed levels of concern are not going to be monitored. This SAP cannot reduce the COPCs list from the *Remedial Investigation/Feasibility Study Work Plan for the 200-BP-5 Groundwater Operable Unit* (DOE/RL-2007-18, Rev. 1). At the earliest, only after reviewing and Ecology approving the language and logic provided in the 200-BP-5 RI may COPCs be reduced from those listed in the WP. Basis/Justification: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process and clarity. Example wells that this SAP describes that will not be monitored are 299-E33-57A, -205, -265, -266, -334, -343, -4; 699-62-43F, and 699-70-68.	Include all of the COPCs listed in the *Remedial Investigation/Feasibility Study Work Plan for the 200-BP-5 Groundwater Operable Unit* (DOE/RL-2007-18, Rev. 1). Before eliminating contaminants from monitoring, evaluate risk and hazard on a well-by-well basis, and retain contaminants that contribute greater than 1% to risk and/or hazard, and those that exceed action levels. Monitor the associated contaminants and wells, in addition to those already identified by using action levels.			
Item 22 P: 1-17 S: 1.2.4.8 L: 39-43	Comment: Identify if all chromium in groundwater in the 200-BP-5 area is to be considered hexavalent chromium or if total chromium plumes are also present Basis/Justification: COPC confirmation.	Confirm chromium species and anticipated extent in groundwater for 200-BP-5 are consistent with approved workplan.			
Item 23 P: 1-18 S: 1.2.4.11 L:21-25	The text states the waste associated with the hydrofluoric acid was neutralized before sending to the ground. Identify the neutralization chemicals that were used to counteract the hydrofluoric acid, and explain if those chemicals have been taken into account during the COPC development process. Basis/Justification: Completeness and clarity.	Identify the neutralization chemicals that were used to counteract the hydrofluoric acid, and explain if those chemicals have been taken into account during the COPC development process.			
Item 24 P: 1-18 S: 1.3 L: 37-39	Comment: This sentence starts out with, "The objective of this DQO process is to define…." Never has the U.S. Department of Energy (USDOE) mentioned to Ecology that review of this SAP includes a DQO process. Further, this document does not clearly state that this SAP would contain a DQO to vary from WMP-28945. Ecology should be engaged from the beginning in any DQO proposal where Ecology is the Lead Regulatory Agency of the affected OU. Basis/Justification: Completeness, clarity, and accuracy.	Delete discussion of this SAP containing a DQO or modifying from the existing DQO (WMP-28945).			
Item 25 P: 1-19 S: 1.5 L: 8-9	Comment: As stated, "This SAP will direct CERCLA and AEA monitoring activities needed for the 200-BP-5 OU until the ROD is approved." Does DOE/RL-2014-33, Draft A represent an "adaptive" SAP (based on field analytical method for a faster turn around of sampling anomalies)? And how will it be translated throughout the project schedule? Basis/Justification: Clarification and accuracy.	Clarify project schedule per comment.			
Item 26 P: 1-19 S:	Comment: Monitoring of BP-5 wells should include all of the contaminants in Table 1-3 of this document plus those in Table 6-14 of the BP-5 RI, and those listed below. The contaminants that should be monitored are ICP-metals, VOCs (which would	Monitor for ICP-metals, VOCs, and hexavalent chromium in the areas where they have been			

Table 1-3; Appendix A, General	include TCE, PCE, and carbon tetrachloride), hexavalent chromium, and selected radionuclides. Basis/Justification: Ecology has examined the data set provided for BP-5, covering well sampling results from 2008-2013, and has determined a number of wells and associated contaminants that need additional consideration and further monitoring. The wells listed below with their associated contaminants are of concern because they have elevated concentrations of a variety of contaminants, including contaminants that may be excluded from risk assessments or future monitoring. In many cases individual contaminants exceed criteria of concern, though in some cases it is the total hazard index, or total cancer risk that exceeds criteria. A number of these wells are outside of major plume areas. It is assumed that wells within major plume areas will be retained for future monitoring. The data were filtered so that results associated with non-detect or blank lab qualifiers were not included on the list below. Also, validation flags were checked manually; results with R and U validation flags were not included. This evaluation has been revised from the previous version which listed contaminants with hazard quotients greater than 0.1 and risk values greater than 1E-06. This table was revised by eliminating hazards that did not cause target organ contaminant groups to exceed a hazard index of 1, and by including contaminants that were inadvertently overlooked in the previous version after considering Tables H-6 – H-13, DOE/RL-2009-127, Draft A. Also, it has been rearranged to parallel the information in Tables H-6 – H-13 and should be looked at alongside of Tables H-6 through H-13. A general problem with Tables H-6 through H-13 is that they have omitted a number of contaminants that have hazard quotients exceeding 1 (using IRIS reference doses unless otherwise stated). Though the omitted contaminants might contribute a small percentage to total hazard (especially when other contaminants have high hazard quotients), they exceed the WAC 173-340 hazard quotient limit of 1 (see WAC 173-340-705(c)(i); using WAC 173-340 Equation 720-1). Additionally, the percent contribution to hazard index in Tables H-6 – H-13 is based on summing all contaminants regardless of target organ. However, the document breaks hazards down based on target organ (throughout section 6.4.4), so in that regard the tables are not consistent with how the data were used in the document. In addition to a list of contaminants, narrative explanations are provided about contaminants that are missing from the Appendix H Tables (note: any flags on the results are mentioned below). *Exposure Area: LLWMA-1 (reference: Table H-6)* Well 299-E28-28	observed in the past, and include them in risk calculations.			

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	Associated Unit: 218-E-10 Carcinogens: Tc-99, tritium Hazards: Cyanide, tetrachlorodibenzo-p-dioxins, nitrate (N) In Well 299-E28-28, tetrachlorodibenzo-p-dioxin was detected on 10/10/12 and estimated at 1.4 pg/L, which results in a cancer risk of roughly 2E-06, which is twice the WAC 173-340 acceptable limit for individual contaminants. It was a true detect with a J qualifier (estimated value), which is acceptable for risk assessment. It is not given on Table H-6 for this well. Well 299-E33-34 Associated Unit: 200-E-20 Carcinogens: Co-60, I-129, Tc-99, tritium Hazards: Cyanide, nitrate (N), strontium, uranium, vanadium Well 299-E33-265, E33-266 Associated Unit: LLMWA (216-E-10) Carcinogens: I-129, Tc-99, tritium Hazards: Cyanide, nitrate (N), uranium Uranium was detected 9/9/2010 through 7/17/2013 on 5 sample dates in Well 299-E33-265 but was not included in Table H-6. Using the ATSDR MRL from 2013, the hazard index for uranium is up to 5.6 in this well. While USDOE favors IRIS over ATSDR, the ATSDR information is a line of evidence that uranium should be maintained as a COPC for monitoring and treatment. *Exposure Area: LLWA-2 and 216-B-63 Trench (reference: Table H-7)* Well 299-E33-33 Associated Unit: 216-E-128 Carcinogens: Arsenic, I-129, Tc-99 Hazards: Arsenic, cyanide, nitrate (N), vanadium Arsenic is not mentioned for Well 299-E33-33. This well had detections of arsenic above Hanford site background during the period of 10/4/2009 through 6/13/2011 on 3 sample dates. Its hazard quotient is up to 1.8. *Exposure Area: WMA B-BX-BY Tank Farms (Table H-8)* Well 299-E33-4 Associated Unit: B-BX-BY Carcinogens: Co-60, Tc-99, tritium Hazards: Cyanide, manganese, nitrate (N)				

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	Well 299-E33-4 had cyanide at 7180 µg/L on 7/16/2008, which gives a hazard quotient of 748. It had D, N, and J- qualifiers. However, none of these disqualify it for use in risk assessment. Additionally, manganese was up to 1680 µg/L on this date, yielding a hazard quotient of 4.4 on this date. Nitrate was as high as 4030 mg/L, yielding a hazard quotient of 157. All exceed hazard quotients of 1 and should be retained for this well. Table H-8 lists no major hazards for this well. <u>Well 299-E33-15</u> Associated Unit: B-BX-BY Carcinogens: Tc-99, tritium, I-129, Co-60 Hazards: Antimony, cyanide, chromium/hexavalent chromium, nitrate (N), uranium Well 299-E33-15 had antimony at roughly 230 µg/L on 5/1/2012, which gives a hazard quotient of 36 (IRIS reference dose); this is not included on Table H-8 (or previously on Table H-3) (this has a Y qualifier which is sample specific; the explanation is not provided). Hexavalent chromium and chromium have roughly equal concentrations and were detected on 1/4/2011 and 5/3/2011 at 65 to 71 µg/L. The hazard quotient for hexavalent chromium is roughly 1.5 using the IRIS reference dose and 4.9 to 8.8 using ATSDR MRLs for other target organs. Nitrogen in nitrate was detected several times from 2008 to 2013 up to 354 mg/L, giving a hazard quotient of roughly 13 (IRIS reference dose). Uranium was detected from 5/1/2012 to 7/29/2013 at roughly 49 to 99 µg/L, giving hazard quotients from 1 to 2.1 (IRIS, 1989) or 15 to 31 (ATSDR, 2013); this was also excluded on Table H-8. <u>Well 299-E33-16, E33-17, E33-18, E33-1A</u> Associated Unit: B-BX-BY Carcinogens: Arsenic (E33-16), Co-60, I-129, Tc-99, tritium Hazards: Antimony (E33-16), arsenic (E33-16), chromium, cyanide, hexavalent chromium, nitrate (N), uranium, cobalt (E33-1A, E33-17, E-33-18) Well 299-E33-1A had dissolved chromium (2008 – 2009, 3 sample dates) up to 91 µg/L. Dissolved chromium is generally hexavalent chromium, so this is well above the WAC 173-340-720 concentration of 48 µg/L for hexavalent chromium; the hazard quotient for dissolved chromium as hexavalent chromium is roughly 11. Uranium is also significant in this well, with detects from 5/14/2008 – 1/26/2012 on 6 sample dates, with a hazard quotient up to 3.9 using the 1989 IRIS reference dose, and 59 using the 2013 ATSDR MRL. This well also had cobalt at a hazard quotient of 1.0 (using the PPRTV reference dose) on 2/13/2008. These contaminants were not included on Table H-8. For Wells 299-E-33-16, -17, and -18, antimony was detected on 2/13/2008 and again on 5/1/2012 (Well 200-E33-16 only) from 58 µg/L (HQ approx. 9) to 220 µg/L (HQ approx. 34). This is not included on Table H-8. Hexavalent chromium and					

	chromium were roughly equivalent when both were detected, though chromium was detected more often. Concentrations for chromium species ranged from 54 to 182 µg/L (2008 – 2012). The highest hexavalent chromium value was 83 µg/L on 7/11/2011 giving a hazard quotient of roughly 1.7. Nitrogen in nitrate was detected several times from 2008 to 2013 up to 340 mg/L, giving a hazard quotient of roughly 13 (IRIS reference dose). Uranium was detected in Well 299-E33-16 from 2/13/2008 to 1/21/2013 at roughly 201 to 744 µg/L, giving hazard quotients from 4.2 to 15 (IRIS, 1989); this was also excluded on Table H-8 for Well 299-E33-16. Cobalt was detected on 2/13/2008 at 8.4 µg/L in Well 299-E33-17, giving a hazard quotient of 1.7 (using PPRTV toxicity database (Tier 2) – no IRIS reference dose available); this also is not shown on Table H-8. Well 299-E33-20 Associated Unit: B-BX-BY Carcinogens: Co-60, I-129, Tc-99, tritium Hazards: Cyanide, nitrate (N), uranium For Well 299-E33-20 cobalt was detected on 2/13/2008 at 5.8 µg/L, giving a hazard quotient of 1.2 (using PPRTV toxicity database (Tier 2) – no IRIS reference dose available); this is not shown on Table H-8. Uranium is just below its Maximum Contaminant Levels (MCL) at 29.7 µg/L on 2/7/2013 and 22.2 µg/L on 10/29/13. These concentrations are higher than the 14.5 µg/L detection on 8/29/2012, so it is possibly increasing in this well. Cobalt should be retained for monitoring in this well. Well 299-E33-38 Associated Unit: B-BX-BY Carcinogens: Arsenic, I-129, Tc-99, tritium, uranium (high – convert to isotopes) Hazards: Antimony, arsenic, cyanide, nitrate, uranium Antimony is not listed for Well 299-E33-38 on Table H-8. It was detected on 5/4/2012 at 187 µg/L giving a hazard quotient of 29. Arsenic was detected on 2/6/2013 at 8.5 µg/L, giving a cancer risk of 1.4E-04. Arsenic was also not included on Table H-8. Nitrate-N is also not on the table of hazards for this well. Its concentration was up to 340 mg/L (hazard quotient of 1.3) and above 100 mg/L throughout the period of 2008 - 2013, well above the 10 mg/L MCL. Uranium was not included, while its concentration was above the 30 µg/L MCL throughout the period of 2008 – 2013, as high as 1000 µg/L (hazard quotient of 21) on 5/16/11. For rads, I-129 should be included because its risk level is above the 1 pCi/L level of concern. Well 299-E33-42 Associated Unit: B-BX-BY				

	Carcinogens: I-129, Tc-99, tritium Hazards: Cyanide, nitrate (N), n-nitrosodi-n-dipropylamine, silver, uranium <u>Well 299-E33-44</u> Associated Unit: B-BX-BY Carcinogens: Arsenic, bis(2-ethylhexyl)phthalate, Co-60, I-129, Tc-99, tritium, uranium (high – convert to isotopes) Hazards: Arsenic, cyanide, chromium/hexavalent chromium, nitrate (N), uranium Bis(2-ethylhexyl)phthalate in Well 299-E33-44 is not included in Table H-8. The cancer risk associated with it on 2/5/2013 was 1.5E-06, which exceeds the WAC 173-34-720 Method B threshold for individual contaminants. Text in the document on p. 4-101 mentions this contaminant in this well and discusses that over the last 10 years it was only detected twice at this well. The detections were at the end of the time period of interest and were both in 2013; this relatively recent data suggests a potential problem. Chromium also was not mentioned. It was detected above 48 µg/L from 2008 to 2012, up to 73 µg/L. Since it is dissolved it is likely hexavalent chromium and would have a hazard quotient of 1.5 using IRIS (1998); 9.1 using ASTDR (2012). Hexavalent chromium was measured in years 2010 – 2011 at 40 to 66 µg/L. Uranium is also not given on Table H-8. It was measured above 100 ug/L on 8/8/13 (hazard quotient 20, IRIS, 1989) up to 559 µg/L (hazard quotient 11, IRIS, 1989) on 5/3/11. Arsenic is not listed as a hazard; its hazard quotient was up to 2.1 on 5/3/11. <u>Well 299-E33-47</u> Associated Unit: B-BX-BY Carcinogens: Co-60, I-129, Tc-99, tritium, uranium, methyl methanesulfonate (given in Table H-8) Hazards: Chromium/hexavalent chromium, cyanide, nitrate (N) Several contaminants are missing on Table H-8 for Well 299-E33-47. Chromium ranged from 58 to 88 µg/L in 2011 to 2012 (HQ up to 1.8 if it is hexavalent) and hexavalent chromium ranged from 49 to 69 µg/L in 2010-2011 (HQ up to 1.4), with all values in that time period above the WAC 173-340 Method B limit of 48 µg/L. Uranium is also missing; its concentration exceeded 30 µg/L in 2013 and was up to 58 µg/L (HQ = 12 using IRIS database). Text on p. 4-106 in the RI mentions that uranium at this well exceeded 30 µg/L; however, the highest value on Table is H-3 is 24 µg/L for this well. <u>Well 299-E33-48</u> Associated Unit: B-BX-BY Carcinogens: I-129, Tc-99, tritium Hazards: Cyanide, nickel, nitrate (N), uranium				

O/C = open or closed

	For Well 299-E33-48 nickel has not been included as a hazard yet it is additive with uranium, as both cause weight decreases. The hazard quotient of nickel is up to 0.5 (11/2/12), while uranium hazard quotient is up to 1.4 (8/3/12). <u>Well 299-E33-205</u> Associated Unit: B-BX-BY Carcinogens: Am-241, C-14, Tc-99, tritium Hazards: Cyanide, hexavalent chromium, nitrate <u>Well 299-E33-334</u> Associated Unit: B-BX-BY Carcinogens: N-nitrosodi-n-dipropylamine, Tc-99, tritium, I-129 Hazards: Cyanide, nitrate (N), uranium <u>Well 299-E33-337, E33-338, E33-339</u> Associated Unit: B-BX-BY Carcinogens: Tc-99, tritium, uranium (high – convert to isotopes) Hazards: Chromium/hexavalent chromium, cobalt, copper, cyanide, nickel, nitrate (N), uranium Well 299-E33-337 had chromium concentrations up to 356 µg/L (HQ = 7.4 for hexavalent; this is greater than the MCL of 100 µg/L for total chromium) in 2011, and in 2013 the concentrations were still above the WAC 173-340 Method B value of 48 µg/L for hexavalent chromium in 2013. Uranium increased from 34 µg/L (above the MCL) in 2011 to as high as 87 µg/L in 2013 (hazard quotient of 1.8). Well 299-E-33-339 had detections of chromium as high as 237 µg/L in 2011. They have dropped since and were under 48 µg/L in 2013, possibly due to plume migration. Nickel showed the same trend, with a hazard quotient up to 2.5 in 2011. While this plume appears to be moving away from this well, some nickel remains and is additive with uranium, which was still at 99 µg/L in 2013 (total HI = 2.2, 93% uranium and 7% nickel). <u>Well 299-E33-341</u> Associated Unit: B-BX-BY Carcinogens: Am-241, C-14, Co-60, I-129, Pu-239/240, Tc-99, Sr-90, tritium Hazards: Chromium, cyanide, hexavalent chromium, mercury, nitrate (N), uranium Chromium/hexavalent chromium were not included in Table H-8 for Well 299-E33-341. Hexavalent chromium was detected many times between 48 and 58 µg/L from 2009-2011 (exceeding the WAC 173-340 Method B limit, hazard quotient up to 1.2).				

	Uranium was also omitted as a hazard. Its concentration was up to 182 µg/L on 8/9/2011 (hazard quotient of 4.6). <u>Well 299-E33-342</u> Associated Unit: B-BX-BY Carcinogens: Am-241, C-14, Co-60, I-129, Pu-239/240, Tc-99, Sr-90, tritium Hazards: Antimony, carbon tetrachloride, cyanide, nitrate (N), uranium Only 96.3% of the total cancer risk has been reported for Well 299-E33-342, which is somewhat less than 99%. Various radionuclides have been detected in this well including Am-241, C-14, Co-60, I-129, Pu-239/240, and Sr-90. These may make up the remaining 3 to 4% and should be included on Table H-8, as the table should include risk and hazard contributors up to 99%. Antimony was not included on Table H-8. It was detected in 2 samples on 5/9/12 at 213 and 238 µg/L (hazard quotient approximately 34). Carbon tetrachloride was also omitted from Table H-8. It was detected at 5.9 µg/L (cancer risk of 2.3E-03) on 9/27/09. This value is greater than the MCL of 5 µg/L. Nitrogen in nitrate ranged from 172 to 374 mg/L (HQ 6.7 to 14) from 2009 to 2012, which is well above the MCL of 10 mg/L; it was omitted from Table H-8. <u>Well 299-E33-343</u> Associated Unit: B-BX-BY Carcinogens: Am-241, C-14, I-129, Np-237, Tc-99, Sr-90, Th-230, tritium, U isotopes Hazards: Carbon tetrachloride, cyanide, nitrate (N), uranium Well 299-E33-343 had carbon tetrachloride from 1.2 µg/L (cancer risk ≈ 4.7E-04, J qualified) on 8/11/08 to 3 µg/L (cancer risk ≈ 1.2E-03, J qualified) on 9/27/09 but has been omitted from Table H-8. <u>Well 299-E33-345</u> Associated Unit: B-BX-BY Carcinogens: Am-241, Sb-125, C-14, I-129, Pu-239/240, Sr-90, Tc-99, Th-230, tritium, uranium (high – convert to isotopes) *<u>Exposure Area: WMA C Tank Farm (Table H-9)</u>* <u>Well 299-E27-4 (submitted for WMA C RFI but not this document previously)</u> Associated Unit: WMA C (just outside) Carcinogens: I-129, Tc-99, tritium Hazards: Cyanide, nitrate (N), nickel					

O/C = open or closed

	Well 299-E27-4 needs to be added to the tables. It is near WMA C; in the absence of a WMA C-specific evaluation in the WMA C RFI, it should be included for the BP-5 RI. Well 299-E27-7 Associated Unit: WMA C (just outside) Carcinogens: I-129, Tc-99, tritium Hazards: Cyanide, nitrate (N) Well 299-E27-14 Associated Unit: WMA C Carcinogens: Arsenic, I-129, Tc-99, tritium, uranium (as isotopes) Hazards: Arsenic, copper, cyanide, nitrate (N), uranium, vanadium Well 299-E27-15 Associated Unit: WMA C (just outside) Carcinogens: Arsenic, I-129, Tc-99, tritium Hazards: Arsenic, antimony, selenium, nitrate (N), vanadium, uranium, nickel Antimony was detected in Well 299-E27-15 at 61.8 µg/L (hazard quotient of 9.7) on 3/13/08 but is not included on Table H-9. Well 299-E27-155 Associated Unit: WMA C (just outside) Carcinogens: I-129, Pu-239/240, Tc-99, tritium Hazards: Cyanide, hexavalent chromium, nitrate (N), selenium, vanadium *Exposure Area: B Plant (Table H-10)* Well 299-E28-24 Associated Unit: 216-B-5 Reverse Well and upgradient (?) from 216-B-59B Carcinogens: Cs-137, I-129, Pu-239/240, Sr-90, uranium isotopes, tritium Hazards: Fluoride, nitrate (N), uranium The total percentage of risk for Well 299-E28-24 on Table H-10 is only 97%, less than 99%. Other radionuclides were detected in this well, including Pu-239/240, Pu-238 and uranium isotopes. Well 299-E28-25 Associated Unit: B-Plant Carcinogens: Am-241, Cs-137, I-129, Pu-239/240, Pu-238, Sr-90, uranium isotopes, tritium Hazards: Nitrate (N), uranium				

O/C = open or closed

	Exposure Unit: 200-BP-5 West (Table H-11) Well 699-E49-57A Associated Unit: BY Cribs and B-BX-BY Carcinogens: Co-60, I-129, Tc-99, tritium, Sr-90 Hazards: Cyanide, nitrate (N) Well 699-50-56 Associated Unit: North of 200-East Carcinogens: Arsenic, Pu-239/240, Tc-99, Sr-90, tritium Hazards: Arsenic, cyanide Well 699-50-56 had detections of arsenic at 8.1 µg/L (hazard quotient of 1.7) twice, 4/29/09 and 10/20/09, but is not included on Table H-11. The cancer risk at this concentration is 1.4E-04. Therefore, arsenic exceeded both the WAC 173-340 hazard and risk limits for individual contaminants. Well 699-50-59 Associated Unit: Northwest of 200-East Carcinogens: I-129, Tc-99, tritium Hazards: Cyanide, nitrate (N) Well 699-52-55 Associated Unit: West of Gable Mountain Pond Carcinogens: Am-241, carbon tetrachloride, Np-237, Tc-99, thorium isotopes, tritium, bis-(2-ethylhexyl)phthalate (699-52-55B) Hazards: Cadmium, cobalt, cyanide, iron, manganese, zinc Nitrate (N) is not listed on Table H-11 for Well 699-53-55B though it was detected 3 times from 4/29/09 through 4/20/12 at roughly 32 mg/L (hazard quotient of 1.3), and several times 4/29/09 through 4/4/13 in Well 699-53-55C from 29 to 34 mg/L. Well 699-53-55B, C Associated Unit: West of Gable Mountain Pond Carcinogens: Co-60, Tc-99, tritium Hazards: Cyanide, nitrate (N) Well 699-54-45A Associated Unit: Gable Mountain Pond Carcinogens: Carbon tetrachloride Hazards: Cobalt, iron, zinc				

O/C = open or closed

	Well 699-55-57 Associated Unit: West of Gable Mountain Pond Carcinogens: Tc-99, tritium Hazards: Cyanide *Exposure Unit: 200-BP-5 Far-Field (Table H-12)* Well 699-62-43F Associated Unit: North of Gable Mountain Carcinogens: Arsenic, I-129, Tc-99, tritium Hazards: Arsenic, fluoride, chromium/hexavalent chromium, nitrate (N) Well 699-65-50 Associated Unit: North of Gable Mountain, near dunes Carcinogens: Am-241, Arsenic, I-129, Tc-99, tritium Hazards: Arsenic, chromium/hexavalent chromium, fluoride Well 699-70-68 Associated Unit: South of 100-K Carcinogens: Am-241, trichloroethylene, Tc-99, tritium.				
Item 27 P: 2-1 S: 2.1.1.1 L/¶: 30-34	Comment: This section/paragraph needs a rewrite. Spell out LRA once, and mention Ecology as the LRA. From that point forward, mention Ecology and not a LRA. In addition, this does not explain that Ecology is the "LRA" for the OU, but the U.S. Environmental Protection Agency (USEPA) signs off on the SAP with Ecology's concurrence. Basis/Justification: Completeness, clarity, and accuracy.	Rewrite section.			
Item 28 P: 2-4 S: 2.1.1.11 L:27-35	The text lists that the analytical laboratories are responsible for the following actions: • Analyzing samples in accordance with established methods • Providing data packages containing analytical and QC results • Providing explanations in response to resolution of analytical issues • Meeting requirements of this plan • Being on the Mission Support Alliance Evaluated Supplier List • Being accredited by Ecology for the analyses performed for the Soil and Groundwater Remediation Project (S&GRP) In addition to the listed actions, the following should also be included: • Being evaluated under the DOE Consolidated Audit Program (DOECAP) and the Hanford Analytical Services Requirements Document (HASQARD) (DOE/RL-96-68).	Include that the analytical laboratories must be evaluated under the DOE Consolidated Audit Program and the Hanford Analytical Services Requirements Document (DOE/RL-96-68).			

	Basis/Justification: USDOE Headquarters requires that analytical laboratories undergo auditing via the DOECAP. The HASQARD serves as the quality basis for all sampling and field/laboratory analytical services provided to support the Hanford Site environmental clean-up mission. The HASQARD establishes quality requirements in response to DOE Order 414.1C or 414.1D, "Quality Assurance" (as applicable). The HASQARD satisfies the requirements from the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement [TPA]) Article XXXI and TPA Action Plan Sections 6.5 and 7.8.				
Item 29 P: 2-4 S: 2.1.1.10 L:8-26	This section is intended to state that the sample management and reporting (SMR) organization is responsible for the activities that have been specified. Later in the document, Section 2.2.I lists that the SMR can approve changes to analytical methods. This task is missing from Section 2.1.1.10. Please address the discrepancy. Basis/Justification: Completeness and clarity.	If accurate, include that the SMR can approve changes to analytical methods, per the criteria listed in Section 2.2.1 Analytical Methods Requirements.			
Item 30 P: 2-5 S: 2.1.1.12 L: 2-9	Comment: Discuss how samples containing radionuclides are disposed. Basis/Justification: Specificity of assigned tasks.	Cite document discussing radionuclide sample disposal			
Item 31 P: 2-5 S: 2.1.1.12 L: 10-30	Comment: These sections define Field Sampling Organization and Well Maintenance as roles but without details of those roles. If these roles are the same as surveillance monitoring then the accuracy of data from groundwater monitoring frequency and timing is based in these roles. The rate at which the water level changes (directions and velocities) is primary compared to the cost associated with taking the water-level measurements. Basis/Justification: Clarity and accuracy.	These sections should reflect details of the water-level monitoring program.			
Item 32 P: 2-5 S: 2.1.1.13 & 2.1.1.14 L: 27-30	Comment: Identify if the well maintenance manager ensures wells that require replacement are submitted to the project manager for inclusion on the TPA M-24 Milestone. Basis/Justification: Specificity of assigned tasks.	Add requested details			
Item 33 P: 2-9 and 2-10 S: 2.1.4 L/¶: 33-37 and Table 2-2	Comment: The contractor OU Project Manager has no authority to change a SAP. Suggested changes are discussed between USDOE and Ecology for this OU, with Ecology giving approval before USEPA signature approval. SAPS must follow the approved WP, which is also approved by Ecology. Table 2-2 needs to reflect to correct relationship between an approved SAP with the associated WP, and the authorities approving and concurring with changes to this SAP. Basis/Justification: Completeness, clarity, and accuracy.	Rewrite this section and Table 2-2.			
Item 34 P: 2-11 S: 2.1.4 L: 8	Comment: Provide if the "Global positioning system data" includes well survey data. If not, add bullet indicating survey data for wells are maintained. Basis/Justification: Management of all necessary data.	Verify all well survey data are accounted			

Document Title(s)/Number(s):
Groundwater Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit (DOE/RL-2014-33, Draft A)

Item 35 P: 2-11 S: 2.1.4 L:25-29	The text states the laboratory is responsible for maintaining, and having available upon request the following items: • Analytical logbooks. • Raw data and QC sample records. • Standard reference material and/or proficiency test sample data. • Instrument calibration information. For complete accuracy, also include the following bullets in the list of items: • Training records for employees, as they relate to analytical methods. (This will ensure that personnel are qualified to perform the specific analyses.) • Laboratory State Accreditation records. • Laboratory audit records. Basis/Justification: The regulatory basis for requiring the requested items for laboratories performing analytical work for the Hanford Site is provided in DOE/RL-96-68, Hanford Analytical Services Quality Assurance Requirements Document. The HASQARD serves as the quality basis for all sampling and field/laboratory analytical services provided to support the Hanford Site environmental clean-up mission. Volume 1 includes guidance related to laboratory personnel training records (Section 3.0), laboratory accreditation records (Section 12.0) and laboratory audit records (Sections 5.5, 10.0 and 10.5). The requirement to comply with DOE/RL-96-68 is included in the U.S. Department of Energy – Richland Operations Office and Office of River Protection contracts with their contracted entities.	Also include the following in the list of items: • Training records for employees, as they relate to analytical methods. (This will ensure that personnel are qualified to perform the specific analyses.) • Laboratory State Accreditation records. • Laboratory audit records.			
Item 36 P: 2-13 S: Table 2-3 L:	Comment: Why is the MCL presented for arsenic 11.8 µg/L? Where does this number come from, as it doesn't match the EPA MCL or the MTCA Method A or B cleanup levels? Basis/Justification: Clarity regarding comparison values.	Provide Clarify source of arsenic value			
Item 37 P: 2-13 Table 2-3	Comment: Similar to comment(s) made for the 200-PO-1 OU SAP, Rev 0; Re uranium (U) in Table 2-3, the MTCA Method B CUL for groundwater would default to Hanford groundwater background (9.9 µg/L=90th percentile value, DOE/RL-96-61, Rev 0), because the MCL (30 µg/L) needs to be adjusted downward to HQ=1 (9.6 µg/L) per WAC 173-340-720[7][b]. This will also alter the required quantitation limit. Basis: The MTCA Method B noncancer CUL for U in groundwater (9.6 µg/L, corresponding to HQ=1) is derived with an oral RfD=6E-4 mg/kg-d (EPA, Office of Groundwater and Drinking Water) per USEPA memo from Marc Stifelman (dated 8/7/2008).	Please note that the MCL for U in Table 2-3 (30 µg/L) exceeds the MTCA Method B groundwater CUL for Hanford (9.6 µg/L) which, in turn, would default to Hanford background (9.9 µg/L).			

O/C = open or closed

Document Title(s)/Number(s):
Groundwater Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit (DOE/RL-2014-33, Draft A)

Item 38 P: 2-13 S: 2.2.3 L:Table 2-3	The table is missing the MCL for hexavalent chromium. Please include this value. Basis/Justification: Completeness and clarity.	Include the MCL value for hexavalent chromium.			
Item 39 P: 2-13 Table 2-3	Comment: Similar to comment(s) made for the 200-PO-1 OU SAP, Rev. 0; Re Table 2-3, in addition to MCLs, other regulatory criteria (both human and eco) apply, because groundwater ultimately discharges into surface water (Columbia River). For human health, MTCA Method B surface water CULs (WAC 173-340-720[4][b][ii], -720[8][d], and -730[6][b]) should be met, along with criteria specified in the Clean Water Act and National Toxics Rule (WAC 173-340-730[3][b]) for nonrads. For ecological receptors, state surface water quality standards (WAC 173-201A) and criteria specified in the Clean Water Act and National Toxics Rule (WAC 173-340-730[3][b]) for nonrads apply, along with USDOE biota concentration guides (BCGs) for rads in water and sediment (DOE-STD-1153-2002). Basis: Regulatory criteria for surface water and sediment may apply, because groundwater discharges into surface water.	Re Table 2-3, include surface water and sediment criteria for human health and eco receptors (for rads and nonrads), because groundwater discharges into the Columbia River.			
Item 40 P: 2-16 S: 2.2.3.2 L:19-22	The text states data from samples analyzed outside the holding times are flagged in the HEIS database with an "H". It should be noted that per USEPA guidance for laboratory data validation, if holding times are exceeded the reviewer may determine the results to be unusable, and qualified as Rejected. Basis/Justification: USEPA guidance for data validation.	Include that per USEPA guidance for laboratory data validation, if holding times are exceeded the reviewer may determine the results unusable, and qualified as Rejected.			
Item 41 P: 2-16 S: 2.2.3.2 L:Table 2-5	The table has referenced an "f" footnote, however, there is not an "f" footnote in the table footer. Basis/Justification: Completeness and clarity.	Provide the missing "f" footnote in the table footer.			
Item 42 P: 2-18 to 2-19 Table 2-6	Comment: Re "Holding Time" for rads in Table 2-6, footnote "c" and "NA" appear to be in conflict. Basis: Tables should be internally consistent.	Re "Holding Time" for rads in Table 2-6, clarify a potential conflict between footnote "c" and "NA."			
Item 43 P: 2-20 S: 2.2.9 L:27	The text states that laboratory errors are reported to the SMR organization on a routine basis. Please provide a greater degree of specificity on this issue. It is important for laboratory errors to be reported immediately as they are encountered. This is especially necessary if the errors have impacted the analytical data. Basis/Justification: Completeness and clarity.	Provide a greater degree of specificity on the reporting of laboratory errors to the SMR organization.			
Item 44 P: 3-1 S: 3.1 L/¶: 12	Comment: It is stated, "These objectives were accomplished by review of COPCs derived during the past three annual reports." This contrasts with most of the references of subsections under 1.2.4 that only reference the 2010 annual report, not the 'past three annual reports'. In addition, how in the world can the second bullet be true when proposed sampling at some locations occur only once every two or three years? Plume migration trend analysis cannot be made over three years when there is	Rewrite this section with accurate and agreed upon approaches and methodology with Ecology.			

O/C = open or closed

	only one sample taken over that time period. Further, not all of WMA C sampling requirements (third bullet) are met for retrieval, as those discussions are still occurring. Basis/Justification: Completeness, clarity, and accuracy.				
Item 45 P: 3-1 S: 3.1 L: 12-16	Comment: In the vicinity of 216-B-3 Pond, wells are all screened in the semiconfined/confined aquifer. This SAP does not fully address sampling in the confined aquifer near 216-B-3 Pond. Address sampling in the vicinity of 216-B-3 Pond for the confined aquifer and address if there is perched water sitting atop the Ringold Lower Mud (Unit 9B), or potentially atop Unit 8. Basis/Justification: Determining vertical distribution of contamination.	See comment			
Item 46 P: 3-1 S: 3.2 L: 36-37	Comment: Expound upon how RCRA sampling events and CERCLA sampling events are coordinated using the SMILE process. Basis/Justification: Understanding sampling coordination.	Add additional detail or citation to explain exactly how SMILE process integrates all these data.			
Item 47 P: 3-1 S: 3.2 L: 25-28	Comment: How do flow rates identified by COPC migration compare to calculated groundwater gradients? Basis/Justification: Determining lateral extent of contamination.	Show comparison or identify if the comparison is going to be addressed as part of the RI/FS			
Item 48 P: 3-1 S: 3.2 L: Table 3-3	Comment: 1. Verify that all wells, which are not WAC 173-160 compliant, have been added to the M-24 Milestone. 2. Wells 299-E28-23, 299-E28-24, and 299-E28-25 were all drilled in 1979 or 1980 and are identified as WAC 173-160 compliant in the SAP. These wells are listed as non-compliant in PHOENIX. Verify these wells are compliant with WAC 173-160. Basis/Justification: Ensuring compliant well construction for data collection.	Verify well compliance. Add statement to text, as needed, to confirm non-compliant wells are scheduled for replacement.			
Item 49 P: 3-1 S: 3.2 L: Figure 3-4	Comment: Lateral and vertical definition of various contaminant plumes in 200-BP-5: 1. Identify additional wells or propose new well locations in order to define the lateral extent of the easternmost nitrate plume to the east. As depicted, nitrate plume does not appear to be laterally defined. 2. Iodine-129 plume crosses from unconfined to confined aquifer conditions in the vicinity of 216-B-3 Pond. DOE/RL-2008-59, Rev. 0 and Rev. 1 indicate groundwater contamination would be present in the confined aquifer beneath the Ringold Lower Mud and not on top of the Ringold Lower Mud. Determine the distribution of Iodine-129. 3. Iodine-129 plume, as depicted on Figure 3-6, and via data presented in annual groundwater monitoring reports, does not appear to be delineated. Identify existing well(s) to delineate the lateral extent of the Iodine-129 plume in groundwater.	Verify vertical and lateral extent of contamination in groundwater. Verify sampling schedule for Well 699-42-40A.			

	4. Well 699-42-40A, as depicted on figure 3-6, is along the leading edge of the Iodine-129 plume. In 2015 and 2016, the I-129 concentration in groundwater exceeded the comparison cleanup level. This well needs to be sampled more frequently than every other year, in order to determine if the trend is increasing I-129 or if the 2015 and 2016 data are an aberration. Based on PHOENIX, the I-129 sampling in groundwater sampled from 699-42-40A appears to already be on an annual basis. 5. Strontium-90 groundwater plume to the southwest of Gable Mountain appears to be undefined. Identify additional wells or propose new wells to delineate this plume laterally. 6. Should "Encrouching" be "Encroaching" in the legend? 7. Tritium appears to be undefined to the east. Identify what additional well data could be used or propose new wells to ensure definition of the plume laterally and vertically. 8. Tritium plume is depicted in the vicinity of 216-B-3 Pond above the Ringold Lower Mud. Is the tritium plume in the vicinity of 216-B-3 Pond only in the confined aquifer? If radial flow occurred out of the 216-B-3 Pond, what evidence would eliminate the possibility that disposal resulted in perched water sitting atop the Ringold Lower Mud? Basis/Justification: Define the extent of contamination in groundwater.				
Item 50 P: 3-2 S: 3.2.1 L: 1	Comment: "Appendix A Tables A3-1 through A3-14…." should read "Appendix A Tables A-3 through A-15…."	"Appendix A Tables A3-1 through A3-14…." should read "Appendix A Tables A-3 through A-15…."			
Item 51 P: 3-24 S: 3.2 L: Figure 3-13	Comment: Should "Encrouching" be "Encroaching" in legend? Basis/Justification: Editorial.	Revise legend as needed			
Item 52 P: 3-30 S: 3.3 L:16-17	The text states that samples may require filtering in the field, as noted on the chain-of-custody forms. A joint letter written by the U.S. Environmental Protection Agency and the Department of Ecology directly addressed the use of filtered samples for groundwater monitoring well at the Hanford Site. Specifically, "…groundwater samples should not be field-filtered unless the turbidity exceeds 5 NTUs. Field-filtering under any circumstance must be specifically requested, with basis provided, and approved by Ecology or USEPA in work plans." Provide the basis for the proposal to filter the groundwater samples that are not exceeding a turbidity level of 5 NTUs. Basis/Justification: Direction from Ecology and USEPA.	Provide the basis for the proposal to filter the groundwater samples that are not exceeding a turbidity level of 5 NTUs			

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Groundwater Sampling and Analysis Plan for the 200-BP-5 Groundwater Operable Unit (DOE/RL-2014-33, Draft A)

Item 53 P: 3-30 S: 3.3 L:25-27	The text states that exceeding required holding times could result in changes in constituent concentrations due to volatilization, decomposition, or other chemical alterations. It should be noted that per USEPA guidance for laboratory data validation, if holding times are exceeded the reviewer may determine the results to be unusable, and qualified as Rejected. Basis/Justification: USEPA guidance for data validation.	Include that per USEPA guidance for laboratory data validation, if holding times are exceeded the reviewer may determine the results unusable, and qualified as Rejected.			
Item 54 P: 3-30 S: 3.3.1 L: 30-39	Comment: Provide additional detail regarding how decontamination of groundwater sampling equipment prevents cross-contamination. Basis/Justification: Verifying field procedures are sufficient for stated goals.	Provide requested information.			
Item 55 P: 3-30 S: 3.3 L:	Comment: The majority of the sampling methodology focuses on what happens between collection and receipt of analytical results. The following questions regarding the actual groundwater sampling need to be addressed: 1. At each well, what type of pump is used? 2. In what interval of the monitoring well screen is the intake set for each pump? Why? 3. What is the flow rate of sampling? Is the flow rate of sampling the same for each analyte, or is the sampling flow rate varied during sampling? 4. In what order are analytes collected? If this information is supposed to be in Appendix A and/or B, reference and revise the applicable appendices to answer these questions. Basis/Justification: Verifying field procedures collect valid data.	Provide requested information.			
Item 56 P: A-1 S: A1.2 L:	Comment: All assumptions for analyzing the data associate with this SAP should be clearly stated. Basis/Justification: Statistical methods for compliance monitoring /173-340-720 WAC	State all applicable assumptions for analyzing the mentioned data.			
Item 57 P: A-1 S: A1.2 L/¶: 34-35	Comment: The document states "Groundwater well results with elevated metals (chromium, cobalt, iron, manganese, nickel, and zinc) are considered associated with well screen corrosion and are not monitored by this SAP." This assumption may not be true. Basis/Justification: Assumptions should not exclude contaminants without supporting data. There are many wells with these constituents that were used in Hanford processes. It is DOE's responsibility to keep well conditions within acceptable standards. RCRA wells are to be maintained per 8C RCRA Permit Condition II.F.3. However, all wells must be maintained per WAC 173-160-430	Elevated metals should be evaluated as groundwater COPCs. Continue to monitor for metals (including those listed in the quoted text) at wells where they have been detected. If well screens are corroding that badly they should be replaced. Further, this SAP is not the place to justify possible dropping of COPCs. Acceptable evidence to explain the rationale for eliminating			

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	which states in part, "The casing may not affect or interfere with the chemical, physical, radiological, or biological constituents of interest."	these metals/COPCs must be made in the 200-BP-5 RI, not in this SAP.			
Item 58 P: A-3 Table A-1	Comment: The WAC (MTCA Method B) CUL for U would default to Hanford background (9.9 µg/L). Basis: Assumptions should not exclude contaminants without supporting data.	The WAC (MTCA Method B) CUL for U would default to Hanford background (9.9 µg/L).			
Item 59 P: A-5 S: A2.3.2 L/¶: 31-32 and 39-41	Comment: The text states, "Analyses showing sharply increasing concentrations for previous measurements would initiate a change from biennial sampling to a shorter frequency…" A definition is needed for "sharply increasing." Basis/Justification: The criteria for use of a shorter frequency appears to be undefined.	Include a definition for "sharply increasing," and what that means in the context of this SAP. If there is a "rule-of-thumb" logic and/or assumptions associated with this language, it should clearly be stated in the text.			
Item 60 P: A-64 -71 Table A-10	The header for Table A-10 should specify Hexavalent Chromium, not Chromium. Basis/Justification: Completeness and clarity.	Correct the title to read Hexavalent Chromium, not Chromium.			

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