



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY  
3100 Port of Benton Blvd • Richland, WA 99352 • (509) 372-7950

August 25, 2004

Mr. Kevin Bazzell, Project Manager  
Richland Operations Office  
United States Department of Energy  
P.O. Box 550; MSIN A3-04  
Richland, Washington 99352

**RECEIVED**  
AUG 31 2004  
**EDMC**

Dear Mr. Bazzell:

Re: Risk Assessment Work Plan for the 100 Area and 300 Area Component of the  
River Corridor Baseline Risk Assessment, DOE/RL-2004-37, Draft A

Enclosed are the Washington State Department of Ecology's comments on DOE/RL-2004-37,  
Draft A.

If you have any questions, please contact me at (509) 372-7921, or Dib Goswami at  
(509) 372-7902.

Sincerely,

John B. Price  
Environmental Restoration Project Manager  
Nuclear Waste Program

lkd

cc: Larry Gadbois, EPA  
John Sands, USDOE  
Steve Weiss, BHI  
Stuart Harris, CTUIR  
Pat Sobotta, NPT  
Russell Jim, YN

Todd Martin, HAB  
Ken Niles, ODOE  
Dib Goswami, Ecology  
**Administrative Record:** 100 Area  
Environmental Portal

**Washington State Department of Health Comments**  
**Risk Assessment Work Plan for the 100 Area and 300 Area Component of the RCBRA**  
**(DOE/RL-2004-37, Draft A)**

Comment #	Page, Paragraph	Comment
1.	General Comment	This risk assessment work plan discusses numerous tasks, such as conducting risk assessments, developing exposure scenarios, selecting contaminants of potential concern, and determining cleanup levels. Much of this work appears to have previously been completed. For example, human health risk assessments have already been carried out for remediated sites in Cleanup Verification Packages, COPCs have been identified, and soil cleanup levels have already been established for residential and industrial scenarios in the 100 and 300 Areas. Please provide an explanation as to how previous work will be integrated into this risk assessment, and explain how this risk assessment will differ from, for example, the risk assessments in the CVPs.
2.	Page 1-9	The assumption has been made that "Protection of ecological receptors from direct exposure to contaminated soils was based upon the conclusion that attainment of standards for protection of human health would also be protective of ecological receptors". This assumption may not be valid in all cases. For example, for scenarios in which institutional controls may prevent human exposure, these institutional controls may not prevent ecological receptors from exposure. The work plan should acknowledge that there are situations where humans are protected, yet a specific ecological risk assessment may be necessary.
3.	Page 1-14	The work plan calls for the evaluation of waste sites that have been remediated as part of a ROD. Explain how risks that have already been evaluated in Cleanup Verification Packages will be used. Clarify whether this risk assessment will re-evaluate human health risks from waste sites that have already been shown, in CVPs, to meet human health standards.
4.	Page 1-14	The work plan calls for the development of cleanup levels for each of the exposure scenarios. Explain how cleanup levels that have already been developed elsewhere (residential and recreational cleanup levels for the 100 and 300 Areas) will be used, and if these levels will be re-calculated.
5.	Page 1-15	The 100 Area RODs and cleanup goals are interim. Explain how results from the risk assessment will be used when final, and potentially different, cleanup goals are established.
6.	Page 3-1	Following the development of the CSM, clarify whether a screening-level evaluation will be performed for protection of human health (human health is omitted from the list of standards of protectiveness).
7.	Page 3-8 and 3-14	The Presidential Proclamation 7319 states that the 100 Area will not be developed for residential or commercial use in the future. Explain the significance of using a residential scenario in the risk assessment, and clarify if and how the results will be used in decision making.
8.	Page 3-10	Clarify how groundwater riverbank seeps can be utilized for beneficial activities. It is highly questionable that these seeps can actually be used for any kind of beneficial activity, as when they are "flowing" they are a mere trickle of water through the sand and gravel.

**Washington State Department of Health Comments**  
**Risk Assessment Work Plan for the 100 Area and 300 Area Component of the RCBRA**  
**(DOE/RL-2004-37, Draft A)**

Comment #	Page, Paragraph	Comment
9.	Page 3-12	Consider adding plant uptake from soil in the list of contaminant release mechanisms.
10.	Page 3-12	Groundwater protection will not be re-evaluated in this risk assessment because it has already been evaluated in the CVPs. Clarify why human health protection will be re-evaluated since it also has already been evaluated in the CVPs. The logic here appears inconsistent.
11.	Page 3-14	Explain the process for finalizing the list of human exposure pathways and receptors.
12.	Page 3-19	Explain why the work plan calls for collection of biota samples regardless of the results from screening-level data. DOE's Graded Approach calls for the collection of biota only if the site fails all of general screening, site specific screening, and site specific analysis. Explain why DOE is not following the methodology in its own standard for protection of biota.
13.	Page 3-23	The work plan specifies that the window for sampling adjacent to the Columbia River is limited to the fall during low water. This plan will certainly bias the results high. For example, this is the time of year when riverbank seeps typically are active, and concentrations of Columbia River water samples collected near the seeps will be higher than average annual values. Explain how these high-biased results will be compared to standards that specify criteria as average annual concentrations. For example, Washington State water quality standards for surface water are based on EPA drinking water standards, which specify MCLs as average annual concentrations. For media with average annual criteria, the work plan should specify that the sampling plan will determine average annual concentrations.
14.	Page 3-24	The work plan specifies that the purpose of gamma surveys in the riparian zone is to identify areas of elevated radionuclide activity on surface soils. However, elevated gamma results are often attributed to "sky shine" from radionuclides such as Co-60 and Cs-137 that are located away from the riparian zone in the near surface soils of waste sites. Explain how gamma surveys will be able to distinguish between sky shine from a distant source and local contamination at the riparian zone (for example, use the N Area in the explanation).
15.	Page 3-27	For the baseline risk assessment, clarify whether or not currently contaminated groundwater will be addressed.
16.	Page 3-36	Explain how DOE's Graded Approach will be used in the Ecological Risk Assessment.
17.	Page 4-1	Include a discussion of standards for protection of human health in the discussion of Environmental Standards for Protectiveness.
18.	Page 4-3	Clarify why it is not certain that the BCGs and methodology from DOE's Graded Approach for Evaluating Radiation Doses to Biota will be used at part of the screening level ecological risk assessment. If the Graded Approach is not used, explain why DOE will not its own standards, and explain what will be used in its place.

**Washington State Department of Ecology Comments**  
**Risk Assessment Work Plan for the 100 Area and 300 Area Component of the RCBRA**  
**(DOE/RL-2004-37, Draft A)**

Comment #	Page, Paragraph	Comment
1.	Section 1.0, Page 1-3, 3 <sup>rd</sup> paragraph	Change the statement "Data and results from the 100 and 300 Area Component will then be integrated with data from the Columbia River Component to produce <del>a single, all-inclusive</del> baseline risk assessment report for the entire River Corridor."
2.	Section 1.0, Page 1-3, 3 <sup>rd</sup> paragraph	<p><b>Risk assessments should provide an integrated, comprehensive view of risk.</b> While some need for divisions between geographic areas and contaminant sources is necessary for regulatory and logistical purposes, DOE should ultimately integrate all Hanford geographic areas and contaminant sources to support final remedial decisions.</p> <p>Revise this introduction to describe the relationships between all Hanford Site risk assessments. This should be a generic write-up that will be included in many Hanford documents. The generic write-up should include an explicit description of the inter-relationships between the different risk assessments. For example, the relationship between this 100 and 300 Area Component of the RCBRA and the 200 Area terrestrial ecological risk assessment could be described as "weakly linked"; although birds and animals can move freely between the River Corridor and the 200 Area, they are unlikely to carry significant amounts of contamination between the two areas. Conversely, there is a strong linkage between this 100 and 300 Area Component and the Columbia River Component, as noted in this section.</p> <p>For those risk assessments that are strongly linked, there will have to be a detailed description of how outputs from one risk assessment will be integrated into other risk assessments. For this 100 and 300 Area Component, there is a presumption that RI/FS for the 200 Area groundwater operable units (particularly 200-PO-1) is strongly linked, so this work plan should describe the specific inputs from the 200-PO-1 RI/FS, and how they will be integrated into this risk assessment.</p>
3.	Section 1.0	Add text describing how the evaluation of aquatic receptor impacts at 100-NR-2, due October 2005, will be integrated into this RCBRA. Include specific description of expected outputs from the 100-NR-2 study, and how those will be used as inputs into this risk assessment.

**Washington State Department of Ecology Comments**  
**Risk Assessment Work Plan for the 100 Area and 300 Area Component of the RCBRA**  
**(DOE/RL-2004-37, Draft A)**

Comment #	Page, Paragraph	Comment
4.	Global	This document should prepare DQO participants for the DQO by highlighting the planned work. A lot of the planning and explanation appears to be deferred to the DQO (ex. top of p. 3-41 "Input parameters used in exposure modeling are being developed as part of the problem formulation phase and DQO process"). It is difficult to discern a real focus to the study based on this document. This document is a work plan and should provide a plan for the work to be performed. Add more detail throughout the document to provide the actual plan for the work.
5.	Global	This study must address the groundwater pathway, and comply with the requirements of WAC 173-340-747 and -705 (2001). This is a risk assessment, and ingestion of drinking water in the river corridor is part of exposure scenarios such as the rural residential scenario. This pathway has not been addressed across the river corridor in a manner that is appropriate for a risk assessment for the whole river corridor. The results of this risk assessment will not be useful if this pathway is omitted.
6.	Section 2, Page ES-4 – ES-5	Correct the last sentence of ES-4 as follows: "Situated within the semiarid ... the Hanford Site receives only 6.8 inches of precipitation a year; <del>most of which is lost through evapotranspiration.</del> " This statement at least requires a reference, but may not be true. The majority of the precipitation in this region falls in the winter, when plants are not transpiring.
7.	Section 1.1, Page 1-6, Figure 1-2	Since there is also an N Area risk assessment in progress, it should be integrated with the two risk assessments shown on this figure. Consider adding it to the figure.
8.	Section 1.2.2, Page 1-11, Last paragraph	Add the following sentence as the 3 <sup>rd</sup> sentence of the paragraph: "However, the state of Washington requires that total risk levels for carcinogens not exceed 1E-05, and that total hazard indices for hazardous chemicals not exceed 1.0 (WAC 173-340-705[4])."
9.	Section 2.1, Page 2-1 – 2-2, Last sentence of page 2-1, continues on 2-2	Again this sentence must at least have a reference, or it must be deleted: " <del>Most precipitation that falls on the Hanford Site is lost through evapotranspiration.</del> "
10.	Section 2.4.2, RAO 2	Change the sentence as follows: "Prevent migration of ... safe drinking water act (40CFR 141) and/or Washington State ..."

**Washington State Department of Ecology Comments**  
**Risk Assessment Work Plan for the 100 Area and 300 Area Component of the RCBRA**  
**(DOE/RL-2004-37, Draft A)**

Comment #	Page, Paragraph	Comment
11.	Section 3.1.1.1, Page 3-2, 1 <sup>st</sup> paragraph of section	The last sentence of this paragraph indicates that currently unremediated sites that may need remediation will not be evaluated in this risk assessment. Consider the timing of the risk assessment and remediation. These unremediated sites could influence biota and interfere with the risk assessment if the risk assessment is performed before remediation. They may need to be addressed after all.
12.	Section 3.1.1.1, Page 3-2, 2 <sup>nd</sup> paragraph of section	The 105-N Reactor is being excluded from this document. That might be ok, but this site could also influence this risk assessment if it is within the range of the ecological receptors in the other parts of the 100 area. Will this area (N-reactor) be cleaned up before the risk assessment begins?
13.	Section 3.1.5.1, Page 3-12 – 3-13, Last paragraph of 3-12, continues on 3-13	Groundwater protection must be evaluated in this risk assessment. If the data were collected using focused approaches they are not appropriate for use in a risk assessment (EPA/540/1-89/002, 1989, p. 4-18) and you are left without any real evaluation of the groundwater pathway. Note that groundwater use is part of the rural residential scenario. Without a good evaluation of this pathway, the risk assessment will not be meaningful. The groundwater pathway must be addressed and re-evaluated.
14.	Section 3.1.5.1, Page 3-13, 1st paragraph of Riparian Zone sec.	The last sentence of this paragraph does not mention landslides and slumping as ways by which waste from the upland areas might reach the riparian zone. Consider adding them.
15.	Section 3.1.5.1, Page 3-13, bullets	Ingestion of contaminated plants or animals/insects would seem to be a possible mechanism that would introduce contaminants from soil to potential receptors. Consider listing it here.
16.	Section 3.2.1, Page 3-23, 1 <sup>st</sup> and 2 <sup>nd</sup> full paragraphs	Biased sampling will not give scientifically-valid results. Furthermore, it is not wise so early to decide that no additional soil data are needed. The following approach is strongly suggested: (1) Develop working hypotheses and null hypotheses about the expected risk patterns; (2) choose a statistical approach for sampling to address those hypotheses and give you the power you will need to reject the null hypotheses if they should be rejected; (3) sample as dictated by the statistical requirements. This document does not provide clear evidence that sampling has been carefully planned. Please provide your sampling goals and revise this section to indicate how you will achieve your goals.

**Washington State Department of Ecology Comments  
Risk Assessment Work Plan for the 100 Area and 300 Area Component of the RCBRA  
(DOE/RL-2004-37, Draft A)**

Comment #	Page, Paragraph	Comment
17.	Section 3.2.5	The statement "If available, groundwater modeling and risk calculations from this program will be included in the risk assessment report, with an evaluation of their significance to the 100 and 300 Areas and Columbia River" is insufficient level of detail for this very important component. Add a description of what specific "outputs" from 200-PO-1 or other RI/FS will be used in this risk assessment. See also comment about Section 1.0, page 1-3.
18.	Section 3.6.3, Page 3-30, 1 <sup>st</sup> bullet	Before the first bullet include a statement about how the initial list of contaminants was developed.
19.	Section 3.6.3, Page 3-30, 2nd bullet	Eliminate the second bullet and do not use frequencies of detection as criteria.
20.	Section 3.6.3, Page 3-30, 4 <sup>th</sup> bullet	Modify the 3 <sup>rd</sup> sentence of the 4 <sup>th</sup> bullet as follows: "If the <del>maximum detected</del> <u>mean as estimated by the 95% UCL</u> concentration of each metal ..." If the 95% UCL is higher than the maximum, it probably indicates that there are not enough data; in these cases the maximum is not conservative.
21.	Section 3.6.3, Page 3-30, 5 <sup>th</sup> bullet	In addition to IRIS, use the following databases: Health Effects Assessment Summary Tables (HEAST), Oak Ridge National Laboratory – Risk Assessment Information System (ORNL-RAIS), and Cleanup Levels and Risk Calculations (CLARC, v. 3.1). Only if all have been checked should you dismiss a COPC due to lack of toxicity data.
22.	Section 3.6.4.2, Page 3-32, bullets	Add Health Effects Assessment Summary Tables (HEAST), Oak Ridge National Laboratory – Risk Assessment Information System (ORNL-RAIS), and Cleanup Levels and Risk Calculations (CLARC, v. 3.1) to the list of databases that will be used for toxicity data.
23.	Section 3.6.4.3, Page 3-33, 2 <sup>nd</sup> bullet	Use the WAC 173-340-705(4) risk goal of 1E-05 for total carcinogens. This is an ARAR.
24.	Section 3.6.4.4, Page 3-35, Last paragraph	A sensitivity analysis should be performed. Add a statement that indicates that a sensitivity analysis will be performed for each source of uncertainty.

**Washington State Department of Ecology Comments**  
**Risk Assessment Work Plan for the 100 Area and 300 Area Component of the RCBRA**  
**(DOE/RL-2004-37, Draft A)**

Comment #	Page, Paragraph	Comment
25.	Section 3.6.5.2, Page 3-38, 1 <sup>st</sup> bullet	Modify the second sentence as follows: "Selected receptors will meet criteria specified in the DQO <u>and SAP.</u> " The regulators will have additional input at the SAP level.
26.	Section 3.6.5.2, Page 3-38, Last paragraph of section	Define 'site-specific study' in the context of the river corridor. This entire study is a Hanford site-specific study, and it should produce a number of hypotheses and include proper testing of the hypotheses.
27.	Section 4.2, Page 4-2, Table 4-1	Add the following to the Details column for WAC 173-340-740(3): "Provides reference to WAC 173-340-747 for soil cleanup levels for the protection of groundwater."
28.	Section 4.2, Page 4-2, Table 4-1	Add a row for WAC 173-340-747 (1-11). In the Details column for this new row, add the following: "Provides formulae for calculating soil cleanup levels for protection of groundwater for nonradioactive contaminants including petroleum."
29.	Section B.3.2, Page 3-4	Change the title of this section to "Unconsolidated sedimentary strata and soils". The Hanford and Ringold formations are geologic, not pedogenic (except for a small amount of paleosol), so they are not soils. Soils have horizons, not strata.
30.	Section B.5, Page B-8 – B-9, Last sentence of Page B-8, continues on B-9	Change the sentence as follows: " <del>Most of the remaining precipitation is lost through evapotranspiration;</del> <del>however,</del> Some precipitation infiltrates ...." There is no supporting reference for this sentence.
31.	Section C-1, Page C-2, Table C-1	Change the arsenic row as follows: Background concentration column: 20 <sup>b</sup> <u>for 100 Area</u> ; 6.5 <sup>a</sup> <u>for 300 Area</u> Source column: The Tri-Parties have agreed to use the WAC 173-340 Method A value of 20 mg/kg for arsenic in the 100 area due to pre-Hanford applications of arsenicals in the 100 area. Note that footnote b must also be changed (see later comment). The value of 20 mg/kg is not the state background. The state background is 7.0 mg/kg (San Juan, 1994, Ecology Pub. No. 94-115).

**Washington State Department of Ecology Comments**  
**Risk Assessment Work Plan for the 100 Area and 300 Area Component of the RCBRA**  
**(DOE/RL-2004-37, Draft A)**

Comment #	Page, Paragraph	Comment
32.	Section C-1, Page C-3, Table C-1	Add uranium's background concentration in mg/kg to this table. Total uranium, as a hazardous metal, must be a COC in this river corridor risk assessment. A great deal of uranium was used and/or disposed of in both the 100 and 300 Areas, and there is currently groundwater contamination in these areas.
33.	Section C-1, Page C-4, Table C-1	Change footnote b to the following: "Elevated concentrations of arsenic in the 100 Area surface soil exist because of the pre-Hanford agricultural use of lead arsenate pesticides. Consequently, the Tri-Parties have agreed to use the WAC 173-340 Method A cleanup level of 20 mg/kg for the 100 Area."