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Richland Operations Office
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Richland, Washington 99352

0072316

07-AMRC-0103

FEB 22 2007

Ms. Cheryl L. Whalen
Cleanup Section
State of Washington
Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

RECEIVED
FEB 27 2007
EDMC

Dear Ms. Whalen:

RESPONSE TO TWO STATE OF WASHINGTON DEPARTMENT OF ECOLOGY (ECOLOGY) LETTERS REGARDING COMPLETION OF THE 116-N-1 CRIB AND TRENCH PORTION OF THE CLOSURE ACTIVITIES ASSOCIATED WITH TREATMENT STORAGE AND DISPOSAL (TSD) UNIT 1301-N LIQUID WASTE DISPOSAL FACILITY

References: 1) Ecology ltr. to K. D. Bazzell, RL, from J. B. Price, "Cleanup Verification Package/Clean Closure Report for the Soil Column of the 116-N-1 (1301-N) Crib and Trench; CVP-2006-00004, Rev. 0, May 2006," dtd. July 21, 2006.

2) Ecology ltr. to K. D. Bazzell, RL, from J. B. Price, "Backfill Concurrence Checklist for 116-N-1 Combined Crib and Trench (1301-N Trench)," dtd. April 11, 2006.

The purpose of this letter is to respond to the two referenced letters relative to completion of the interim remedial actions and closure activities (actual cleanup) at the crib and trench portions (i.e., the 116-N-1 waste site) of TSD unit 1301-N Liquid Waste Disposal Facility.

The U.S. Department of Energy, Richland Operations Office (RL) acknowledges that interim remedial action and closure activities of a significant amount of piping (i.e., the 100-N-63 waste site) associated with this TSD unit have not been completed. The draft Cleanup Verification Package (CVP) provided to Ecology did not imply nor state that the remaining piping was included. The intent begins with the document titled, "Cleanup Verification Package/Clean Closure Report for the Soil Column of the 116-N-1 Crib and Trench." It is clear in the Waste Information Data System (WIDS) that waste site 116-N-1 included the crib and trench and that waste site 100-N-63 includes the piping to both 116-N-1 and 116-N-3. Additionally, no Certification of Closure was submitted which further supports that RL recognized there were unfinished portions of the 1301-N TSD unit.

RL recognizes that, based on Ecology's comments in both letters, a major issue in demonstrating that site cleanup attained the remedial action objectives (RAO's) for the 116-N-1 portion of the TSD unit is tied to applying known leachability data from other 100 Area locations to the 100-N Area soils. Prior to RL's receiving the letter, (Reference 2), with a signed backfill concurrence, the issue of leachability had been jointly discussed. If RL understood that uncertainties regarding the use of known data from other 100 Areas was still an issue, actions to resolve the issue, including additional soil samples and leach testing, would have been taken. Although backfill was a primary concern, since the subcontractor was mobilized, a work around would have allowed additional timely sampling and testing. Deeper cleanup verification samples could have been more simply and economically taken if it had been determined, at that time, to be needed.

Attached are detailed responses to both referenced letters. Also attached is a summary of the requirements that are driving this closure activity. After Ecology has reviewed these documents, we look forward to meeting to discuss our responses and work out a path forward.

If you have any questions, you may contact me or your staff may contact Kent Westover, of my staff, on (509) 376-3967.

Sincerely,

Joe R. Franco

Joe R. Franco, Assistant Manager
for the River Corridor

AMRC:KRW

Attachments:
1. Responses to Ecology letter of July 19, 2006
2. Responses to Ecology letter of April 11, 2006
3. Requirements Summary for Ecology

cc w/attachs:
Administrative Record, H6-08 D-1-2
R. L. Donahoe, WCH
J. W. Golden, WCH
S. E. Parnell, WCH
J. B. Price, Ecology
M. L. Proctor, WCH
J. A. Vanni, Ecology

Attachment 1

Responses to Comments from Department of Ecology Document Review

Document Title/Number:
Cleanup Verification Package/Clean Closure Report for the Soil Column of the 116-N-l Crib and Trench; CVP-2006-00004, Rev. 0, May 2006

Date Comments Provided: July 19, 2006

Ecology Comment 1. Title: The title of the document implies "clean closure" was achieved. That should be a conclusion of the document, for evaluation by Ecology. It is requested that the title be changed to be neutral about the results of the cleanup.

Response: The document title will be modified to remove the word "clean"; *Cleanup Verification Package/Closure Report for the Soil Column of the 116-N-l Crib and Trench.*

Ecology Comment 2. Page ES-1, Executive Summary, first sentence: The text states that this cleanup verification package/clean closure report documents the completion of remedial action for the 116-N-l Crib and Trench. There are several problems with this statement and it should be changed:

- The action is an interim action, so at most, the document could document completion of the interim action.

Response: This CVP documents completion of remedial actions that were agreed upon with Ecology in the 100-NR-1 interim action ROD for the 116-N-1 Crib and Trench. The sentence in the Executive Summary will be modified by inserting "as defined by the interim action ROD" at the end of the statement.

- A CVP is not a TPA primary document, nor is it a type of document called out in the National Contingency Plan/guidance. A construction completion report is typically used to document the completion of remedial action. So, this CVP is not the right document to make that conclusion [that remedial actions are complete].

Response: This CVP documents completion of remedial actions that were agreed upon with Ecology in the 100-NR-1 interim action ROD for the 116-N-1 Crib and Trench. The above modification to the Executive Summary language indicates that remediation is complete per the interim action ROD. A Certification of Closure for the TSD will be prepared when 100-NR-1 TSD remedial actions are complete.

- Remedial actions are not complete. Approximately 600 ft of piping associated with the 116-N-l TSD has been deferred to a later date. Per RCRA requirements, the 116-N-l site cannot be considered to have met the Remedial Action Objectives until the entire site is remediated.

Response: This CVP documents completion of remedial actions that were agreed upon with Ecology in the 100-NR-1 interim action ROD, in unit managers' meeting minutes, and in a modification to the Hanford RCRA permit for the 116-N-1 Crib and Trench and a portion of the associated pipelines (100-N-63) and the UPR-100-N-31 unplanned release. The entire TSD unit does not need to be included in this CVP as long as what is being closed out is clearly defined. The second paragraph of the Executive Summary will be rewritten as follows: "Remedial actions are complete including site excavation and

waste disposal as agreed upon with Ecology in the 100-NR-1 interim action ROD, in unit managers' meeting minutes, and in a modification to the Hanford RCRA permit. Approximately 600 feet of piping that is associated with the 1301-N (or 116-N-1) TSD Waste Site as well as the additional 5,600 ft of pipeline that goes back to the 105-N Reactor Building and the 116-N-2 Facility and support facilities (1322-NA, NB, NC) have been deferred until decontamination and decommissioning (D&D) of these facilities. This deferral is due to safety concerns with remediating the piping and the radiological dose exposure to remedial action workers. Remediation will require excavation of the earthen berm at the 116-N-2 Facility, which provides radiological shielding. The majority of this work is scheduled to begin in 2009. Results of the sampling, laboratory analyses, data evaluations, and modeling for the 116-N-1 site indicate that remedial action objectives and goals for direct exposure, protection of groundwater, and protection of the Columbia River have been met (see Table ES-1)."

- Ecology's April 11, 2006 letter stated that ". . . additional field investigations will be required at 100-N Area." Ecology's letter required the completion of a focused feasibility study that could lead to additional remedial actions.

Response: DOE does not agree that additional field investigations or a focused feasibility study are warranted at this time. That will be determined following completion of a risk assessment to evaluate residual contamination for the entire 100-N Area. To that end, DOE requests a copy of Ecology's assessment of the accumulated data used in their April 11, 2006, letter to conclude that additional field investigations will be required at the 100-N Area. DOE also requests that Ecology provide the scope of what they believe the additional investigations should encompass.

Ecology Comment 3. Page ES-1, Executive Summary, first paragraph, fourth sentence: It is recommended that it be identified that the 116-N-l site lies above the 100-NR-2 groundwater operable unit by the following re-write: "The 116-N-l site is located within the 100-NR-l Operable Unit in the 100 Areas of the Hanford Site in southeastern Washington State and lies above the 100-NR-2 groundwater Operable Unit."

Response: Accept

Ecology Comment 4. Page ES-1, Executive Summary, second paragraph, first sentence: The sentence states: "Site excavation and waste disposal are complete, and ...." As explained above, site excavation is not complete for the 116-N-l Crib and Trench complete. This sentence should be deleted.

Response: The sentence in the Executive Summary will be modified by inserting "as defined by the interim action ROD" at the end of the statement. Also, as explained above, this CVP documents completion of remedial actions that were agreed upon with Ecology in the 100-NR-1 interim action ROD, in unit managers' meeting minutes, and in a modification to the Hanford RCRA permit for the 116-N-1 Crib and Trench and a portion of the associated pipelines (100-N-63) and the UPR-100-N-31 unplanned release. The entire TSD unit does not need to be included in this CVP as long as what is being closed out is clearly defined.

Ecology Comment 5. Page ES-1, Executive Summary, second paragraph, second sentence: The sentence states: "Results of the sampling, laboratory analyses, and data evaluations for the 116-N-l site indicate that remedial action objectives and goals for direct exposure, protection of groundwater, and protection of the Columbia River have been met." This statement is contradicted by Ecology's April 11, 2006 letter: "Our assessment of the backfill concurrence data is that releases have occurred (notably, hexavalent chromium), and remain, in the vadose zone at concentrations that exceed the numeric cleanup values referenced at WAC 173-303-610(2)(b)(i)." Therefore, the Executive Summary statement does not describe remaining contamination.

Response: WAC 173-303-610(2)(b)(i) states "For soils, ground water, surface water, and air, the numeric cleanup levels calculated using unrestricted use exposure assumptions according to the Model Toxics Control Act Regulations, chapter 173-340 WAC as of the effective date or hereafter amended. Primarily, these will be numeric cleanup levels calculated according to MTCA Method B, although MTCA Method A may be used as appropriate, see WAC 173-340-700 through 173-340-760, excluding WAC 173-340-745."

WAC 173-340-700 through 173-340-760, excluding WAC 173-340-745 only provides for calculation of soil cleanup levels to be protective of groundwater. The hexavalent chromium soil cleanup level of 2 mg/kg to be protective of the Columbia River is solely based upon the 100-NR-1 interim action ROD, Table 2. The most stringent soil cleanup levels for hexavalent chromium per the (2001) and (1996) versions of WAC 173-340-700 through 173-340-760 is 8 mg/kg to be protective of groundwater as shown in the 100-NR-1 interim action ROD, Table 2. The cleanup of 116-N-1 meets the 8 mg/kg cleanup level (2.96 mg/kg is the highest soil concentration of hexavalent chromium). Therefore, the concentrations of hexavalent chromium do not exceed the numeric cleanup values referenced at WAC 173-303-610(2)(b)(i).

WAC 173-340-740(3)(a)(ii)(A) in the 1996 revision of MTCA allows for demonstrating that soil concentrations above cleanup levels are protective. Specifically with regard to hexavalent chromium, the CVP concludes based on leachability data from the 100-D, 100-F, and 100-H Areas of the Hanford Site that the residual levels in soil will not leach to groundwater or the Columbia River at levels that will cause cleanup levels to be exceeded. Therefore, the CVP concludes the 116-N-1 site has met the remedial action objectives and goals for direct exposure, protection of groundwater, and protection of the Columbia River. As a consequence of the information presented in the CVP, RL believes that the residual contaminant levels do, in fact, meet the numeric cleanup criteria for "clean closure" under WAC 173-303-610.

Ecology Comment 6. Page **ES-1,** Executive Summary, third paragraph: The paragraph should include the following information: "The excavation of contaminated material from this portion of the 1301-N Trench was done in accordance with the Hanford Past Practice (HPP) Strategy, DQE/RL-91-40, Revision 0. The excavation and sampling of the Trench completes a step in DQE/RL-91-40, Figure 1, "Hanford Past Practice Strategy **RI/FS** (RFI/CMS) Process. The next steps, for this portion of the trench, in the HPP Strategy are to assess the accumulated data and determine minimum data needs. The results of the additional field investigations, and the previously accumulated data, will have to be evaluated in a Focused Feasibility Study (studies) as shown in Figure 1 of DQE/RL-91-40. The studies will have to consider the alternative of capping the unit if necessary to protect human health and the environment."

Response: The remediation was performed in accordance with the 100-NR-1 interim action ROD and the 100-NR-1 RDR/RAWP. The ROD and the RDR/RAWP are the requirements documents. The Hanford Past Practice Strategy (HPPS) is not a primary document per the Tri-Party Agreement. The HPPS is a strategy, not a requirements document. The LFIs that were conducted for development of the Focused Feasibility Study and ROD used the guidance from the HPPS. Whether or not additional field investigations will be required at the 100-N Area can only be determined after completion of a risk assessment to evaluate residual contamination for the entire 100-N Area.

Ecology Comment 7. Page ES-1, Executive Summary, third paragraph, first sentence: The sentence states: "The site meets cleanup standards and has been reclassified as 'interim closed out' in accordance with the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989) and the Waste Site

Reclassification Guideline TPA-MP-14 (RL-TPA-90-0001)(DOE/RL 1998)." The determination that a site has been interim closed out can only be made by the TPA Project Managers. It cannot be made by a subcontractor, nor can it be made unilaterally by the DOE TPA Project Manager. The statement is inappropriate in a CVP and should be deleted.

Response: The statements in the CVP and the "Waste Site Reclassification Form" (WSRF) included as Attachment ES-1 are for the TPA Project Managers' agreement. This CVP documents completion of remedial actions that were agreed upon with Ecology for the 116-N-1 Crib and Trench and a portion of the pipelines as defined by the interim action ROD and supports the WSRF. If Ecology agrees with what is written in this document the Ecology Project Manager can approve the WSRF. Without Ecology's and DOE's joint approval of the WSRF as TPA Project Managers, the statements in the CVP do not become final.

Ecology Comment 8. Page ES-1, Executive Summary, third paragraph, third sentence: As waste removal from the unit has not been completed, the waste site does not qualify for reclassification. Delete the sentence that states: "A copy of the waste site reclassification form is included as Attachment ES-1." Insert a sentence that identifies that the WIDS waste site description will be updated to describe the unit's current configuration.

Response: This CVP documents completion of remedial actions that were agreed upon with Ecology for the 116-N-1 Crib and Trench and a portion of the pipelines as defined by the interim action ROD, in unit managers' meeting minutes, and in a modification to the Hanford RCRA permit for the 116-N-1 Crib and Trench and a portion of the associated pipelines (100-N-63) and the UPR-100-N-31 unplanned release. The entire TSD unit does not need to be included in this CVP as long as what is being closed out is clearly defined. The WIDS waste site reclassification form applies only to the 116-N-1 Crib and Trench, which does not encompass the entire TSD boundary.

Ecology Comment 9. Page ES-1, Executive Summary: It is requested that the Executive Summary include a note which states: "Due to radiological dose exposure and safety concerns, approximately 600 feet of piping (i.e., ancillary equipment) associated with the 1301-N Trench and Crib is deferred to Decontamination and Decommissioning (D&D) of the 116-N-2 Facility and support facilities (1322-NA, NB, NC). Therefore, closure of the unit is not complete until such time as the ancillary equipment has been removed and the closure performance standards of WAC 173-303-610 have been satisfied for the entire unit."

Response: As explained above, this CVP is for the 116-N-1 Crib and Trench WIDS site only and is not directly tied to the performance standards of WAC 173-303-610 for the entire TSD unit. The last sentence from the comment above will be included in the Executive Summary after it is modified to read, as follows; "Therefore, closure of the entire TSD unit is not complete until such time as the ancillary equipment has been removed and the closure performance standards of WAC 173-303-610 have been satisfied for the entire unit." This CVP documents completion of remedial actions that were agreed upon with Ecology for the 116-N-1 Crib and Trench and a portion of the pipelines as defined in the interim action ROD, in unit managers' meeting minutes, and in a modification to the Hanford RCRA permit for the 116-N-1 Crib and Trench and a portion of the associated pipelines (100-N-63) and the UPR-100-N-31 unplanned release. The entire TSD unit does not need to be included in this CVP as long as what is being closed out is clearly defined. The WIDS waste site reclassification form applies only to the 116-N-1 Crib and Trench, which does not encompass the entire TSD boundary.

Ecology Comment 10. Page ES-2, Table ES-1, Direct Exposure - Radionuclides row: The Remedial

Action Objective to attain the regulatory requirements for direct exposure - radionuclides were not achieved. As a radiologically significant portion of the unit has not been remediated, the remedial action objective of attaining 15 mrem/yr dose rate above background over 1,000 years has not been achieved and the table does not accurately reflect this status. Therefore, the column entitled "Remedial Action Objectives Attained?" should indicate "No" for the row pertaining to direct exposure radionuclides.

Response: As explained above, this CVP documents completion of remedial actions that were agreed upon with Ecology in the 100-NR-1 interim action ROD, in unit managers' meeting minutes, and in a modification to the Hanford RCRA permit for the 116-N-1 Crib and Trench and a portion of the associated pipelines (100-N-63) and the UPR-100-N-31 unplanned release. The entire TSD unit does not need to be included in this CVP as long as what is being closed out is clearly defined. The WIDS waste site reclassification form applies only to the 116-N-1 Crib and Trench, which does not encompass the entire TSD boundary. A Certification of Closure for the TSD will be prepared when 100-NR-1 TSD remedial actions are complete.

Ecology Comment 11. Page **ES-2,** Table **ES-1,** Direct Exposure - **Nonradionuclides** row: The Remedial Action Objective to attain the regulatory requirements for direct exposure - nonradionuclides were not achieved. The results table does not take the non-remediated portion of the unit into consideration. Therefore, the column entitled "Remedial Action Objectives Attained?" should either indicate "No" or "Unknown".

Response: As explained above, this CVP documents completion of remedial actions that were agreed upon with Ecology in the 100-NR-1 interim action ROD, in unit managers' meeting minutes, and in a modification to the Hanford RCRA permit for the 116-N-1 Crib and Trench and a portion of the associated pipelines (100-N-63) and the UPR-100-N-31 unplanned release. The entire TSD unit does not need to be included in this CVP as long as what is being closed out is clearly defined. The WIDS waste site reclassification form applies only to the 116-N-1 Crib and Trench, which does not encompass the entire TSD boundary. A Certification of Closure for the TSD will be prepared when 100-NR-1 TSD remedial actions are complete.

Ecology Comment 12. Page ES-2, Table **ES-1,** Meet Nonradionuclide Risk Requirements row: The Remedial Action Objective to attain the regulatory requirements for nonradiological risk were not achieved. The results table does not take the non-remediated portion of the unit into consideration. Therefore, the column entitled "Remedial Action Objectives Attained?" should either indicate "No" or "Unknown".

Response: As explained above, this CVP documents completion of remedial actions that were agreed upon with Ecology in the 100-NR-1 interim action ROD, in unit managers' meeting minutes, and in a modification to the Hanford RCRA permit for the 116-N-1 Crib and Trench and a portion of the associated pipelines (100-N-63) and the UPR-100-N-31 unplanned release. The entire TSD unit does not need to be included in this CVP as long as what is being closed out is clearly defined. The WIDS waste site reclassification form applies only to the 116-N-1 Crib and Trench, which does not encompass the entire TSD boundary. A Certification of Closure for the TSD will be prepared when 100-NR-1 TSD remedial actions are complete.

Ecology Comment 13. Page ES-2, Table ES-1, Groundwater/River Protection Radionuclides row: The Remedial Action Objective to attain the regulatory requirements for groundwater/river protection of radionuclides were not achieved. The results table does not take the non-remediated portion of the unit into consideration. Also, see comments below regarding RESRAD. A RESRAD model deficiency is that

the model does not take into consideration high river stage and the upwelling of ground/surface water into contaminated vadose zone. This mechanism is very likely to allow immediate contaminant migration. Thus, vadose zone contamination is very likely to reach groundwater sooner than the stated criteria of 1,000 years. Therefore, the column entitled "Remedial Action Objectives Attained?" should indicate "No".

Response: The requirements for performing RESRAD analysis are defined in the 100-NR-1 RDR/RAWP. RESRAD modeling does not include the portion of the vadose zone into which up-welling of river water occurs. This is "Layer C" discussed on page 3 of EPA 2003, *Explanation of Significant Difference for the 100-NR-1 Operable Unit Treatment, Storage, and Disposal Interim Action Record of Decision and 100-NR-1/100-NR-2 Operable Unit Interim Action Record of Decision* (100-NR-1 ESD), May 2003, United States Environmental Protection Agency, Region X, Seattle, Washington. Cleanup of the 116-N-1 Crib and Trench is described on page 3 of the 100-NR-1 ESD and only involved removal of the excavation area above "Layer A" and a portion of "Layer A." The RESRAD modeling determined that residual contamination remaining in the "Layer A" deep zone after remediation was complete would not migrate to reach "Layer C" (and, hence, the groundwater) at concentrations exceeding drinking water standards. Therefore it is not required to model the up-welling of river water to show that concentrations of residual contamination in the portions of 116-N-1 that were remediated are protective of groundwater and the river. Up-welling of groundwater in response to changes in river stage elevations mobilizes strontium-90 in the capillary fringe between the groundwater and the deep vadose zone which is not affected by residual contamination in the upper vadose zone.

Ecology Comment 14. Page ES-2, Table ES-1, last Groundwater/River Protection - Nonradionuclides: The Remedial Action Objectives to attain individual nonradionuclide groundwater and river cleanup requirements were not achieved.

- The Trench DZ-09 sample exceeded the hexavalent chromium Columbia River protection RAG of 2.0 mg/kg, with a result of 2.52 mg/kg.
- The statistical deep zone value calculated for hexavalent chromium is 2.96 mg/kg, exceeding the soil RAG for river protection.
- Hexavalent chromium also failed the WAC 173-340 3-Part Test due to the following: 95% UCL > Cleanup Limit, and >10% of the samples were above the Cleanup Limit.
- In addition to the hexavalent chromium failures, total chromium for Trench DZ-09, Crib DZ-05 and Crib DZ-10 exceeded the RAG. The values were 31.7 mg/kg, 22.1 mg/kg, and 19.0 mg/kg, respectively. The Ecology split results were also elevated for the Crib DZ-05 and Crib DZ-10 samples. (A split sample of Trench DZ-09 was not analyzed.)
- Furthermore, the results table does not take the non-remediated portion of the unit into consideration.
- Also, see comments regarding RESRAD. A modeling deficiency of RESRAD is that the model does not take into consideration high river stage and the upwelling of ground/surface water into contaminated vadose zone. This mechanism is very likely to allow immediate contaminant migration. Thus, vadose zone contamination is very likely to reach groundwater sooner than the stated criteria of 1,000 years.

Therefore, the column entitled "Remedial Action Objectives Attained?" should indicate "No". Please edit the last row as follows:

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?	Ref.
Groundwater River Protection - Nonradionuclides	1. Attain individual nonradionuclide groundwater and river cleanup requirements	1. ~~Residual hexavalent chromium concentrations are not predicted to leach to groundwater or the Columbia River at concentrations exceeding the applicable water quality criteria.~~	Yes- No	a, b
		The statistical deep zone value calculated for hexavalent chromium exceeded the soil RAG for river protection. Individual total chromium results also exceeded the soil RAG for river protection.		

Response: The six bulleted comments in Ecology Comment No. 14 generally relate to global issues regarding hexavalent chromium cleanup levels, and the scope of the CVP. The first and second bullets have been discussed in the responses to comments on the Backfill Concurrence Checklist where it is shown that soils with hexavalent chromium assays below 6.1 mg/kg at 100-D, 5.7 mg/kg at 100-H, or 7.2 mg/kg at 100-F will meet river protection criteria. The third bullet is answered by the fact that geology and soils of the 100-N, 100-D, 100-H, and 100-F Areas are so similar that the behavior of hexavalent chromium at each area would be expected to be the same. The 100 area soils are similar, and data from various locations shows that soils with hexavalent chromium assays below 6.1 mg/kg at 100-D, 5.7 mg/kg at 100-H, or 7.2 mg/kg at 100-F will meet river protection criteria. The fourth bullet discusses groundwater protection criteria for total chromium which can be shown to be met by analogous site RESRAD modeling because the Kd for total chromium is 200 mL/g. For the fifth bullet the WIDS waste site reclassification form applies only to the 116-N-1 Crib and Trench, which does not encompass the entire TSD boundary. A Certification of Closure for the TSD will be prepared when 100-NR-1 TSD remedial actions are complete. For the sixth bullet cleanup of the 116-N-1 Crib and Trench is described on page 3 of the 100-NR-1 ESD and only involved removal of the excavation area above "Layer A" and a portion of "Layer A." The RESRAD modeling determined that residual contamination remaining in the "Layer A" deep zone after remediation was complete and would not migrate to reach "Layer C" or the groundwater at concentrations exceeding drinking water standards. Therefore it is not required to model the up-welling of river water to show that concentrations of residual contamination in the portions of 116-N-1 that were remediated are protective of groundwater and the river.

Ecology Comment 15. Page ES-3, Table ES-1, footnote "d": This footnote is not referenced in the table, nor is it applicable to the report, as uranium is not a site contaminant of concern. Please delete the footnote.

Response: Footnote d is called out in the referenced table under Groundwater/ River Protection – "Radionuclides, 4. Meet total uranium standard of 21.2 pCi/L[d]." Uranium is included in the Groundwater/ River Protection portion of the table for completeness.

Ecology Comment 16. Page ES-5, Attachment ES-1: This attachment should be replaced with an updated WIDS description of the waste management unit. Since the unit is not closed and has not met remedial action objectives, it does not qualify to be reclassified as having been remediated.

Response: The cleanup has accomplished the remedial actions for the 116-N-1 crib and trench as they and the waste site itself are described in the 100-NR-1 interim action ROD. The WIDS waste site reclassification form applies only to the 116-N-1 Crib and Trench, which does not encompass the entire TSD boundary. A Certification of Closure for the TSD will be prepared when 100-NR-1 TSD remedial actions are complete.

Ecology Comment 17. Page 4, section 3.1, last two sentences: The text states the following: "The contamination within the boundaries of the UPR-100-N-31 waste site was also removed but the waste site is not proposed to be interim closed out because of contaminant plumes that impacted active facilities and cannot be excavated until the active facilities are closed out or relocated. Contaminated materials were disposed of at ERDF."

This reasoning used for the UPR-100-N-31 should also apply to the entire 116-N-l site, due to the remaining unremediated 600 ft of associated piping which was deferred. The issue of the deferred piping needs to be discussed in detain within the 116-N-l report. This discussion should include the basis for deferment, site specific map, and remediation schedule.

Response: The UPR-100-N-31 waste site and unremediated piping have been deferred per the RCRA Permit. Their future remediation will be reported in a separate document. This work is scheduled to begin in 2009.

The deferred piping associated with the 105-N and 109-N Facilities will be remediated as part of D&D of the 105-N Reactor Facility Complex in accordance with Tri-Party Agreement Milestone M-093-20.

Two figures in Attachment 41 of the RCRA Permit describe the piping being deferred:

Figure 2.1. 116-N-1 Crib Influent Piping to be Rescheduled for Remediation
Figure 2.2. 116-N-1 Crib Influent Piping to be Rescheduled for Remediation

Ecology Comment 18. Page 1, section 1.0, first paragraph: The first sentence is written in the past tense as follows: "The purpose of this cleanup verification package.... is to document that the 116-N-l Crib and Trench site (herein referred to as the 116-N-l site) <u>was</u> [emphasis added] remediated in accordance with ...." As the remediation is not complete, the sentence is incorrectly written in past tense. The sentence should be written to communicate that the remediation is not complete and that the information contained in this report is intended to provide a status of remediation activities. Also, per a comment on the Executive Summary, it is requested that "clean closure report" be deleted from the first sentence.

Response: The cleanup has accomplished the remedial actions for the 116-N-1 Crib and Trench as they and the waste site itself are described in the 100-NR-1 interim action ROD. The WIDS waste site reclassification form applies only to the 116-N-1 Crib and Trench, which does not encompass the entire TSD boundary. A Certification of Closure for the TSD will be prepared when 100-NR-1 TSD remedial actions are complete.

Ecology Comment 19. Page 1, section 1.0: The introduction needs to identify that part of the unit remains unremediated. The following statement is recommended: "Due to radiological dose exposure and safety concerns, approximately 600 feet of piping (i.e., ancillary equipment) associated with the 1301-N

Trench and Crib is deferred to Decontamination and Decommissioning (D&D) of the 116-N-2 Facility and support facilities (1322-NA, NB, NC). Therefore, closure of the unit is not complete until such time as the ancillary equipment has been removed and the closure performance standards of WAC 173-303-610 have been satisfied for the entire unit."

Response: The WIDS waste site reclassification form applies only to the 116-N-1 Crib and Trench, which does not encompass the entire TSD boundary. A Certification of Closure for the TSD will be prepared when 100-NR-1 TSD remedial actions are complete.

Ecology Comment 20. Page 7, first sentence: Change the text to the following: "In October 2005, the excavation planned for the interim remedial action was completed."

Response: The suggested change would be incorrect because remediation of unanticipated plumes of contamination during the excavation resulted in removal of contaminated soil that was not planned for the interim remedial action.

Ecology Comment 21. Page 17, Table 5, Combined Crib and Trench Deep Zone, Hexavalent chromium row: The statistical cleanup verification data value of 2.96 mg/kg exceeds the remedial action goal of 2.0 mg/kg. However, the report is declaring that the RAG was attained based on the findings of 100-D, 100-F, and 100-H Area hexavalent chromium leach studies. Since the leach tests were approved under the 100 Area RDR/RAWP (DOE-RL 2005), and not the **100-N** RDR/RAWP (DOE-RL 2001), Ecology has not, and does not approve the applicability of this approach for the 100-N soils. In order for this approach to be applied to the 116-N-l data, a 100-N Area study will need to be completed to determine if the findings presented for the 100-D, 100-F, and 100-H Area soils also apply to the 100-N Area. Furthermore, based on the chromium contamination issues detected in the groundwater in various areas of the Hanford Site, it is not clear that the leach studies have been proven to be technically valid. Therefore, the applicability of the studies is questionable.

Response: DOE disagrees with the statement "...based on the chromium contamination issues detected in the groundwater in various areas of the Hanford Site, it is not clear that the leach studies have been proven to be technically valid." There is no hexavalent chromium contamination in the groundwater in the N-Area. Furthermore, in other parts of the 100 Area where hexavalent chromium soil concentrations are below concentrations shown to produce hexavalent chromium in leachate there is no direct correlation of groundwater contamination to soil contamination. Due to the similarity of geology and soils of the 100-N, 100-D, 100-H, and 100-F Areas, the behavior of hexavalent chromium at each area would be expected to be similar as well. Leach tests on soils contaminated with hexavalent chromium from 100-D, 100-H, and 100-F showed that no hexavalent chromium could be detected in the leachate if the soil assays were below 6.1 mg/kg at 100-D, below 5.7 mg/kg at 100-H, or below 7.2 mg/kg at 100-F. All of the soil concentrations at 116-N-1 are less than 2.96 mg/kg which would be expected to show no detectable leaching of hexavalent chromium in leach testing. Attempting to do leach tests on soils from 116-N-1 would not be expected to give meaningful results because the residual hexavalent chromium concentrations at 116-N-1 are too low. That is, the maximum hexavalent chromium soil concentration detected at 116-N-1 was 2.96 mg/kg but the leach tests on soils contaminated with hexavalent chromium from 100-D, 100-H, and 100-F showed that no hexavalent chromium could be detected in the leachate if the soil assays were below 6.1 mg/kg at 100-D, below 5.7 mg/kg at 100-H, or below 7.2 mg/kg at 100-F.

Ecology Comment 22. Page 18, section **5.3.2:** Ecology does not support the applicability of "Hexavalent Chromium Issues at 100D-DR Project" (BHI 2000b) to the hexavalent chromium RAG exceedance at the 116-N-l site. In order for this approach to be applied to the 116-N-l data, a 100-N Area study will need to

be completed to determine if the findings presented for the 100-D, 100-F, and 100-H Area soils are applicable to the 100-N Area.

Response: The geology and soils of the 100-N, 100-D, 100-H, and 100-F Areas are so similar that the behavior of hexavalent chromium at each area would be expected to be the same. Leach tests on soils contaminated with hexavalent chromium from 100-D, 100-H, and 100-F showed that no hexavalent chromium could be detected in the leachate if the soil assays were below 6.1 mg/kg at 100-D, below 5.7 mg/kg at 100-H, or below 7.2 mg/kg at 100-F. All of the soil concentrations at 116-N-1 are less than 2.96 mg/kg which would be expected to show no detectable leaching of hexavalent chromium in leach testing. Attempting to do leach tests on soils from 116-N-1 would not be expected to give meaningful results because the residual hexavalent chromium concentrations at 116-N-1 are too low.

Additionally, Ecology concurred with the backfill concurrence for the 116-N-1 Crib and Trench, using the same information as stated above.

Ecology Comment 23. Page 18, section 5.3.2, second paragraph, last sentence: Please correct 7.2 ug/L and 5.7 ug/L to 7.2 mg/kg and 5.7 mg/kg for the 100-F and 100-H Area soils, respectively.

Response: Accept

Ecology Comment 24. Page 19, Table 6, Combined Crib and Trench Deep Zone, Cr and Cr (VI) row: Please correct the table as follows:

Table 6. Application of the WAC 173-340 (MTCA Cleanup Regulation) Three-Part Test.

Nonradionuclides	Most Stringent Applicable RAG (mg/kg)	Statistical Value (mg/kg)[a]	Maximum Detected (mg/kg)	Total Number of Samples[0]	Percent Exceeding Most Stringent Applicable RAG[d]	RAGs Attained?
Combined Crib and Trench Deep Zone						
Chromium (total)	18.5	14	31.7	22	14%	~~Yes~~[g]-No
Hexavalent chromium	2	2.96	2.96	22	14%	~~Yes~~[h] No

Hexavalent chromium for the combined 116-N-1 Crib and Trench deep zone failed the RAG of 2.0 mg/kg. Both total and hexavalent chromium also failed the WAC 173-340 3-Part Test for various reasons. However, Table 6 is declaring that the WAC 173-340 Three-Part Test was attained for both of these COCs; based on the Kd value for total chromium, and the 100 Area leach study results for hexavalent chromium. These claims are not proven to be acceptable.

Response: Fate and transport modeling of total chromium with a distribution coefficient (Kd value) of 200 mL/g shows that all concentrations of total chromium in soil will be protective of groundwater and the river. Therefore, the stated concentrations of total chromium in soil are protective of groundwater and the river and the requirements of the three part test for total chromium are met. The geology and soils of the 100-N, 100-D, 100-H, and 100-F Areas are so similar that the behavior of hexavalent chromium at each area would be expected to be similar as well. Leach tests on soils contaminated with hexavalent chromium from 100-D, 100-H, and 100-F showed that no hexavalent chromium could be detected in the leachate if the soil assays were below 6.1 mg/kg at 100-D, below 5.7 mg/kg at 100-H, or below 7.2 mg/kg at 100-F. All of the soil concentrations at 116-N-1 are less than 2.96 mg/kg which would be expected to

show no detectable leaching of hexavalent chromium in leach testing. Because no detectable leaching of hexavalent chromium from soils at 116-N-1 is predicted, the requirements of the three part test for hexavalent chromium are met.

Ecology Comment 25. Page 20, Table 6, footnotes g and h: The following footnotes are incorrect and should be deleted:

> [g] the deep zone total chromium data set does not meet the 10% Criteria (footnote d). However, because total chromium has a Kd of 200 mL/g, and evaluation based on the 100 Area Analogous Sites RESRAD Calculations (BHI2005) shows that total chromium will not reach groundwater (and therefore the Columbia River) within 1,000 years.
>
> [h]Since the deep zone hexavalent chromium data set did not meet the 10% criteria (note d), protection for the deep zone hexavalent chromium is demonstrated based on the 100 Area leach study results discussed in Section 5.3.2.

Response: WAC 173-340-740(3)(a)(ii)(A) in the 1996 revision of MTCA allows for demonstrating that soil concentrations above cleanup levels are protective. Specifically with regard to hexavalent chromium, the response to Ecology Comment 24 shows that based on leachability data from the 100-D, 100-F, and 100-H Areas of the Hanford Site the residual levels in soil will not leach to groundwater or the Columbia River at levels that will cause cleanup levels to be exceeded. Therefore, the requirements of the three part test to demonstrate protection of groundwater and the river are met and the footnotes are correct.

Ecology Comment 26. Page 22, section 7.0: Because cleanup levels were not attained and because remediation actions are not complete, the "Statement of Protectiveness" should be revised to state that the cleanup levels were not achieved, the actions are not protective, and to recommend further actions, e.g., Limited Field Investigation and Focused Feasibility Study in accordance with Ecology's 11 April 2006 letter.

Response: The responses to Comment 21 and Comment 24 show that the cleanup levels have been attained or allowances of WAC 173-303-610(2)(b)(i) for demonstrating that soil cleanup levels are protective have been met. Therefore, residual soil concentrations of contaminants are protective. Whether or not additional field investigations or a focused feasibility study will be required at the 100-N Area can only be determined after completion of a risk assessment to evaluate residual contamination for the entire 100-N Area.

Ecology Comment 27. General: Based on groundwater information, Part A waste codes, and process information, the closure plan should have included more constituents to be analyzed at the deep zone than nitrate, mercury, and hexavalent chromium. The Part A permit identifies the following dangerous waste codes: F003 (spent solvents), D002 (corrosive waste), D006 (cadmium), D007 (chromium), D008 (lead), D009 (mercury), WC02 (no longer a waste code, but formerly pertained to carcinogens), and WT.02 (pertains to toxic wastes). During development of groundwater permit conditions, it was concluded that the following constituents occurred at higher concentrations in downgradient wells than in upgradient wells: antimony, arsenic, barium, boron, cadmium, calcium, chromium, lead, magnesium, mercury, selenium, silver, sodium, strontium, tin, zinc, chloride, fluoride, nitrate, nitrite, phosphate, and sulfate.

Response: The constituents to be analyzed at the shallow zone and deep zone at 116-N-1 were determined through the Ecology-approved SAP and the CERCLA process using the results of the *1301-N*

and 1325-N Liquid Waste Disposal Facilities Limited Field Investigation Report, DOE/RL-96-11, Rev. 0, December 1996. The constituents to be analyzed for are stated in Table 2 of the *Interim Remedial Action Record of Decision for the 100-NR-1 Operable Unit*, Hanford Site, Benton County, Washington, January 2000, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

Ecology Comment 28. Appendix B, Data Quality Assessment: There are some pathways in the decision logic for evaluation of split/duplicate sample results that are not carried out automatically in the data spreadsheets. Specifically, (Section Bl.5.4 of the CVP, item 3 of the EPA guidelines) comparison with the "two times TDL" criterion for cases where either of the results is greater than five times the TDL (but not both) is carried out by direct human evaluation rather than automatically in the spreadsheet. Ecology's primary concern is for a potential case where the DOE result is not detected, but the regulator split is detected. It seems prudent to have this evaluation included in the automated calculations to ensure that no potentially important evaluations are missed. For data in the present CVP, there are indeed instances of this situation but the results are very low compared to the RAGs so that none of the instances cause concern. However, it is important to be confident that these situations will be "caught" and evaluated in general. Ecology will request that this change be made for the 100 Area Remedial Design/Remedial Action Work Plan.

Response: Accept. No action required.

Ecology Comment 29. Appendix B, Data Quality Assessment: Appendix B concludes that all data were found to be acceptable for decision-making purposes, yet also discusses instances where the relative percent difference (RPD) evaluation for split/duplicate samples exceeds the acceptable limits. Ecology agrees with the discussion that occasional exceedance of the RPD limit is expected due to lack of homogeneous samples. However, please provide discussion (quantitative preferred if possible) of how it was determined that the number of split/duplicate samples exceeding the RPD limits, and the degree of exceedances, are acceptable.

Response: The RPDs in the 116-N-1 data set are consistent with RPDs seen in environmental soil data sets and were, in this case, determined not to be an indicator of any failure by the laboratory. Not all aspects of data evaluation are quantitative in nature. It is well known that environmental soil samples in general exhibit a heterogeneous tendency that water samples do not. The evaluation of RPDs requires qualitative consideration of the granular nature of soil samples collected on the Hanford site, which can introduce variable amounts of essentially inert material (i.e., rocks) into the samples and their duplicates.

Ecology Comment 30. RESRAD Modeling: The *User's Manual for RESRAD Version 6* (My 2001) ANL/EAD-4 describes "pathway factors" as the model's way of expressing the relationship between radionuclide concentrations in soil and the dose to a member of a population group. Pathway factors correspond to pathway segments connecting compartments in models of the environment between which radionuclides can be transported or radiation transmitted. The pathway factors are structured such that they may be added, deleted, or replaced without affecting the other pathways or pathway factors. In this way, RESRAD is designed to be "easily" modified or tailored to model any given situation by merely adding or replacing factors or terms in the pathway sum. However, from the information provided in the backfill package, it is concluded that this RESRAD configuration does not include a pathway factor segment for river water upwelling into the contaminated vadose zone, thus mobilizing contaminants and allowing contaminant transport to the river. This should be noted in the report as an uncertainty.

Response: The 100-NR-1 RDR/RAWP defines the RESRAD modeling inputs and parameters. Those

requirements have been followed. RESRAD modeling does not include the portion of the vadose zone into which up-welling of river water occurs. This is "Layer C" discussed on page 3 of EPA 2003, *Explanation of Significant Difference for the 100-NR-1 Operable Unit Treatment, Storage, and Disposal Interim Action Record of Decision and 100-NR-1/100-NR-2 Operable Unit Interim Action Record of Decision* (100-NR-1 ESD), May 2003, United States Environmental Protection Agency, Region X, Seattle, Washington. Cleanup of the 116-N-1 Crib and Trench is described on page 3 of the 100-NR-1 ESD and only involved removal of the excavation area above "Layer A" and a portion of "Layer A." The RESRAD modeling determined that residual contamination remaining in the "Layer A" deep zone after remediation was complete would not migrate to reach "Layer C" or the groundwater at concentrations exceeding drinking water standards. Therefore it is not required to model the up-welling of river water to show that concentrations of residual contamination in the portions of 116-N-1 that were remediated are protective of groundwater and the river.

Attachment 2

DOE-RL Responses to Ecology's Letter, Dated April 11, 2006, Relative to the Backfill Concurrence for the 116-N-1 Waste Site (Also Known as TSD Unit 1301-N)
February 1, 2007

Ecology Comment (1st paragraph): "The signed backfill concurrence checklist for the 116-N-1 Combined Crib and Trench is enclosed. After considering the factors listed below, the Department of Ecology agrees to the backfill. However, our agreement is contingent upon the United States Department of Energy's (USDOE) agreement to incorporate the requirement for a Focused Feasibility Study into the 1301-N chapter of the Hanford Facility Resource Conservation and Recovery Act Draft Permit (Site-Wide Permit). The permit modification is necessary to support completion of Hanford Federal Facility Agreement and Consent Order Milestone M-16-55, "Complete the interim response actions for the 100 N Area" (12/31/2012)"

DOE Response: A U.S. Department of Energy, Richland Operations Office (RL) representative (Kevin Bazzell) contacted the Washington State Department of Ecology (Ecology) (John Price) upon receipt of the April 11, 2006, letter to clarify the intent of contingent requirements. Upon that discussion, Ecology indicated the use of the word "contingent" was not intended, and that backfill could proceed without committing to a Focused Feasibility Study (FFS). While this action spurred the initiation of backfill operations at 116-N-1, RL still maintains its position that the cleanup objectives as specified in the Record of Decision (ROD) and the requirements of the approved RCRA Closure Plan were met for this waste site. Therefore, presupposing any further cleanup action and a FFS is premature. If the results of the risk assessment identify the need for further action, strategic discussions with Ecology would be necessary to identify the appropriate regulatory path, the necessary public involvement processes needed, and involvement of the U.S. Environmental Protection Agency (EPA). Additionally, RL does not plan to submit a permit modification for the 1301-N unit to require a FFS at this time.

The subsequent Ecology notification requesting a Limited Field Investigation (LFI) for the 100-N Area made by John Price at the June 8, 2006, Unit Manager Meeting, appears to be in conflict with the request for a FFS as an LFI is a process to gather more data and a FFS is an evaluation of remedial action alternatives. It is also noted that the Ecology approval of backfill was misleading because subsequent issues regarding residual contamination at 116-N-1 could have been resolved with Ecology before backfilling the site, especially if attainment of cleanup objectives were in question by Ecology.

Ecology stated in the April 11, 2006 letter that their comment above was made in consideration of several factors. These are listed below, including responses.

Factor 1: The excavation of contaminated material from the 1301-N Trench was done in accordance with the Hanford Past Practice (HPP) Strategy, DOE/RL-91-40, Revision 0. The excavation and sampling of the Trench completes a step in DOE/RL-91-40, Figure 1, "Hanford Past Practice Strategy RI/FS (RFI/CMS) Process" (enclosed). That step is "Perform IRM; Concurrent Characterization."

Response: The approach outlined in the Hanford Past Practice (HPP) Strategy is consistent with the remediation performed at the 116-N-1 waste site. However, the statement "in accordance with the HPP Strategy" implies that the HPP is a Tri-Party Agreement primary document. The HPP is a guidance document which is founded on existing regulatory processes, but the HPP in itself is not a procedure or requirements document. Remediation and RCRA closure was performed in accordance with the *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA) Record of Decision (ROD), the *Resource Conservation and Recovery Act* (RCRA) Corrective Measures Study, and enforceable provisions (including the approved Closure Plan) of the RCRA Site Wide Permit (with the exception of removal of certain portions of the 116-N-1 ancillary piping, which has been deferred per the approved RCRA permit schedule). The 100-NR-1 interim action CERCLA ROD for the 116-N-1 Crib and Trench was based upon the Ecology-approved Corrective Measures Study (DOE/RL-96-39, Rev. 1) and the associated Limited Field Investigation (LFI) report (DOE/RL-96-11). The 116-N-1 waste site was selected for implementation of an interim measure via the ROD and RCRA closure plan in accordance with the Closure Plan incorporated into the Hanford Facility RCRA Permit. The *Nature and Extent of Contamination and Investigative Approach* Section on page 19 of the 100-NR-1 interim action ROD provides a discussion of the results of the LFI, and explains the use of the HPP Strategy consistent with the remedy selection. Additionally, the preamble to U.S. Environmental Protection Agency's *National Contingency Plan* (NCP) 55 *Federal Register* 8666 expresses a bias for action using interim measures to eliminate, reduce, or control hazards posed by a site as early as possible. Also expressed is that interim remedial measures are intended to achieve remedies that are expected to be consistent with final actions and a final ROD. RL believes the interim measures and RCRA closure taken at 116-N-1 are consistent with these principals, and will wait for the risk assessment results prior to making any future decision regarding additional cleanup actions.

Factor 2: The next steps in the HPP Strategy are to assess the accumulated data and determine minimum data needs. Ecology's assessment of the accumulated data is that additional field investigations will be required at 100-N. The results of the additional field investigations, and the previously accumulated data, will have to be evaluated in a Focused Feasibility Study (studies) as shown in Figure 1 of DOE/RL-91-40. The studies will have to consider the alternative of capping the unit if necessary to protect human health and the environment.

Response: This statement implies the "next steps" following the remediation activities approved by Ecology, are to assess the accumulated data and determine if there is sufficient data to conduct a risk assessment. It is unclear what Ecology intends as the scope of the FFS (or LFI) because only waste site 116-N-1 is cited but Ecology's comment says "100-N" which implies a larger scope. Any potential future cleanup actions will be evaluated following the result of the 100 and 300 Area Component of the River Corridor Baseline Risk Assessment, which is scheduled to be completed in late 2007. RL does not plan to make decisions on potential cleanup alternatives for a FFS at this time because it would be premature. If the risk assessment results show that no additional actions are necessary to ensure protection of human health and the environment, development of an FFS would not be necessary. If the risk assessment results identify the need for further action, strategic discussions with Ecology would be necessary to identify the appropriate regulatory path, the necessary public involvement processes, and involvement of the EPA.

Factor 3: The 1301-N Trench is a regulated unit as defined at Washington Administrative Code (WAC) 173-303-040. Requirements for corrective actions for releases from regulated units are

found at WAC 173-303-64620. Our assessment of the backfill concurrence data is that releases have occurred (notably, hexavalent chromium), and remain, in the vadose zone at concentrations that exceed the numeric cleanup values referenced at WAC 173-303-610(2)(b)(i). Ecology notes that the completion of a Focused Feasibility Study would be compliant with WAC 173-303-64620(4)(a), which applies to corrective action for releases from regulated units.

Response: A CERCLA ROD and a RCRA CMS and Closure Plan were already approved by Ecology to conduct cleanup actions at 116-N-1 because releases did occur at this waste site that exceeded cleanup protection values. Following the cleanup action, a draft Cleanup Verification Package (CVP-2006-00004) was submitted to Ecology for review and comment. The CVP concludes the 116-N-1 site has met the remedial action objectives and goals for direct exposure, protection of groundwater, and protection of the Columbia River. Specifically with regard to hexavalent chromium, the CVP concludes that the residual levels will not leach at levels which cause groundwater or surface water standards to be exceeded. The MTCA Method B cleanup values referenced in WAC 173-303-610(2)(b)(i) allow for demonstrating that soil cleanup levels are protective. As a consequence of the information presented in the CVP, RL believes that the residual contaminant levels do, in fact, meet the numeric cleanup values for "clean closure" under WAC 173-303-610. Again, RL feels that it is premature to make a decision that a FFS or LFI needs to be conducted.

Factor 4: Ecology merely lists documents as a statement of fact. No response is necessary.

Factor 5: Requirements at WAC 173-303-645(2) – (12) for "Releases from Regulated Units" apply to the 1301-N Trench. The Dangerous Waste Permit for the Hanford Site, WA7890000897, is currently being renewed. Ecology has drafted closure/post closure groundwater monitoring conditions for the 1301-N Trench and other solid waste management units at the 100-N Area. Those draft conditions will undergo public comment and revision as necessary. USDOE will also have the opportunity to comment.

Response: It is unclear how this factor, which discusses groundwater monitoring, directly applies to Ecology's desire for additional investigations at the 116-N-1 waste site (TSD 1301-N). This unit is currently undergoing closure as required by Part V (Units in Closure) of the current Site Wide Permit. Since portions of the 1301-N TSD waste site and ancillary piping still require cleanup actions, this unit will remain in Part V of the Site Wide Permit until closure of the entire 1301-N TSD waste site and ancillary piping is completed. RL will not presuppose the outcome of the draft Dangerous Waste Permit renewal. Any additional regulatory action for 1301-N above and beyond what is required by the Site Wide Permit and the CERCLA ROD will require input from RL, and RL understands there will be an opportunity for comment.

Attachment 3

Summary of Requirements for Remediation and Closure of the 116-N-1 Crib and Trench

Remedial activities for the 116-N-1 Crib and Trench (which is only part of the 1301-N TSD unit) were initiated in April 2002, and completed in October 2005. This remediation was conducted pursuant to the agreements and requirements identified below. The waste site reclassification form and supporting CVP were prepared to document that these activities meet the requirements for the 116-N-1 Crib and Trench, as agreed to between RL, Ecology and EPA, as appropriate.

The 1301-N Piping (WIDS site 100-N-63) remediation was "deferred until D&D activities of the 105-N Reactor Complex." per Attachment 41, section 4.9 of the current permit. When the closure/remediation activities for the piping is completed, the closure documentation for the crib, trench and piping will be used to support the Certification of Closure that will be prepared for this site by an independent professional engineer and submitted to Ecology to complete the RCRA TSD closure requirements.

The Waste Site Reclassification Form is a primary document, as it requires signatures from the TPA project managers to document the decision. The supporting closure documentation (CVP) is a secondary document in the TPA.

Summary of Requirements
***Record of Decision* (EPA/ROD/R10-00/120) EPA ID: WA3890090076) 01/18/2000**
- Comply with all permit conditions
- Coordinate RCRA closure and CERCLA remedial action
- Remove soil, structures, pipelines for 116-N-1, 116-N-3, and UPR-100-N-31
- Remove soils to depth of 5 ft below engineered structures
- RDR, RAWP, and SAP are primary documents
- Remove 15 ft or bottom of engineered structure, whichever is deeper
- Meet MTCA Method B cleanup criteria & 15 mR/yr
- Cs-137, Co-60, Eu-154, Eu-155, Pu-239/240, Sr-90, H-3, mercury, nitrate are discussed as COCs in text. Table 2 of ROD specifies COPCs which include the COCs plus Th-228, Th-232, U-233/234, U-238, cadmium, and lead. o *Email from John Fancher dated 12/19/05 has Am-241, Cs-137, Co-60, Eu-154, Eu-155, Ni-63, Pu-239/240, Sr-90, H-3 (deep zone only- UMM), nitrate, mercury, total chromium (deep zone only); CrVI (deep zone only). Table 1-1 of the SAP lists Am-241, Cs-137, Co-60, Eu-154, Eu-155, Ni-63, Pu-239/240, Sr-90, H-3, nitrate, mercury (shallow zone only), total chromium (deep zone only), CrVI (deep zone only).*
- Subsurface soil layer (3-5 ft thick) below the crib and trench contains Pu-239/240, H-3, chromium and nitrates greater than cleanup standards – Modeling indicates contaminants will not pose threat to groundwater; however monitoring will be required as part of remediation activities to verify accuracy of modeling.
***Explanation of Significant Differences* (EPA/ESD/R10-03/605)(WA3890090076)**
- Removed 30 in. irrigation in RESRAD model. Provides for institutional controls to prevent irrigation in the 100-N Area.

Permit Conditions
- F003, D002, D006, D007, D008, D009, WT02 - December 27, 2000: Ecology granted contained-in determination for F003 (methanol).   o *Contains the TSD unit closure plans, corrective action plans, and RCRA Permit conditions*
- Remove earthen structures, concrete structures, remove contaminated piping systems, fencing and signage surrounding the units, and ancillary structures such as valve houses associated with piping.   o *Piping systems were deferred per attachment 41, section 4.9 and will be remediated as part of D&D of 105-N per TPA Milestone M-093-20.*
***WIDS Reclassification Form* (2006-018)**
- "After this waste site is backfilled, a Certification of Closure shall be prepared for this site by an independent professional engineer and shall be submitted to Ecology. A Certificate of Closure Acceptance Letter signed by Ecology shall be issued for the reclassification of this waste site to complete the RCRA TSD closure requirements.   o *WIDS Reclass Form for 116-N-3 was signed which included a portion of the piping (100-N-63:1).*
***100-NR-1 Treatment, Storage, and Disposal Units Corrective Measures Study/Closure Plan* (DOE/RL-96-39)**
RCRA Facility Investigation/Corrective Measures Study Work Plan for the 100-NR-1 Operable Unit Hanford Site, Richland, Washington (DOE/RL-90-22)
***Remedial Design Report/Remedial Action Work Plan for the 100-NR-1 Treatment, Storage, and Disposal Units* (DOE/RL-2000-16)**
- Section 2.2.3.6 of the 100-N RDR/RAWP explains the methodology for determining if residual contaminant levels are protective of gw. The process starts out with the 100 times rule, followed by site-specific modeling if the site fails based on the 100 X approach. Section 2.2.3.8 takes the same approach for protection of the Columbia River.
- UPR-100-N-31 is not part of the TSD (section 1.2) but included in ROD and permit for remediation.
- Modified closure(section 2.0) due to presence of groundwater plumes (radionuclide and sulfate)
- Closed in accordance with RCRA. Certification of closure prepared and submitted to Ecology within 60 days of completing the remedial actions at the site (section 3.7).
- Subsequent to remedial action, each waste site will be reclassified in the WIDS database in accordance with TPA. Regulator approval documented on MP-14 site reclassification form.
***Sampling and Analysis Plan for the 100-NR-1 Treatment, Storage, and Disposal Units During Remediation and Closeout* (DOE/RL-2000-07)**
- Table 1-1 of the SAP lists COCs as Am-241, Cs-137 (shallow zone only), Co-60 (shallow zone only), Eu-154 (shallow zone only), Eu-155 (shallow zone only), Ni-63, Pu-239/240, Sr-90, H-3, nitrate, mercury (shallow zone only), total chromium (deep zone only), CrVI (deep zone only).
Unit Manager Meeting Minutes
- August 25, 2005 (CCN 129622): Deleted tritium as a COC for the shallow zone; only deep zone COC. Allowed use of GEA instead of AEA for Am-241.
***Proposed Plan Interim Remedial Action and Dangerous Waste Modified Closure of the Treatment Storage and Disposal Units in the 100-NR-1 Operable Unit* (DOE/RL-97-30)**
- Contains RCRA permit conditions.