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STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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June 21, 2016

16-NWP-112

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) Response to the *Aquifer Treatability Test Report for the 200-BP-5 Groundwater Operable Unit*, Draft A, DOE/RL-2015-75, received May 2, 2016, for the Initial 45-day Review Comment Record (RCR) Period

Dear Mr. Cline:

In accordance with the *Tri-Party Agreement*, Section 9.2.1, Ecology received and reviewed the referenced document. Due to workload, we were unable to submit our comments until this time.

Enclosed is the RCR with Ecology's comments. Ecology is submitting a copy of the RCR to the Administrative Record in accordance with the *Tri-Party Agreement*, Section 9.4.

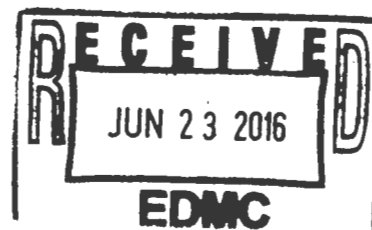
If you have any questions, please contact me at [nina.menard@ecy.wa.gov](mailto:nina.menard@ecy.wa.gov) or (509) 372-7941, or Kim Welsch, Environmental Specialist, at [kim.welsch@ecy.wa.gov](mailto:kim.welsch@ecy.wa.gov) or (509) 372-7882.

Sincerely,

Nina M. Menard  
Environmental Restoration Project Manager  
Nuclear Waste Program

kw/aa  
Enclosure

cc: See page 2



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cc electronic w/enc:

Dennis Faulk, EPA  
Rod Lobos, EPA  
Jim Hansen, USDOE  
Jim Hanson, USDOE  
Marty Doornbos, CHPRC  
Curt Wittreich, CHPRC  
Jon Perry, MSA  
Ken Niles, ODOE  
Nina Menard, Ecology  
Kim Welsch, Ecology  
Cheryl Whalen, Ecology  
USDOE-RL Correspondence Control  
Environmental Portal  
Hanford Facility Operating Record

cc w/enc:

Steve Hudson, HAB  
Administrative Record  
NWP Central File

cc w/o enc:

Rod Skeen, CTUIR  
Gabriel Bohnee, NPT  
Alyssa Buck, Wanapum  
Russell Jim, YN  
NWP Reader File

Review Comment Record

Washington State Department of Ecology  
Nuclear Waste Program  
Cleanup Section, Environmental Restoration Project

Date: June 16, 2016

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Document Title: *Aquifer Treatability Test Report for the 200-BP-5 Groundwater Operable Unit* (DOE/RL-2015-75, Draft A)

Document Lead: Kim Welsch, (509) 372-7882, kim.welsch@ecy.wa.gov

Project Manager: Nina Menard, (509) 372-7941, nina.menard@ecy.wa.gov

Item # Page # Section # Line/¶ #s	Comment and Basis/Justification	Modification Needed	DOE Response	Ecology Response	Open or Closed?
GENERAL	<p>Aquifer Treatability Test Report for the 200-BP-5 Groundwater Operable Unit reported that during a 3-day and a 27-day constant rate pumping tests the sustained yield of extraction well 299-E33-268 was greater than 150 gpm pumping rate, with a maximum drawdown of 4.09 inch. Ecology concurs that, based on these results, pumping of contaminated groundwater should continue.</p> <p>However, Ecology notes that the test was poorly described in the report. In particular, the thickness of the aquifer in 299-E33-268 is not stated in Sections 1 or 2, where the site of the test and the experimental design are described. The saturated thickness of the aquifer is of particular interest due to the earlier test in well 699-50-53A which had been discontinued because of low extraction rates in a 2 ft thick aquifer.</p> <p>Section 2.3.1 states only that the extraction well screen was extended across the entire saturated thickness of the unconfined aquifer; the saturated thickness of the aquifer is also not explicitly noted on Figure 2-4, where it appears to be less than 5 ft. thick (distance between the bottom of the screen of 252 ft. - depth to water of 247 ft.). Considering that extraction was not sustainable in the 2 ft. thick aquifer, a better explanation should have been included in the report why the 5 ft. thick aquifer is expected to continue to perform at 150 gpm.</p>	<p>Clarify document considering this overall comment, along with the following specific comments.</p>			
GENERAL	<p>In reporting water level and well information, both English and metric units are used. Please keep units consistent throughout to facilitate ease of understanding.</p>	<p>See comment</p>			
Item 1 P: 1-1 S: 1 L: 3	<p>Comment: Add revision number after DOE/RL-2010-74 report.</p> <p>Basis/Justification: Indicate which version of report is being referenced, as revision 2 is most recent report in the AR.</p>	<p>See comment</p>			
Item 2 P: 1-1 S: L: 36-40	<p>Comment: The information/data developed in this test is useful for the B Complex remediation planning, but should not be generalized to the entire BP-5 groundwater operable unit without further analysis and testing at specific sites where P&amp;T operations might be planned.</p>	<p>Qualify these statements as indicated.</p>			

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	Basis/Justification: In this area of extremely heterogeneous sediments and highly variable aquifer properties, one cannot validly apply a "one size fits all" approach. I would hope that further investigation would be forthcoming in an FS.				
Item 3 P: 1-3 S: L13-17	Comment: Where will the treated water be returned to the aquifer? 200 E, 200 W, or ??  Basis/Justification: Injected water will affect groundwater and aquifer characteristics in the area of injected wells.	Please specify the location and number of wells that will be used to return the treated water to the aquifer, its approximate quality, injection rates and how injected water will affect the water table configuration and groundwater flow direction as well as water quality for other monitored facilities in the vicinity.			
Item 4 P: 1-6 S: L: 4-8	Comment: The paleochannel controls groundwater flow, but recharge is from infiltration, runoff, and, in the past, artificial recharge by humans.  Basis/Justification: Completeness of information	Please correct these statements as indicated.			
Item 5 P:1-6 S: Table 1-1 L:	Comment: Values for several of these constituents (e.g., U, Tc-99, and CN) need to be updated, as the values shown are considerably lower than the maximum.  Basis/Justification: Completeness of information	Please update and correct this table as indicated.			
Item 6 P: 1-6 and 1-13 S: L: Tables: 1-1 and 1-3	Comment: Table 1-1 and Table 1-3 list conflicting Drinking Water Standards for Cyanide. Table 1-1 lists 200 ug/L and Table 1-3 lists 4.8 ug/L. Please address the discrepancy.  Basis/Justification: Technical discrepancy.	Address why Table 1-1 lists a DWS of 200 ug/L for Cyanide and Table 1-3 lists 4.8 ug/L.			
Item 7 P:1-7 S:Fig. 1-5 L:	Comment: Nice figure. Compared to previous years, both the gradient and flow direction have considerable uncertainty. What will you use as a planning basis, and justify your choice? Do you anticipate that the unconfined aquifer thickness will decline to zero in areas, and how will that affect your planning; i.e., what will happen with contaminants remaining in the thickened vadose zone?  Basis/Justification: Completeness of information	Please clarify and update as indicated.			
Item 8 P:1-8, S: L:7-12	Comment: Please provide ECF-200BP5-10-0254. Fig. 1-10 hints at the use of uniform, homogeneous, isotropic aquifer properties which is hardly the case.  Basis/Justification:	Please provide details of the modeling that supports these statements.			

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Item 9 P: 1-10 S: 1.3 L: 16-24	Comment: Reiterate citation at end of paragraph.  Basis/Justification: Remind reader of the report source for the information in this paragraph.	Editorial; see comment			
Item 10 P: 1-14 S: 1.4 L: Figure 1-14	Comment: Consider adding sampling port locations to figure.  Basis/Justification: Visually represent sample port locations described in text.	See comment			
Item 11 P: 2-1 S: 2.1 L: 8	Comment: "Test Objectives and Rationale"  Basis/Justification: Editorial	Editorial; See comment			
Item 12 P: 2-2 S: 2.3.2 L: Figure 2-4	Comment: Add bullet explaining why pump intake was set below the well screen (e.g., to reduce potential for pulling sand pack into well and clogging intake of pump)  Basis/Justification: Clarification of experimental design	See comment			
Item P: 2-4 S: 2.3.2 Fig 2-2	How closely did actual drawdown in observation wells match the predicted? These are very minimal withdrawals that may fall within the limits of error of the measuring equipment.	Please address and clarify as indicated.			
Item 13 P: 2-4 S: 2.3.2 L: 1-3	Comment: Upon review of Figure 2-1, explain in text why no wells to the northwest of 299-E33-268 were selected as observation wells for drawdown measurements. Especially because wells 299-E33-26 and 299-E33-35 are in the vicinity.  Basis/Justification: Completeness of information.	See comment			
Item 14 P:2-10 S: L:16	Comment: Delete the term "laminar", as you have no idea that this would be laminar flow.  Basis/Justification:	Modify as indicated in the comment.			
Item 15 P: 2-10 S: 2.3.3 L: 18	Comment: Replace bullet text "and associated monitoring wells" with a list of the wells where measuring devices were installed  Basis/Justification: Providing specific information	See comment			
Item 16 P:2-10 S:2.3.4 L:	Comment: Explain what is meant by "a local scale hydrologic numerical model".  Basis/Justification: Completeness of information	Provide explanation, including assumptions, boundary conditions, scale, and parameters for a "local scale hydrologic numerical model" for each instance where it is used in this report. Be clear on the objectives of "local scale hydrogeologic models."			

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<p>Item 17 P: 2-12 S: L: 1-27</p>	<p>Comment: Without familiarity with the various models cited, it is nearly impossible to determine how the various models functioned and what derives from what.</p> <p>Basis/Justification: Completeness and clarification of information</p>	<p>Provide a listing of all models cited here and give the basic assumptions, parameters, and boundary conditions for each. Deriving one model from another just further compounds abstraction and makes comprehension very challenging.</p>			
<p>Item 18 P: 2-15 Fig. 2-12 S: L:</p>	<p>Comment: At the scale presented, there is too much undecipherable detail on this figure. Simplify this figure or prepare more than one figure that is decipherable at the scale presented.</p> <p>Basis/Justification: Clarification</p>	<p>See comment</p>			
<p>Item 19 P: 2-17, Table 2-1 S: L/¶:</p>	<p>Comment: The B Complex is not considered as part of the paleochannel, so some of these figures seem extremely high, given that they presumably apply to the paleochannel sediments and not those directly beneath the wells used in the aquifer test.</p> <p>Basis/Justification: Clarity of information</p>	<p>Justify and clarify the use of these extreme hydraulic properties.</p>			
<p>Item 20 P: 2-18 S: L: Table: 2-2</p>	<p>Comment: Fix this table. Call out that units for cyanide and nitrate are in µg/L. As currently presented in table, units appear to be in pCi/L. The units of concentration listed for the "Water Lowest Overall Risk Based Screening Level" and "Water Target Detection Limits" columns should be pCi/L and ug/L. Uranium (Total), Cyanide and Nitrate are all measured in ug/L.</p> <p>Basis/Justification: Technical accuracy.</p>	<p>Add ug/L to the "Water Lowest Overall Risk Based Screening Level" and "Water Target Detection Limits" columns units of measure.</p>			
<p>Item 21 P: 2-20 S: 2.8 L: 15</p>	<p>Comment: Are there any well gauging data (not necessarily logged automatically) for the well network within 24 hours before the start of the step drawdown test?</p> <p>Basis/Justification: Clarification of information presented.</p>	<p>See comment</p>			
<p>Item 22 P: 2-20 S: 2.8 L: 23-26</p>	<p>Comment: At what time during the 3-day constant rate test did the Levelogger in well 299-E33-38 fail? In well 699-49-57A?</p> <p>Basis/Justification: Completeness of information presented.</p>	<p>See comment</p>			
<p>Item 23 P: 2-21 S: 2.7 L: 1-4</p>	<p>Comment: Add the boring logs for the wells used in this study as a separate appendix.</p> <p>Basis/Justification: Completeness of information in this report, without having to search for pertinent information in other reports.</p>	<p>See comment</p>			

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<p>Item 24 P: 2-21 and 3-4 S: 2.8, 3.1.3 L/¶: 4-5</p>	<p>Comment: Based on statement: "To reduce this data set to a reasonable size for analysis, the data were arranged to a log frequency." Explain in greater detail why it is important to reduce the data set, as 23,000 water level measurements may not seem like a lot of data for a computer to process. For instance, it might make more sense to describe the limitation of a data set size that can be imported into AQTESOLV®, or perhaps curve fit is the same using the original data set or the reduced data set, if that is the case. Whatever the reasoning, add those reasons.</p> <p>Basis/Justification: Clarity of process.</p>	<p>See comment</p>			
<p>Item 25 P: 2-21 S: 2.8 L/¶: 21-23</p>	<p>Comment: "Because normalization of the water level measurements to a constant barometric pressure contains some residual error, the recovery data at well 299-E33-342 (which had the lowest drawdown) was adversely affected."</p> <p>Basis/Justification: Completeness of information</p>	<p>Revise "adversely affected" to indicate if residual error caused underestimation, overestimation, or a combination thereof, as it effects recovery data at well 299-E33-342.</p>			
<p>Item 26 P:3-8, Tables 3-6, 3-7 S: L/¶:</p>	<p>Comment: What is the uncertainty in these various values for derived parameters? What is range of azimuth values?</p> <p>Basis/Justification: Completeness of information</p>	<p>See comment</p>			
<p>Item 27 P: 3-9 S: 3.1.4 L/¶: 4-6</p>	<p>Comment: Explain in greater detail why "Many of the specific yield determinations came out unrealistically high" and why those results were excluded from the range and average calculations.</p> <p>Basis/Justification: Clarity and elaborate on information presented.</p>	<p>See comment</p>			
<p>Item 28 P: 3-15 S: 3.3 L/¶: Table 3-8</p>	<p>Comment: For Table 3-8, looks like nitrate and cyanide headers are swapped.</p> <p>Basis/Justification: Swap column headers.</p>	<p>Editorial</p>			
<p>Item 29 P: 3-15 S: L: Table: 3-8</p>	<p>Comment: Several of the Pumping Test dates have missing measurements for Uranium, Cyanide, Nitrate, Iodine-129, and Tritium. All dates list results for Technitium-99. Explain the basis for the missing data. Furthermore, it would have been beneficial to include a note or footnotes for the empty cells.</p> <p>Basis/Justification: Missing data.</p>	<p>Explain the basis for the missing data. Furthermore, it would have been beneficial to include a note or footnotes for the empty cells.</p>			

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Item 30 P: 3-15 S: L: Table: 3-8	Comment: For technical accuracy, Uranium should be identified as Uranium (Total). This is important because previously in the document, Table 2-2, Analytical Performance Requirements are listed for Uranium-233/234, Uranium-235, and Uranium-238, in addition to Uranium (Total). By only listing "Uranium" in this table may lead to a misinterpretation.  Basis/Justification: Technical accuracy.	Identify Uranium as Uranium (Total).			
Item 31 P:3-16, S: L: 1-4	Comment: During the 27 day test, what was the contaminant mass removed? As the purpose of P&T is to remove contaminants, the mass of contaminants removed is a better indicator of the success of the operation. If the pumping were to continue at this rate, what is the estimated time to remove contaminants down to the DWS?  Basis/Justification: Technical accuracy	Please indicate the mass of contaminants removed and the estimated percentage of the total inventory of each contaminant removed, and the estimated time to remove the total mass of contaminants down to the DWS if pumping at this rate were to continue.			
Item 32 P: 3-16 S: L: 6-19	Comment: These contaminants are also associated with the BX and BY tanks.  Basis/Justification: Discuss the basis for judging them to be solely from the BY cribs or change this sentence/paragraph.	Please address as indicated.			
Item 33 P: 3-16 S: 3.3 L/¶:	Comment: Section is called "contaminant mass removal" and figures only show mass removal for technetium-99 and uranium. Explain why there are not figures for mass removal of nitrate, cyanide, iodine-129, and tritium? Mass removal values are provided in Table 3-9.  Basis/Justification: Clarification of information presented.	See comment			
Item 34 P: 3-18 S: 3.3 L/¶: Table 3-9	Comment: Average pumping rate should be in gallons per minute not Liters per minute  Basis/Justification: Use correct units.	See comment.			
Item 35 P: 4-1 L: 2-4 L/¶:	Comment: This treatability test is valid for one of several source areas known to contaminate groundwater in the 200-BP-5 OU. While it may receive consideration for use elsewhere, similar tests need to be run at the different source area. Generalization from this test to all of 200-BP-5 is a stretch.  Basis/Justification: Please qualify this statement.	See comment			
Item 36 P: 4-2, Fig 4-2	Comment: The streamlines indicate that flow was mostly from the conductive sediments in the paleochannel. What about contaminants "stuck" in less permeable sediments	Please address as indicated.			



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S: L/¶:	and that are left in the vadose zone? Please address contaminants in all sedimentary sequences and all source areas in the 200-BP-5 OU.  Basis/Justification: Technical accuracy				
Item 37 P: 5-1 S: 5 L/¶:	Comment: Lots of useful literature references. However, no links to where they reside in the AR. How are these external references going to be linked to this report? All references <u>must</u> be in the AR.  Basis/Justification: Access to references used.	See comment			
Item 38 P: D-1 S: App D L:	Comment: Item for discussion with Ecology.  Meeting minutes in Appendices C and D need to be identified as draft, or relabeled as "CHPRC meeting notes." Signatures of Ecology and EPA would be required to approve of these as TPA meeting notes, like at the 100/300 UMM or 200 PMM meetings. Attendance without formal signature by Ecology and EPA to the update meeting does not necessarily constitute agreement with the minutes recorded therein. An attendance/sign in sheet is not a signatory agreement either.  Basis/Justification: Legal process.	See comment			