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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
3100 Port of Benton Blvd • Richland, WA 99354 • (509) 372-7950

February 22, 2010

Mr. Matthew S. McCormick
Richland Operations Office
United States Department of Energy
P.O. Box 550, MSIN: A5-11
Richland, Washington 99352

Re: *Integrated 100 Area Remedial Investigation/Feasibility Study Work Plan, Addendum 5: 100-N Decision Unit*, DOE/RL-2008-46-ADD5, Draft A (Work Plan) and the *Sampling and Analysis Plan for the 100-N Decision Unit Remedial Investigation/Feasibility Study*, DOE/RL-2009-42, Draft A (SAP)

References: See page 2

Dear Mr. McCormick:

The Department of Ecology (Ecology) submitted comments on the Work Plan and SAP (reference 1). Enclosed is a Review Comment Record containing our current detailed and general comments as part of the 60-day comment period outlined by Hanford Federal Facility Agreement and Consent Order (HFFACO), Section 9.2.1 (enclosure 1).

Ecology staff gained a better understanding of the data the United States Department of Energy-Richland (USDOE-RL) used as the basis for the Work Plan at the February 17, 2010 workshop. After the workshop we were able to give feedback that focused on both deficiencies in the Work Plan and data needs that Ecology believes still exist. A list of our general concerns with the Work Plan that were communicated at the workshop is enclosed (enclosure 2).

USDOE-RL committed to submit Draft B of the Work Plan within 60 days (reference 2). We expect significant changes in Draft B in order to address our concerns (reference 1) and your response (reference 2). For this reason, Ecology did not perform an exhaustive review of Draft A. We will provide a detailed review of Draft B.

As discussed in our February 18, 2010 meeting, Ecology requests that USDOE-RL provide a detailed work schedule to finalize the Work Plan, and a summary of how that schedule may impact the project schedule given in Section 5 of the Work Plan. Please include any critical path information available in the schedule. Ecology understands that significant delays in Work Plan

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completion will impact HFFACO Target Date M-015-62-T01. Milestone changes may be necessary. The detailed schedule will help Ecology to plan staff time accordingly.

If there are any questions, contact me at 509-372-7941 or Alicia Boyd at 509-372-7934.

Sincerely,

Alicia J. Boyd

for Nina M. Menard
Environmental Restoration Project Manager
Nuclear Waste Program

ab/aa
Enclosures (2)

References:

1) Letter dated January 29, 2010, from N. M. Menard, Ecology to M. S. McCormick, USDOE, "Integrated 100 Area Remedial Investigation/Feasibility Study Work Plan, Addendum 5: 100-N Decision Unit, DOE/RL-2008-46-ADD5, Draft A (Work Plan) and the Sampling and Analysis Plan for the 100-N Decision Unit Remedial Investigation/Feasibility Study, DOE/RL-2009-42, Draft A (SAP)" 0984853

2) USDOE Letter 10-AMCP-0086, dated February 12, 2010, from M. S. McCormick, USDOE, to J. A. Hedges, Ecology, "Integrated 100 Area Remedial Investigation/Feasibility Study Work Plan, Addendum 5: 100-N Decision Unit, DOE/RL-2008-46-ADD5, Draft A and Sampling and Analysis Plan for the 100-N Decision Unit Remedial Investigation/Feasibility Study, DOE/RL-2009-42, Draft A" 0985060

cc w/enc:

Mike Thompson, USDOE
Laura Buelow, EPA
Stuart Harris, CTUIR
Gabriel Bohnee, NPT
Russell Jim, YN
Susan Leckband, HAB
Ken Niles, ODOE
Administrative Record: 100-N
Environmental Portal
Hanford Operating Record General File
USDOE-RL Correspondence Control

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	10. Agreement with indicated comment disposition(s)	
Cheryl Whalen Organization Manager (Optional)	Reviewer/Point of Contact Date Author/Originator	Reviewer/Point of Contact Date Author/Originator

Item	12. Page/Line	13a. Comment/Discrepancy (Provide technical and/or regulatory justification.)	13b. Recommended Change	14. (A)ccept or (R)eject	15. Disposition (Provide justification if **NOT** accepted.)	16. Status
1.	Global Comment	The text needs to identify and describe all applicable 100-N Decision Unit TPA milestones.	Suggest putting a history of TPA milestones in Section 2.			
2.	Global Comment	There are many locations in the text that refer to a planning process and/or a series of workshops. As of now, the only part of the planning process that was not internal to DOE was a single meeting to discuss CSM plates. Several of the text locations are: ES-vi, lines 3-4; ES-vii, line 27; ES-viii, line 9; 1-1, line 12; 4-47, line 8; 1-2, line 24; 1-2, line 25, 4-1, line 3 (which includes a reference to a section 4.5 that doesn't exist) .	This language is acceptable if during the course of rewriting and issuing the work plan we do have a series of workshops and a planning process that Ecology takes part in. If this does not happen, Ecology would like a better description of the actual planning process that did occur.			
3.	Global Comment	There are many text locations that describe an activity as beginning "next year" or the like. Due to the long comment resolution process, this language may be outdated before the workplan is finalized. One of the text locations is 1-23, lines 35-37.	Please edit such text occurrences to include an approximate date when the activity will start.			
4.	Global Comment	What are the COPCs? We haven't really seen a list in this document.	Work with Ecology to develop a list of COPCs.			
5.	ES-v, lines 10-12	Text states: "This document supports final remedy selection under the CERCLA for the 100-N Decision Unit at the Hanford Site."	Text should be changed to read: "The characterization results from the remedial investigation are intended to ~~is document~~ supports final remedy selection under the CERCLA for the 100-N Decision Unit at the			

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			Hanford Site."			
6.	ES-vi, Figure ES-1 & p. 1-3, Figure 1-2	The table included in the figure that identifies the size (in acres and hectares) of the river corridor decision units does not appear to be the same table as was used in the workplan or in Addendum 1. This table also shows up on page 1-3 as Figure 1-2.	For consistency, it is recommended that the same table be used.			
7.	ES-vi, line 7	The text states: "Information includes the facilities operational history…., the nature and extent of groundwater and soil contamination, …" The phrase "the nature and extent of groundwater and soil contamination" should be qualified to convey the extent of knowledge.	Possible wording: "Information includes the facilities operational history…., the known nature and extent of groundwater and soil contamination, …"			
8.	ES-vii, lines 1-2	The text states: "….geohydrologic information, source and groundwater remedial actions and their effectiveness…." Considering the bioventing remediation for the petroleum hydrocarbon contamination and the apatite barrier treatability testing have only recently begun, it is premature to imply that the effectiveness of remediation is understood.	It is recommended that the words "and their effectiveness" be deleted.			
9.	ES-vii, line 2	The text states: "….geohydrologic information, source and groundwater remedial actions and their	"….geohydrologic information, source and			

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		effectiveness and the results of treatability and characterization studies." It is recommended that the words "to date" be inserted into the sentence to clarify which results were identified and collected. Please make it clear that all data used in the document was current as of this date or put "as of XX/XX/20XX" dates on all tables and figures in the document. There are many locations that a date would be appropriate, several of the locations are: ES-vii, line 2; ES-vii, line 5; ES-vii, line 7, 1-8, lines 21-22; 4-47, line 36; B-1 maps;	groundwater remedial actions, ~~and their effectiveness and~~ the results of treatability and characterization studies as of [insert date],....."			
10.	ES-vii, line 2	The text states: "....geohydrologic information, source and groundwater remedial actions and their effectiveness and the results of treatability and characterization studies." It is recommended that credit be taken for compiling the HEIS data.	Possible text wording: "....geohydrologic information, source and groundwater remedial actions, ~~and their effectiveness and~~ the results of treatability and characterization studies as of [insert date], and the results of environmental media monitoring."			
11.	ES-vii, lines 3-4	Text states: "Strontium-90 (SR-90) contamination is the primary risk driver at the 100-N Decision Unit; however, other groundwater plumes exist." This gives the mistaken impression that this RI/FS only addresses groundwater.	Possible rewrite: "Strontium-90 (SR-90) contamination is the primary risk driver at the 100-N Decision Unit~~;~~, however, other groundwater and vadose zone plumes exist~~.~~ that may not have been characterization to adequately evaluate risks at this time.			

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12.	ES-vii, lines 4-5	Text states: "Appendix B presents maps of the facilities source sites, and the Sr-90 groundwater plume." The map provided in Appendix B doesn't appear to be dated. As a general comment for the entire document, when contamination plume maps are presented, the date should also be included to provide the reader relevant information. Also, it is noted the text does not describe the strontium-90 plume as remaining generally consistent in concentration or shape where monitored in the uppermost portion of the unconfined aquifer.	Possible change: "Appendix B presents maps of the facilities source sites, and the Sr-90 groundwater plume as mapped on [insert date]. Generally speaking, the plume has remained fairly consistent in concentration and shape (as measured at the uppermost portion of the unconfined aquifer) since groundwater monitoring began in [insert date]."			
13.	ES-vii, line 6	It is requested that the text also identify that while the "interim closed out" remedial actions satisfied the IRODs , they may not satisfy final CERCLA remediation and/or RCRA corrective action requirements due to vadose zone and/or groundwater contamination remaining after the IROD removal action.	If the word "remediated" is used to describe the 20 "interim closed out" source units, it is recommended the text acknowledge additional remediation may be required. Possible wording: "While the "interim closed out" remedial actions satisfied the IRODs, they may not satisfy final CERCLA remediation and/or RCRA corrective action requirements due to vadose zone and/or groundwater contamination remaining after the IROD removal action."			
14.	ES-vii, lines 9-14	Editorial comment. The text states: "The conceptual site model (CSM) examined the known contamination	Possible re-wording: "~~The conceptual site model (CSM) examined the known~~			

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		levels and location(s), and information needed to support remediation decisions. A CSM is a description of a site representation that organizes the information available and provides a summary of the site conditions. The CSM was used to identify data and information gaps, establish data needs, and design a field program to address the data needs." Consider edits to make the text more accurate.	~~contamination levels and location(s), and information needed to support remediation decisions.~~ A conceptual site model (CSM) is a description of a site representation that organizes the information available and provides a summary of the site conditions. Known contamination levels and location(s), as well as information needed to support 100-N Decision Unit remediation decisions for the final Record of Decision (ROD) were used to develop the CSM. In turn, t~~T~~he CSM was used to identify data and information gaps, establish data needs, and design a field program to address the data needs."			
15.	ES-vii, line 16		Change text, "…providing ~~explanations~~ theories regarding Sr-90 plume persistence…"			
16.	ES-vii, lines 28-29	The text states: "These data gaps included recognition of the need for additional information to better define the following:" The list does not include the verification/validation of RESRAD assumptions used for achieving interim remedial objectives.	Recommended wording: "These data gaps included recognition of the need for additional information to better define, understand, validate, and/or verify the following:" Recommended addition to the list: "Verify and/or validate accuracy of RESRAD modeling			

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			assumptions used to achieve interim remedial objectives."			
17.	ES-viii, line 1	Specify that the remedial actions to date have been under interim action RODs.	Suggested text, "…following interim remedial action…"			
18.	ES-viii, lines 1-2	The bullet starts out with "Potential effects…" while the previous bullet begins with "Asses risk…" They describe similar activities and it is confusing to have it described two different ways. Also, it is requested that surface water be added to the list.	Requested changes: "~~Potential effects~~Assess risk of residual soil contamination following remedial action on human health, groundwater, surface water, and the environment".			
19.	ES- viii, lines 1-9	The list of additional information needed does not include the evaluation of the effectiveness of groundwater contamination remediation.	Recommended addition: "Effectiveness of groundwater contamination remediation"			
20.	ES-viii, Data needs section	The Executive Summary describes data needs and divides the satisfaction of those needs between this RI/FS and "several ongoing programs." The summary explains that "the results of ongoing deactivation, decontamination, decommissioning, and demolition, and from waste site and groundwater interim remediation actions plus the proposed investigations will be used in the selection of final remedies and will be incorporated into a proposed plan…" The approach described imposes an inherent restriction to a mere fraction of the data gaps associated with this decision	The executive summary should clearly identify that, should an additional RI/FS and RFI/CMS phase(s) be required, those requirements will be identified in the final ROD.			

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		unit. It is recommended that the executive summary acknowledge that RI/FSs sometimes require more than one phase.				
21.	ES-ix, Table ES-1	The table implies that in the 100-N Area, 93 source sites will be characterized via 0 new boreholes, 2 new wells into the unconfined aquifer, 2 new wells into the Ringold Upper Mud Unit, and sampling of existing monitoring wells. The text does not explain how characterization will be comprehensive.	It is requested that notes be added to the table which identify where the reader may obtain source-specific information in the addendum or in another document to understand which units are being characterized by which boreholes, test pits, wells, or aquifer tubes.			
22.	ES-ix, line 6	The text states that the "...premise and observation that after 13 years of active remediation and study, a limited number of uncertainties remain that should be addressed to support final remediation decisions." Less remediation has occurred in the 100-N Area than in the other reactor areas. With only 20 waste sites interim closed out and 93 left for evaluation, characterization and/or remediation, this assumption may not be valid in the 100-N Area.	This statement should be discussed in section 4.4. Currently the "limited number of uncertainties" does not seem to be appropriate given the list of data gaps found in Section 4.4.			
23.	ES xix-xii	It is recommended the following terms and/or acronyms be added: "CMS", "ISTM" (for In Situ Treatment Zone), "ITRD" (for Innovative Treatment and Remediation Demonstration), "periodically re-wetted zone", "target analyte"				

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24.	p. 1-2, line 16	Text states: "More importantly, a CSM can identify data gaps and establish…"	Recommended text change: "More importantly, a CSM can be used to identify data gaps and establish…"			
25.	p. 1-2, line 18	Text states: "Additional data collection and other investigations address data gaps…" The sentence should identify that there are other data collection activities and investigations that will be used.	Recommended text change: "Additional data collection and other investigations will also address data gaps…"			
26.	p. 1-2, lines 19-21	The text describes the purpose of the CSM of which process history is an important part. Another important use of the CSM is that it can be used to clearly understand the additional need to evaluate remedial action adequacy. Please clarify this in the text.	Change text, "The CSM addresses contaminant sources (i.e. process history), nature and extent of contamination… it supports risk characterization, remedial action selection, remedial action adequacy evaluation, performance monitoring, and site closure."			
27.	p. 1-4, line 3	Text identifies 234 "former and remaining facilities". It is important that the addendum be consistent and accurate with such facts. It is requested that a reference for the number (234) be included.	Cite source of 234 facilities number.			
28.	p. 1-4, Table 1-1	Table identifies 5 different numbers. It is important that the addendum be consistent and accurate with such facts. It is requested that a reference for the numbers (234, 96, 82, 27, and 29) be included.	Cite source of numbers.			
29.	p. 1-4, Table 1-1	It appears that "D4" definitions are provided for four statuses. There can be confusion between these	Please clarify that these definitions are not the ones used in WIDS.			

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		definitions and those regularly used within WIDS.				
30.	p. 1-4, lines 15-17	Text describes ISS and no source is referenced.	Please ensure that this accurately reflects description in the ISS ROD/AM and cite the reference.			
31.	p. 1-4, lines 17-18	Text states: "The ISS shell also will serve to minimize the spread of any potential contamination from and beneath the reactor." There does not appear to be a CSM plate for the reactor. As such, there does not appear to be an identification of uncertainties associated with potential contamination from and beneath the reactor or conditions that would allow contaminant migration (eg., ISS roof runoff, open fuel basin pit, etc.). Because such uncertainties exist, the referenced sentence should be re-stated to identify ISS shell being "intended" to serve to minimize the spread of any potential contamination from and beneath the reactor.	Recommended text change: "The ISS shell is intended to ~~also will~~ serve to minimize the spread of any potential contamination from and beneath the reactor."			
32.	p. 1-4, lines 3, 21-24	The text states: "A complete status of facilities in the 100-N Decision Unit is provided in Appendix D". Line 3 references 234 facilities. A tabulation of the number of facilities for which a status is provided in Appendix D is 182, not 234. It is requested that	Please reconcile this difference.			

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		Appendix D be corrected to include "a complete status of facilities in the 100-N Decision Unit".				
33.	p. 1-5, Figure 1-3	There is inconsistency between the text in 1.2.1 (which describes active, removed, inactive, and demolished facilities) and Figure 1-3 (which lists "characterization in progress", "ready for deactivation/deactivation in progress", and "ready for demolition/demolition in progress").	The map should be changed to reflect the language/delineations used in the text. Also, there should be explanation as to why all 234 facilities are not shown on the map. If these are "significant" or "major" facilities, that should be described as well as the location to find similar information on the remaining facilities not listed in the figure.			
34.	p. 1-8, line 13	Text states: "Each excavation is soil sampled and modeled (if needed) to assess the potential impact to human health, groundwater, and the Columbia River from residual contamination." It is requested that explanation be provided for modeling.	Recommended text change: "In accordance with the applicable interim ROD, e~~E~~ach excavation is soil sampled and modeled (if contaminant concentrations exceed cleanup levels~~needed~~) to assess the potential impact to human health, groundwater, and the Columbia River from residual contamination."			
35.	p. 1-8, lines 21-22	Text states: "These two liquid disposal facilities were the major sources of contamination to the groundwater." If accurate, it is recommended that an identification that the remediated waste sites account for the sources of contamination from historical waste management practices (i.e., not unplanned releases).	Recommended text addition: "Although vadose zone and groundwater contamination remains associated with the remediated liquid disposal waste sites, to date, xx [insert correct number] land-based waste sites have been remediated to satisfy interim ROD cleanup standards."			

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36.	p. 1-12, lines 4-7	The text states that "Figure 1-10 illustrates the impact of the pump-and-treat system on Sr-90 concentrations in the groundwater at the riverbank." If Figure 1-10 illustrates anything, it is unclear, especially without a legend. How is a figure showing an aerial view with a few concentration lines supposed to illustrate the impact of pump-and-treat? The text refers to a green line which doesn't exit on the figure. Is the wrong figure inserted here?	Ensure that figure 1-10 is the intended figure. If it is, add a legend to figure to clarify or change the figure to one that serves better. A more appropriate figure to illustrate the impact of pump-and-treat may include two plume concentration maps, one from before the installation of the pumps and one from a more current time period.			
37.	p. 1-8, lines 13-22	The text describes cleanup approach and progress to date.	It is requested that an identification that 20 waste sites (or total to date) have been remediated to date. Also, it is recommended that more detailed information in Chapter 2 be referred to.			
38.	p. 1-9, line 3	Line 3 indicates 18 waste sites have been closed or interim closed while the Executive Summary (page vii, line 5) indicates 20 source sites have been remediated. Although the document is large, it should not contain what appear to be discrepancies.	The text should either use the same numbers or clearly explain/identify the derivation of any numbers used. Numbers used in this text (i.e., 18 sites closed or interim closed, 38 sites assigned "no action" or "not accepted", etc.) should include sources where possible and should be verified for accuracy.			

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39.	p. 1-9, line 12	Ideally, the cited evaluation report would be final, rather than draft.	If the report is finalized prior to the finalization of this addendum, it is requested that the reference be updated.			
40.	p. 1-10, Figure 1-8	If Figure 1-8 was taken from *100-NR-1 Area Orphan Sites Evaluation Report*, Draft A, it is requested that a reference be included.				
41.	p. 1-11, line 23	Include a reference of the correspondence dated March 23, 1995.	A full reference should include a letter title if possible. The reference could be put in a footnote.			
42.	p. 1-11, line 35	Typographical error: 1301 N trench should read "1301-N trench"				
43.	p. 1-11, line 37	Include a reference of the approval correspondence regarding the March 2006 pump-and-treat system's termination.				
44.	p. 1-11, lines 41-42	The text indicates a Sr-90 inventory estimated in the saturated sediment and groundwater. Either include an estimate for the unsaturated vadose zone or identify that no estimate exists. If unsaturated vadose zone Sr-90 inventory estimates have been made, the text should identify they have not been field-confirmed.	Recommended text addition: "It should be noted that unsaturated vadose zone Sr-90 inventory estimates have not been made."			
45.	p. 1-12, lines 4-8	The text refers to Figure 1-10 and describes colored lines indicating Sr-90 discharges and pore-water concentrations. Figure 1-10 does not appear to include				

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		that information. The referenced and described figure does not appear to have been included.				
46.	p. 1-12, line 9	Text states: "Since that time, concentrations have fluctuated widely, presumably in response to river stage and sampling date relative to water level." As the river stage effects on contaminant transport and releases to the river are not completely understood, it is requested that the text be changed to indicate "sampling time and/or date".	Recommended text change: "Since that time, concentrations have fluctuated widely, presumably in response to river stage and sampling time and/or date relative to water level."			
47.	p. 1-13, lines 1-4	Text states: "In marked contrast, tritium (a non-adsorbing, 100-NR-2 co-contaminant) declined rapidly after the beginning of pump and treat operations and is currently at or below the detection limit (200 PCi/L) in near-shore groundwater samples, but remains elevated (average of about 20,000 pCi/L) in the pump-and-treat capture zone." Although the text is describing monitoring results during '05, it uses the word "currently" which may not be accurate. Describe '05 monitoring results as in the past and update near-shore tritium monitoring observations. In addition, it is recommended that the text identify which wells are being described as being within the influence of containment during pump-and-treat operations through	Recommended text change: "In marked contrast, tritium (a non-adsorbing, 100-NR-2 co-contaminant) declined rapidly after the beginning of pump and treat operations and through 2005 remained~~is currently~~ at or below the detection limit (200 PCi/L) in near-shore groundwater samples, but remained~~s~~ elevated (average of about 20,000 pCi/L) in the pump-and-treat capture zone. Since 2006, near shore tritium concentrations at wells 199-N-XX and 199-N-XX have not been measured above the analytical detection limit. Note: beyond the pump-and-treat system's influence and from near-shore well 199-N-96A, tritium			

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		2005.	concentrations have fluctuated between non-detect and 3,300 pCi/L; from near-shore well 199-N-99A, tritium concentrations generally increased from non-detect in 2006 to 9,600 pCi/L in early 2009; and from near-shore well 199-N-92A, tritium concentrations ranged from 2,000 to 13,000 pCi/L."			
48.	p. 1-13, Figure 1-10	If Figure 1-10 is used, it is recommended that either a key be added to the photo or explanatory text be added which explains the yellow and orange lines and white circles.				
49.	p. 1-13, lines 19-20	Text states: "It became obvious that larger hammers would be required if the dense soil was to be penetrated. Test pits confirmed that dense soil and medium-sized obstructions prevented penetration." Rather than describe the formational material as "dense soil", it is recommended that other descriptors be used.	Recommended text change: "It became obvious that larger hammers would be required if the cobble- and boulder-laden~~dense~~ soil was to be penetrated. Test pits confirmed that the formational material which contained ~~dense soil and medium~~cobble- and boulder-sized rocks~~obstructions~~ prevented penetration."			
50.	p. 1-14, Section 1.2.6	Was the ISTZ treatability test ever performed?	Provide a brief summary of whether the In Situ Treatability Test was ever performed and why/why not.			
51.	p. 1-15, line 14	It is requested that a reference for the ITRD final report be included in the text.				

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52.	p. 1-19, line 33	Text states: "…in a chemical barrier injected into the aquifer." As the barrier relies on chemical reactions after emplacement of apatite, a wording revision is recommended to more accurately describe the remediation.	Recommended text change: "…in a chemical barrier formed in-situ after injected into the aquifer."			
53.	p. 1-20, lines 1-2 & p. 1-21, lines 7-8	The technology has proven itself successful enough that the barrier is being expanded.	State that the barrier is being expanded, rather than discussing how it may be expanded sometime in the future. Describe the expansion activities that are currently underway.			
54.	p. 1-20, lines 25-27	It is requested that a reference be included of the document that approved the injection of the apatite-forming chemicals/solutions.				
55.	p. 1-20, lines 35-38	It is indicated that "encouraging" monitoring data are available. The encouraging data should either be described and referenced or included. If the encouraging data is included on a CSM plate, the reader may be referred to that portion of the document.				
56.		There have been public workshops on the subject of Hanford Site remediation and technology development on which input has been received from the public on the apatite barrier, including Ecology's input that the creation of a Sr-90 barrier is also the creation of a waste site that should be tracked in WIDS.	The apatite barrier is not yet tracked in WIDS as a waste site. Please provide a description of how this waste site will be tracked.			

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57.	Section 1.3.2	There have been public workshops on the subject of Hanford Site remediation and technology development on which input has been received from the public on phytoremediation, including concern that herbicide would be used to kill the plants prior to their final "harvesting". During workshops, USDOE committed to not using herbicide that could, in turn, negatively affect Columbia River water quality.	It is requested that such commitments be described in this section.			
58.	p. 1-23, lines 29-33	Text states: "If the coyote willow continues to perform over the coming year, the next step will be testing at the 100-N Decision Unit in actual Sr-90 contaminated soil. Methods for safely planting, tending, and harvesting the willows along the rip-rap covering the 100-N Decision Unit shoreline will need to be developed; however, the 100-N Decision Unit tests proved successful and phytoextraction will be incorporated as part of the treatment protecting the Columbia River from Sr-90 contamination." It is this reviewer's understanding that the K Area coyote willow test is finished and the coyote willows have been removed.	The first sentence should be deleted or re-written in past tense to agree with the second sentence. Also, include a description of the administrative process by which phytoextraction will be "incorporated as part of the treatment protecting the Columbia River from Sr-90 contamination."			
59.	p. 1-25, lines 10-	How will data from the Phase I Bioremediation pilot system be used within this RI/FS process?	Tie the data output from the pilot program investigation back to data input for the RI/FS			

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	13		process.			
60.	p. 1-26, lines 1-3	Do we have data on how much petroleum has been removed from the vadose zone/groundwater interface by means of the passive treatment method?	Include any known data regarding effectiveness of the passive treatment method for petroleum remediation. (Deb Alexander mentioned that she was just looking at that information during the UMM 2-11-10.)			
61.	p. 1-26, lines 4-6	This is a vague reference to future ecological risk assessments. Will this data plug into the risk assessment that will be part of this remedial investigation? Into a future update of the RCBRA?	Provide clarification about how the characterization data will be used in ecological risk assessments and which risk assessments.			
62.	p. 1-27, line 8	Does this refer to the apatite barrier or some other unnamed method?				
63.	p. 1-27, line 18	The text states that additional sampling is warranted to better delineate the extent of the diesel contaminated area.	Describe the follow-up sampling that will better delineate the extent of the diesel contaminated area.			
64.	p. 2-8, lines 18-26	It is unclear how the figure of 50 tons was found to be the estimate for sodium dichromate discharged to the 1301-N Crib. If the record indicates 7 to 9 tons of usage from approximately 1963 to 1970, it seems as if the number should be in the 60-90 ton range.	Clarify how the approximate value of sodium dichromate discharged to the 1301-N Crib (50 tons) was achieved.			
65.	p. 2-9, line 27	The text states that 473,798 m tons of contaminated soil and debris have been removed from the 100-N	Clarify what authority the non-waste site remediation soil and debris was removed under			

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		Area and that 97,775 m tons of this are from waste site remediation. What was the remaining 376,023 m tons removed for? Building removal actions or something else?	if not part of waste site remediation.			
66.	p. 2-9, line 32	Stating that something is defined in the work plan is too vague.	Clarify the location in the work plan that WIDS classifications are defined (which appears to be in Table 2-3).			
67.	p. 2-23, Figure 2-12	This is the only cross-section in a series of 5 to not show Sr-90 levels detected. Is this because no Sr-90 was found or because it was not analyzed for in the C-C' cross-section boreholes?	Please clarify whether Sr-90 was analyzed for, and what the concentrations were, in boreholes used for C-C'.			
68.	p. 2-27, Figure 2-14	Why aren't Sr-90 values shown for all boreholes?				
69.	3-1	This brief section needs editing.	First sentence doesn't make sense, also mentions "indentify", which is a typo.			
70.	3-1	There should be summary descriptions of these sections in the 100-N addendum. Also, according to the copy of DOE/RL-2008-046 that I have, the references of where to find the data are incorrect.	Please double check the location of the references with the final version of the workplan. Please add summaries of the workplan sections into section 3 of the addendum.			
71.	4-3, lines 7-8	A brief mention of the other radionuclides that were measured is requested to compare final daughter				

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		products with contaminants found in the groundwater.				
72.	p. 4-4, Table 4-2	It is useful to see how much inventories were added originally, but what we really want to know is how much could potentially remain at this point in time. This means that they need to decay every addition to the inventory.	Please either add the decayed inventory to the table or provide a separate table with decayed inventories.			
73.	4-6, lines 12-13	It is difficult to find the argument for late 60's releases of Sr-90 being the source that first reached the N springs in the mid-80's.	Please clarify the location of the supporting documentation			
74.	Figures 4-5, 4-6, 4-8, and 4-9	The small insert map showing topographic lineage of the cross-section is illegible.				
75.	p. 4-49, Table 4-4, Data Need #1	The "Description" should be worded as: "Continue interim remedial actions as they have demonstrated to be efficient in obtaining the necessary data during remediation using the observational approach. Obtain data documenting the remaining residual contamination following completion of the interim remedial action.",				
76.	p. 4-49, Table 4-4, Data	The "Scope of Work" should be worded as: "Complete interim remedial action as applicable and sampling at 89 waste sites in the 100-N Decision Unit.				

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	Need #1	To ensure D4 and Field Remediation actions provide necessary documentation provide to Ecology for review Verification Sampling Work Instructions for all waste sites.				
77.	p. 4-49 & 4-53, Data Need #2	The "Data Need" reflected by "Data Gap" #2 should be worded as: "Characterize beneath and adjacent to remediated waste sites to assess the nature and extent of contamination in the vadose zone."				
78.	p. 4-49 & 4-53, Data Need #2	This data need is too busy, it should be broken up into its components. It appears that it is echoed by data needs #5 & #7. This is confusing to find which text explains which part of a particular listed data need.	Break up the data need into 2-3 separate data needs, or remove data need #2.			
79.	p. 4-49 & 4-53, Data Need #2	The "Scope of Work" for the revised "Data Need" (see comment #78) should be worded as: "Drill x boreholes and x groundwater monitoring wells; also excavate x test pits. Samples will be collected and analyzed to assess vertical extent of contamination in the vadose zone at borehole and well locations. The test pits will be excavated to assess potential contaminant sources and verify potential levels of contamination to a maximum depth of 7.6 m (25ft.). Details are in the SAP (DOE/RL-2009-42. Most of the test pits will be excavated to a depth of				

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		approximately 6.1 m (20 ft.)."				
80.	General Comment, p 49, Table 4-4, Data Need #2	Ecology feels there is justification for additional boreholes (to be completed as groundwater monitoring wells) near the liquid waste disposal facilities.	Recommend a minimum of 3 boreholes/wells at the 1301-N LWDF and 2 boreholes/wells at the 1325-N LWDF.			
81.	p. 4-49 & 4-53, Data Need #2	The "Justification" of the revised "Data Need" (see comment #78) should be worded as: "Characterization will be performed to validate interim remedial action, address uncertainty regarding nature and extent of residual contamination in soils, refine the conceptual site model (if necessary), and support decision making for the final ROD for the 100-N Decision Unit."				
82.	p. 4-49, Table 4-4, Data Need #4	Slight wording change to the "Justification" section.	Suggested Text: "The orphan site evaluation and waste site discovery ~~process provides and effective mechanism~~ processes are performed to identify new waste sites and sources that are not in CERCLA decision documents."			
83.	p. 4-50, Table 4-4	The "Data Gap" should be reworded.	Suggested Text: "The level of groundwater contamination entering the Columbia River (in			

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	& p. 4-55 & A3 Data Need #6		particular, the hyporheic zone) is not well known."			
84.	p. 4-50, Table 4-4, Data Need #6	Additional or substitute text for "Data Need", "Description", and/or "Scope of Work".	Suggested Text: "Evaluate the utility and/or adequacy of aquifer tubes in supporting the understanding of groundwater contamination entering the Columbia river. Collect groundwater upwelling data and information.",			
85.	p. 4-50, Table 4-4, Data Need #6	Augment the "Description" section with new text.	Suggested Text: "Groundwater discharge to the river at concentrations above aquatic cleanup levels (e.g., Sr-90 and CrVI) has been documented in the 100-N Decision Unit. Aquifer tubes have been installed to analyze groundwater contaminants discharging to the river. Groundwater upwelling sampling and analysis in the Columbia River channel is planned for the winter of 2010 (as part of the Columbia River remedial investigation) and it is expected that these data will provide further insight regarding contaminant levels entering the river through the hyporheic zone and groundwater/river mixing ratios within the biotic			

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			zone (upper ~12-in of substrate).",			
86.	p. 4-54, lines 2-22	The decision tree used to determine whether sites needed further characterization or not should be shown in this document.	Include the results of evaluation on a waste site by waste site basis. This could be included in a table.			
87.	Appendix A General Comment	There does not appear to be a CSM plate for the reactor. As such, there does not appear to be an identification of uncertainties associated with potential contamination from and beneath the reactor or conditions that would allow contaminant migration (eg., ISS roof runoff, open fuel basin pit, etc.).	Another CSM plate should be added to specifically address uncertainties with the reactor and ISS.			
88.	Figure A-1	Data Gaps #1 & #2 appear to be the same.	Delete one of those data gaps or edit text accordingly.			
89.	Figure A-2	The Action Memorandum for N Area Ancillary Facilities wasn't on the list of Facility CERCLA Removal Plan.	Please add the 1998 AM to this list.			
90.	Figure A-3	It is recommended the 1st problem statement be revised to read: "Potential contaminant contributions to the vadose zone and groundwater from past operations, disposal practices, spills, and unplanned releases is not known."	Recommended wording: "Waste management activities resulting from nuclear material production and electric power generation as well as spills have led to contaminated vadose zone and aquifer in unknown quantities.			
91.	Figure A-5	The Nature and Extent of Contamination in the RUM is unknown. This is a data gap that is complementary	Please add the following data gap: The Nature and Extent of Contamination in the RUM is			

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		to #8.	unknown.			
92.	SAP General	Include a section addressing terrestrial ecological protection or incorporate ecological protection values in the tables.				
93.	SAP p. 2-9 through 2-25, Tables 2-2 through 2-5	For calculating values for protection of the Columbia River, Ecology does not assume a 1:1 dilution in the river as this is not allowed in WAC 173-340-730(6)(b). Therefore, divide all of the river protection values by 2.				
94.	SAP p. 2-9 through 2-25, Tables 2-2 through 2-5	Include hexavalent chromium for soil, water, and batch leach samples. It is a contaminant of concern in 100-N and has been problematic at a number of sites such as 116-N-1 trench and crib, 1301-N, and 1325-N. The direct contact value is 2 mg/kg based on dust resuspension. The groundwater protection value is 0.2 mg/kg (using a Kd of 0 mL/g with WAC 173-340 Equation 747-1 (2007)). The value for river protection is 10 μg/L.				
95.	SAP p. 2-9 through 2-20,	Remove footnote e from the tables. Ecology does not accept generic RESRAD modeling for the nonradionuclides for the final ROD.				

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	Tables 2-2 through 2-4					
96.	SAP p. 2-9 through 2-20, Tables 2-2 through 2-4	Change the arsenic PRG to 6.5 mg/kg based on Hanford site background (DOE/RL-92-24).				
97.	SAP p. 2-9 through 2-20, Tables 2-2 through 2-4	Change the cobalt value for groundwater protection to 4.35 mg/kg. This is based on a Kd value of 45 L/kg from ORNL.				
98.	SAP p. 2-9 through 2-20, Tables 2-2 through 2-4	The mercury value for protection of groundwater can be increased to 2.09 mg/kg. The value for protection of the river is actually 2.5E-02 mg/kg, which is below background. Add a footnote for the river protection value to indicate that it is based on Hanford site background.				
99.	SAP p. 2-9 through	The estimated quantitation limits for batch leach samples do not match those that are typical for water	Ecology needs an explanation for this.			

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	2-20, Tables 2-2 through 2-4	sample. **Analyte** / **Batch Leach EQL** / **Water EQL** arsenic 50 ug/L 100 ug/L barium 50 ug/L 20 ug/L cadmium 50 ug/L 2 ug/L chromium 100 ug/L 10 ug/L lead 50 ug/L 50 ug/L silver 100 ug/L 10 ug/L selenium 100 ug/L 100 ug/L				
100	SAP p. 2-13, Table 2-2, and pp. 2-18 through 2-20, Table 2-4	Please change the second sentence of footnote j to: They are based on Hanford Site background.				
101	SAP p. 2-14 through 2-16, Table 2-3, General	Include benzene, ethylbenzene, toluene and xylene. They are associated with gasoline.				

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102.	SAP p. 2-14, Table 2-3	Include direct contact, groundwater protection, and river protection values for TPH/gasoline, which are all 30 mg/kg.				
103.	SAP p. 2-14, Table 2-3	Include values for acenaphthalene: Direct contact 4800 mg/kg, groundwater protection 1.21E02 (based on a Kd of 6.12 L/kg from ORNL), and river protection value of 81 mg/kg.				
104.	SAP p. 2-14, Table 2-3	Change the benzo(k)fluoranthene value for protection of groundwater to 2.95 mg/kg.				
105.	SAP p. 2-15, Table 2-3	Include values for dibenz[a,h]anthracene: 1.37 mg/kg for direct contact, 4.30 mg/kg for protection of groundwater, and 2.21E02 mg/kg for protection of the river.				
106.	SAP pp. 2-18 through 2-20, Table 2-4	Manganese has a j footnote. However, there is no explanation for footnote j provided. Please include an explanation for footnote j. See the comment regarding footnote j for Table 2-2.				
107.	SAP p. 2-22, Table 2-5	Please revise the mercury action level to 1.2E-02 µg/L based on WAC 173-201A.				

REVIEW COMMENT RECORD (RCR)	1. Date 2/17/2010	2. Review No.
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5. Document Number(s)/Title(s)	Project Manager Name	Reviewer Name		
DOE/RL-2008-46-ADD5, DRAFT A	Nina Menard	Alicia Boyd		

	10. Agreement with indicated comment disposition(s)	
Cheryl Whalen Organization Manager (Optional)	Reviewer/Point of Contact Date Author/Originator	Reviewer/Point of Contact Date Author/Originator

Item	12. Page/Line	13a. Comment/Discrepancy (Provide technical and/or regulatory justification.)	13b. Recommended Change	14. (A)ccept or (R)eject	15. Disposition (Provide justification if **NOT** accepted.)	16. Status
108.	SAP p. 2-23, Table 2-5	Please revise the chlordane action level to 5.7E-04 µg/L based on 40-CFR 131.3.				
109.	SAP p. 2-24, Table 2-5	Please revise the benzene action level to 7.95E-01 µg/L based on WAC 173-340-720.				
110.	SAP p. 2-24, Table 2-5	Please revise the carbon tetrachloride action level to 3.37E-01 µg/L based on WAC 173-340-720.				
111.	SAP p. 2-24, Table 2-5	Please revise the following action levels all based on WAC 173-340-720: Tetrachloroethene revise to 8.1E-02 µg/L Trichlorethene revise to 4.9E-01 µg/L Vinyl chloride revise to 2.92E-02 µg/L				
112.	SAP p. 2-24, Table 2-5	Add the following to the table as they are associated with petroleum: Ethylbenzene (action level of 700 µg/L based on the MCL) Toluene (action level of 640 µg/L based on WAC 173-340-720) Xylene (action level of 1.6E03 µg/L based on WAC 173-340-720)				

Enclosure 2

Feedback from Ecology to USDOE-RL from the workshop held on February 17, 2010.

This feedback is in relationship to the *Integrated 100 Area Remedial Investigation/Feasibility Study Work Plan, Addendum 5: 100-N Decision Unit*, DOE/RL-2008-46-ADD5, Draft A (work plan) and the *Sampling and Analysis Plan for the 100-N Decision Unit Remedial Investigation/Feasibility Study*, DOE/RL-2009-42, Draft A (SAP). Comments focus on deficiencies in the work plan and data needs that Ecology currently believes still exist. They are not listed in any given order.

1. The work plan should describe the risk assessment process, how data will be used, and how overall risk will be evaluated for 100N. Ecology has concerns about relying on Integrated Work Plan (IWP) without sufficient specificity in 100N work plan.
2. Contaminants of Potential Concern (COPC) list should be in work plan.
3. Concern about Ecology's responsibility to identify COPCs; will need to use a method-based approach (wide, not deep) as insufficient data exist.
4. Resource Conservation and Recovery Act (RCRA) Part A permits (e.g., at 1301-N Liquid Waste Disposal Facility [LWDF]) identify COPCs; these should be included as well as known waste constituents directed to each Treatment, Storage, or Disposal Facility as part of the COPC list.
5. Unclear that all constituents are addressed in the Limited Field Investigation; revisit RCRA waste codes.
6. Need more detail and rationale on sample designs and analysis plans.
7. Difficult to review draft work plan when it relies on other documents (e.g., integrated work plan, data CDs, other primary documents, or secondary documents); all information should be integrated into the work plan, or at least summarized where agreed to in another Agency approved document.
8. Clarify and define term "EQL" and explain how it is used in work plan.
9. Pull new data available into work plan, such as Total Petroleum Hydrocarbon (TPH) data.
10. Polycyclic Aromatic Hydrocarbons (PAH) should be investigated and included. PAH-specific analytical methods, such as SW-846 Method 8310, should be used.
11. Ecology has not been involved in establishing Data Quality Objectives (DQO); should be DQOs for soil and groundwater to establish when enough data have been obtained.
12. Of the 20 sites remediated under the interim Record of Decision (ROD), there are no plans to sample beneath them to determine adequacy and confirm the conceptual site model (e.g., 1301 and 1325); propose 5 boreholes under those two locations; if data do exist to demonstrate this, followup discussion is needed.
13. Groundwater monitoring wells drilled through the closed units are needed to satisfy RCRA Washington Administrative Code 173-303-645 at 1301-N LWDF and 1325 LWDF, improve the groundwater monitoring network and program.
14. Provide well-specific technical basis (e.g., temporal, spatial, chemical, etc.) for selecting each of 18 groundwater wells to monitor and what they are expected to achieve.

15. Not all Ecology comments were addressed in the conceptual site model section (Appendix A); revisit data gaps listed and reach agreement with Ecology on the gaps, which will form basis for work scope in Table 4-4; table does not directly associate gaps with work scope.
16. Draft work plan anticipates no field work in vadose zone or soil for waste sites, but relies on gleaning information from field activities; should instead identify what information is needed for Remedial Investigation/Feasibility Study (RI/FS), then assure field activities collect it and show how those data will be integrated into the RI/FS (e.g., Cleanup Verification Package [CVP] data might not include all constituents).
17. Need to confirm what is happening in wells with low dissolved oxygen; what is happening with microbes and petroleum.
18. See Model Toxic Control Act Table 830-1 for full list of analytes for petroleum sites.
19. Draft seems to assume another RI/FS phase is needed; intent is for this RI/FS to allow issuance of final ROD unless significant surprises occur.
20. Add references in tables (Cleanup Verification Packages, etc.).