0048584

U.S. Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

054347

Mr. Steve M. Alexander
Perimeter Areas Section Manager
Nuclear Waste Program
State of Washington
Department of Ecology
1315 W. Fourth Avenue
Kennewick, Washington 99336-6018

Mr. Douglas R. Sherwood
Hanford Project Manager
U.S. Environmental Protection Agency
712 Swift Boulevard, Suite 5
Richland, Washington 99352-0539

JAN 1998
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EDMC

Dear Messrs. Alexander and Sherwood:

REMEDIAL DESIGN REPORT/REMEDIAL ACTION WORK PLAN (RDR/RAWP) FOR THE 100 AREA, DOE/RL-96-17, REV. 1, DRAFT C (ENCLOSURE 1); 100 AREA REMEDIAL ACTION SAMPLING AND ANALYSIS PLAN (SAP), DOE/RL-96-22, REV. 1, DRAFT A (ENCLOSURE 2); AND COMMENT RESOLUTION PACKAGE (ENCLOSURE 3)

Enclosed are three copies each of Enclosures 1 and 2 for review and approval. Both documents have been redlined to help reviewers identify revised material. The revision of Enclosures 1 and 2 reflect agreements reached between the U.S. Department of Energy, the U.S. Environmental Protection Agency (EPA), and the State of Washington Department of Ecology (Ecology) since the conditional approval of Rev. 0 of these enclosures in June 1996. Drafts A and B of the RDR/RAWP have been placed in the Administrative Record. These documents encompass design for the Amendment to the Record of Decision (ROD), 100 Area, Benton County, Washington (EPA, March 1997).

Two previous drafts of the RDR/RAWP were internal DOE working drafts and were provided informally to EPA and Ecology staff for review and comment. Enclosure 3 reflects changes made to the RDR/RAWP during these reviews and addresses the original conditions for approval.

The SAP has been updated to reflect proposed field practices as well as the addition of ROD Amendment sites. It should be noted that the schedule in this revision is unchanged from Rev. 0. Additional discussions with EPA and Ecology are forthcoming on revision to these schedules. Impacts from additional waste quantities found during remedial activities, budget shortfalls, and the anticipated remedial action for remaining operable units in the 100 Area need to be addressed. Once these discussions occur, the schedules will be revised.

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If you want to discuss this matter further or require additional information, please contact Ms. Nancy Werdel at 376-5500.

Sincerely,

Glenn I. Goldberg, Project Manager
Remedial Actions Project

RAP:NAW

Enclosures: As stated

cc w/encls:
D. A. Faulk, EPA
K. K. Holliday, Ecology
R. D. Morrison, FDH

cc w/o encls:
J. R. James, BHI
W. E. Remsen, BHI

054347

COMMENT RESOLUTION PACKAGE

REMEDIAL DESIGN REPORT/REMEDIAL ACTION WORK PLAN (RDR/RAWP) FOR THE 100 AREA AND 100 AREA REMEDIAL ACTION SAMPLING AND ANALYSIS PLAN (SAP)

- **LETTER FROM UNITED STATES ENVIRONMENTAL PROTECTION AGENCY TO UNITED STATES DEPARTMENT OF ENERGY – JUNE 26, 1996.**
- **RESPONSE TO EPA AND ECOLOGY CONDITIONAL APROVAL OF RDR/RAWP AND SAP, REV 0**
- **COMMENT/RESPONSE FOR THE REMEDIAL DESIGN REPORT/REMEDIAL ACTION WORK PLAN FOR THE 100 AREA, REV.1, DRAFT A**
- **RDR/RAWP COMMENT RESOLUTION MEETING MINUTES (REV.1, DRAFT A)**
- **FINAL COMMENTS AND RESPONSES TO RDR/RAWP REV.1, DRAFT B**

44698

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 HANFORD PROJECT OFFICE
712 SWIFT BOULEVARD, SUITE 5
RICHLAND, WASHINGTON 99352

June 26, 1996

Nancy Werdel
Project Manager
U.S. Department of Energy
P.O. Box 550 H0-12
Richland, Washington 99352

Re: Approval of Remedial Design Report/Remedial Action Work Plan for the 100 Area and Approval of the 100-BC-1, 100-DR-1 and 100-HR-1 Sampling and Analysis Plan

Dear Ms. Werdel:

The U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) have completed the review of the Remedial Design Report/Remedial Action Work Plan for the 100 Area as well as the 100-BC-1, 100-DR-1 and 100-HR-1 Sampling and Analysis plan. During our review several errors in the documents were found. These errors and suggested corrections are described below. EPA and Ecology conditionally approve these documents provided these comments are resolved and the documents revised.

EPA and Ecology require written confirmation that the U.S. Department of Energy (DOE) concur with our findings and suggested changes. Upon receipt of this concurrence, the Remedial Design and Sampling and Analysis Plan will be considered approved.

Table B-1 of the Remedial Design Report lists values of 0 inches of irrigation and an evapotranspiration coefficient of 96.7%. These values are incorrect. The correct values should be 30 inches of irrigation and an evapotranspiration coefficient of 91%. New tables will need to be generated using these revised input parameters.

Tables 2-1 and 2-7 of the Remedial Design Report and Tables I-4 and A-2 in the Sampling and Analysis Plan contain inconsistent and incorrect values for hexavalent chromium. The correct value for these tables should be the detection limit for hexavalent chromium of .7 mg/kg.

Table II-5 of the Sampling and Analysis Plan still references the use of grab samples. Sampling regimes for the deep zone will use composite samples. The table should be changed to reflect this.

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EPA and Ecology understand that DOE is currently producing a verification package for the 116-B-5 crib. This package should be submitted to EPA and Ecology for our review and approval.

If you have any questions or concerns regarding these comments feel free to contact Dennis at (509) 376-8631 or Keith at (509) 736-3036.

Sincerely,

Dennis Faulk
EPA Project Manager

Keith Holliday
Ecology Project Manager

cc: Steve Alexander, Ecology
Dick Jaquish, DOH
Kevin Oates, EPA
Doug Sherwood, EPA
Glenn Van Sickle, BHI
Jerry Yokel, Ecology
Administrative Record (100-BC-1, 100-DR-1, 100-HR-1)

RESPONSE TO EPA AND ECOLOGY CONDITIONAL APPROVAL OF REMEDIAL DESIGN REPORT/REMEDIAL ACTION WORK PLAN FOR THE 100 AREA AND THE 100-BC-1, 100-DR-1 AND 100-HR-1 SAMPLING AND ANANYSIS PLAN, REV. 0

CONDITION 1: Table B-1 of the Remedial Design Report lists values of 0 inches of irrigation and an evaportranspiration coefficient of 96.7%. These values are incorrect. The correct values should be 30 inches of irrigation and an evapotranspiration coefficient of 91%. New tables will need to be generated using these revised input parameters.

RESPONSE: Tables have been updated to reflect these values.

CONDITION 2: Tables 2-1 and 2-7 of the Remedial Design Report and Tables I-4 and A-2 in the Sampling and Analysis Plan contain inconsistent and incorrect values for hexavalent chromium. The correct value for these tables should be the detection limit for hexavalent chromium of .7mg\kg.

RESPONSE: Current contract value (PQL) for hexavalent chromium is 1 mg/kg. Table I-4 is now I-6 and reflects the currently value of 2.2 that has been agreed to since this letter was issued.

These agreements reflect the 1:1 dilution arrived at after extensive negotiations with EPA and Ecology. The dilution factor is applied to the 11 ug/l AWQC after the 100 times factor to come arrive at 2.2 mg/kg. The same update is reflected in table A-2.

CONDITION 3: Table II-5 of the Sampling and Analysis Plan still references the use of grab samples. Sampling regimes for the deep zone will use composite samples. The table should be changed to reflect this.

RESPONSE: Table II-5 of the Sampling and Analysis Plan has been updated to reflect the use of composite samples for the deep zone.

CONDITION 4: EPA and Ecology understand that DOE is currently producing a verification package for the 116-B-5 crib. This package should be submitted to EPA and Ecology for our review and approval.

RESPONSE: The 116-B-5 crib cleanup verification package was transmitted to EPA on January 8, 1997 (100 NPL Agreement No. 111). The agreement was signed by EPA on January 14, 1997.

September 30, 1997

Comment/Response
for the
Remedial Design Report/Remedial Action Work Plan for the 100 Area, Rev. 1, Draft A

EPA Comments:

1. **Page 2-6, Section 2.1.2.5, 1st paragraph**

[Note: This comment and response also apply to Appendix C.] The rational for why the 100 times rule is being applied to all contaminants should be provided. It is unclear by the text provided on when the RESRAD model will be used and when it will not be applied to help determine groundwater protection. Please clarify this section.

Response: **Comment accepted. The text will be modified to clarify the following:**

- RESRAD will be used initially for all contaminants (radioactive and nonradioactive) to determine if a contaminant is predicted to reach the groundwater within 1,000 years. Only contaminants that do potentially reach groundwater will be evaluated further.

- As a standard for nonradioactive contaminants (and consistent with MTCA), the 100 times rule will be applied to determine residual soil concentrations that are protective of groundwater and the river, unless it is demonstrated on a site-specific basis that a higher value is warranted.

- For radioactive contaminants, modeling using RESRAD will be applied to determine residual soil concentrations that are protective of groundwater and the river. The 100 times rule will not be applied to radioactive contaminants and references to applying the 100 times rule to radioactive contaminants will be removed.

2. **Page 2-9, Section 2.1.5, 1st paragraph**

This section discusses balancing factors and when they might be applied. It appears that #2 is incorrect. The statement currently reads that balancing factors will be invoked if residual contamination is present below the engineered structure. It should be modified to state that balancing factors may be invoked when residual contamination is left below the engineered structure is shown to impact groundwater or the Columbia River.

Response: **Comment accepted. (Note: this text was not revised from Rev. 0) Text will be revised to: (2) where residual contamination is present below 4.6 m (15 ft)**

or below the engineered structure, and ...

The first bullet in Section 2.1.5 will be revised to: Contaminant concentrations below 4.6 m (15 ft) or below the engineered structure will be required to meet the criteria for protection of the groundwater and the Columbia River, as stated in RAO number 2 in Section 2.1. For residual contamination below 4.6 m (15 ft) or below the engineered structure shown to impact groundwater or the Columbia River, the balancing factors may be invoked.

3. **Page 2-22, Table 2-2**

The values shown for uranium 233/234, uranium 235, and uranium 238 appear to be incorrect for the soil concentration corresponding to 15 millirem. The values provided are extremely conservative. Please provide the rational for these look up values.

Response: **Comment noted. The single radionuclide soil concentration look up values corresponding to 15 mrem/yr dose for uranium isotopes presented in Table 2-2 are correct. The values are those determined using RESRAD and the input parameters identified for direct exposure. The input parameters used are identified in Table B-1 of Appendix B (p. B-3). The RESRAD output file identifying the look up values are in the RDR/RAWP calculation brief (0100X-CA-V0003) as part of the project file. The addition of 0.76 m/yr irrigation had an impact on these values.**

4. **Page 3-3, Section 3.1.4**

This section should be expanded to provide the rational on how debris will be sampled. This rational should also be provided in the Sampling and Analysis Plan.

Response: **Comment noted. (Note: this text was not revised from Rev. 0) The sampling of debris is beyond the scope of this document and is determined through the DQO process leading up to the preparation of a Sampling and Analysis Plan. The 100 Area SAP will be modified to include the process for sampling for debris.**

5. **Page 3-6, Section 3.2.2, last paragraph**

The ERDF ESD has been approved. This section should be updated to reflect this.

Response: **Comment accepted. (Note: this text was not revised from Rev. 0) Text was revised as appropriate.**

6. **Page 3-10, Section 3.5 last paragraph**

Change the word goal to responsibility in the second to the last sentence.

Response: **Comment accepted. Text will be revised to: ... agency's responsibility is to determine...**

7. **Appendix B, Table B-1**

Input parameter for the thickness of the contaminated zone should be changed to footnote that this will be calculated using site specific data. In addition Appendix B should be expanded to provide the rational on how the thickness of the contaminated zone will be determined.

Response: **Comment accepted. A footnote will be added to Table B-1 stating: "The thickness of the contaminated zone and the thickness of the uncontaminated zone will be determined on a site-specific basis for cleanup verification calculations." In addition, text to be added to section 5.0 "ASSUMPTIONS": For the purpose of site closeout verification, the RESRAD input values (e.g., the thickness of the contaminated zone, the thickness of the uncontaminated zone, and the size of the waste site) will be determined on a site-specific basis.**

Values for some of these parameters (e.g., thickness of the contaminated zone, thickness of the uncontaminated zone, and areal extent of the site) depend on specific site characteristics. For purposes of developing look-up values to guide field excavation, generic values have been assumed, however, to verify whether a specific site has met cleanup goals, input values will be determined on a site-specific basis.

The general process will be to first determine the nature and extent of residual contamination (concentrations and thickness of contaminated zone(s)). This information will then be input to the RESRAD model to evaluate migration potential. The specific process to determine the thickness of the contaminated zone(s) and the associated contaminant profile, will follow a hierarchy as shown by these steps:

1. **Assume worst case** — **Concentrations of residual contamination are uniform from the bottom of the excavation to groundwater. If modeling using this assumption indicates that this is**

	protective of groundwater and the river, no further evaluation will be performed.
2. Site-specific information	**Use process knowledge, historic sampling data, remediation data, etc., to determine profile. If available site-specific information is sufficient, no further evaluation is required.**
3. Analogous site information	**Compare site to other sites for which profile has been determined to see if appropriate analogies can be made. The factors considered could include site stratigraphy, depth to groundwater, volume of liquid disposed, and type of contaminants. If available analogous site information is sufficient, no further evaluation required.**
4. Test pits	***Only if profile cannot be determined via Steps 1 through 3.*** **Excavate test pit to obtain site-specific data. Location/depth/extent of the pit will be based on available knowledge and physical limitations (e.g., the reach of excavation equipment, size of excavation). Data obtained from test pitting is not intended to meet statistical criteria for representative sampling, but will provide a qualitative measure of the extent of contamination below the site. Location will be determined on a site by site basis by DOE using data collected during the excavation.**

Iterative, step-wise process. Solicit input from regulatory, engineering, and functional resources to ensure acceptable decisions are being made. Each step includes a hold point for evaluation of available information and impacts to schedule and cost of proceeding to next step. This process involves joint decisions to close the site with available data, collect more information, continue remediation, or invoke balancing factors.

Ecology Comments

General Comments

1. The document is better organized than its predecessor. The text now flows in a logical manner through the various steps of design and action operations.

Response: **Comment noted. Thank you.**

2. The planned use, implementation, and importance of institutional controls needs to be discussed in this document. These controls prohibit exposure in the rural residential scenario, reducing risk. The document also needs to acknowledge the importance of separation between soil contamination and ground water. The risks calculated from the rural residential scenario are limited by the inability of contaminants to migrate to ground water and by institutional controls. These factors need to be documented.

Response: **Comment accepted and text modified as follows:**

- A footnote will be added in Section 2 to note that institutional controls (such as deed restrictions) will be implemented to preclude direct contact with deep soils in the event that residual contamination below the excavation exceeds direct contact protection standards.

- Section 2.1.5 and Section 3.8 will be modified to further describe how deed restrictions would be put into place.

Specific Comments

1. **Page 2-2, Section 2.1.1**, Remedial Action Objective (RAO) #2, the point of compliance was discussed in the ROD on pages 25 and 26 (EPA 1995). Please delete the reference to MTCA and the quotation of WAC 173-340-[6][b], then quote the ROD language in RAO #2 on the point of compliance.

Response: **Comment accepted. The text will be revised to: The ROD defines the point of compliance for soil cleanup levels protective of groundwater as *a designated point of compliance beneath or adjacent to the waste site in groundwater. The location and measurement of the point of compliance is to be defined by EPA and Ecology. Monitoring for compliance will be performed at the defined point* (EPA 1995, page 25).**

2. **Page 2-3, Section 2.1.2.1, first paragraph, first sentence**, add "from the grade surrounding the waste site and assuming the waste site will be completely backfilled." after "[15 ft]" inside the parentheses. This will document how the excavation to 15 feet is being defined.

Response: **Comment accepted with modification. After discussion with the parties, it was agreed to modify the text as follows: "to a depth of 4.6 m (15 ft) *from ground surface defined as the grade at the time of disposal.*"**

3. **Page 2-4, Section 2.1.2.2, second paragraph, third bullet**. delete "all." Drinking water ingestion should not be included because there is not a domestic water well in the exposure scenario.

Response: **Comment noted. (Note: this text was not revised from Rev. 0) The residential scenario has always included the ingestion of groundwater. A quick sensitivity analysis has been performed (see below) to assess the impact of turning off this pathway. This has been considered part of the institutional controls (i.e. - no domestic wells) in previous reasoning. If this is indeed a consideration for the exposure scenario, the ERC would support the regulatory agencies in facilitating this revision.**

Not including the drinking water pathway or not allowing any use of contaminated groundwater increases the soil concentration corresponding to 15 mrem/yr for Tc-99 and the uranium isotopes by approximately 4 to 150 times.

4. **Page 2-6 and 2-7, Section 2.1.2.5**. the text is unclear exactly which contaminant standard will be used and where it will be applied. There is discussion on applying the 100 times ground water rule, but to which standard, MCL or AWQC? As an example, for Cr^{+6} the 100 times MTCA value for protection of groundwater in soil gives a value of 8.0 ppm. Yet the 100 times AWQC, times the 1:1 dilution factor gives a value of 2.2 ppm for protection of the Columbia River in soil. Will the most restrictive value for a given contaminant be applied to all waste sites?

Response: **Comment accepted. The referenced text will be clarified. The 100 times rule is applied to both the dilution-attenuation factor (DAF) remedial action goals for protection of the river and the groundwater remedial action goals for protection of groundwater. The current procedure is to apply the most restrictive value for a given contaminant in soil (p. 2-5 sec. 2.1.2.3 last sentence). However, if residual contamination below 4.6 m (15 ft) or below the engineered structure is shown to impact groundwater, and the balancing-factors process is used to determine that potentially impacting the groundwater is preferable to removing the residual contamination, then the value protective of the river would be applicable.**

The verification section of the text (Goal Attainment, section 3.6) will be revised to more fully explain the site close-out verification process including the requirements to meet remedial action goals protective of groundwater and the river, to meet 4 mrem/yr, and to use the 100 times rule when appropriate.

5. **Page 2-6, Section 2.1.2.5, first paragraph.** does applying the 100 times rule to radionuclides comply with the 4 mrem/yr MCL? Are the radionuclide specific DCGs less or more than the 100 times rule concentrations?

Response: **Comment accepted. Applying the 100 times rule to radionuclides does not necessarily comply with the 4 mrem/yr MCL. The radionuclide specific remedial action goals based on 1/25th of the DCG require lower concentrations in soil than those required by the 100 times rule. All references to applying the 100 times rule to radionuclides will be removed from the document. Associated values in Tables 2-5, 2-6, and 2-7 will be changed. See response to EPA comment #1.**

6. **Page 2-10, Section 2.1.5, third paragraph, third bullet.** how are the need for deed restrictions being recorded? How is risk of direct exposure being calculated?

Response: **Comment accepted. (Note: this text was not revised from Rev. 0) Text will be added describing how the requirement for deed restrictions will be documented in the site close-out verification package based on RESRAD modeling. The ultimate implementation of deed restrictions will be dealt with in the public review process as indicated in the ROD.**

Section 3.8 will also be revised to include further clarification on deed restrictions.

7. **Page 2-27, Table 2-7.** Second Remedial Action Objective - Protection of Groundwater/Columbia River. was some depth of clean soil between contamination and ground water assumed in calculating these numbers?

Response: **Yes, 6 meters of clean soil between contamination and groundwater was assumed in calculating which contaminants reach groundwater. The conceptual model applied is illustrated on page C-4 in Appendix C. The text will be revised to indicate that the model is a generic model applicable to the 100 Area, and the generic contaminated zone will be identified as 50% of the vadose zone below 4.6 m (15 ft). All references to 116-C-1 and the use of 6 meters will be removed.**

8. **Page 3-2, Section 3.1.2, first paragraph of the page, first sentence.** delete "soil."

Response: **Comment accepted. The word "soil" will be deleted from the text.**

9. **Page 3-5, Section 3.2.1.1, second sentence.** delete "above" insert "below."

Response: **Comment accepted with modification. The word "above" is correct for the context of the sentence, but the text will be revised for clarity.**

10. **Page 3-13, Section 3.6.5, second paragraph**, unrestricted future use needs to include a discussion of assumptions about institutional controls (e.g., well drilling prohibitions and excavation restrictions) when required because of direct exposure concerns.

Response: **Comment accepted. (Note: this text was not revised from Rev. 0) See response to Ecology general comment #2.**

11. **Page 3-21/22, Figure 3-3**, delete "(100 X DAF Remedial Action Goals)." When modeling calculates residual soil contaminant concentrations above the 100 times rule values as protective, DOE should apply them as remedial action objectives.

Response: **Comment rejected. During discussion, the parties agreed that the standard practice for nonradioactive contaminants will be application of the 100 times rule.**

Environmental Restoration Contractor **ERC Team**

Meeting Minutes

Job No. 22192
Written Response Required? N0
Closes CCN: N/A
OU: N/A
TSD: N/A
ERA: N/A
Subject Code: 4170; 8280

SUBJECT RDR/RAWP Comment Resolution Meeting

TO Distribution

FROM Walter E. Remsen CW for WER

DATE September 15, 1997

ATTENDEES

K. E. Cook H9-02
F. M. Corpuz X9-06
D. A. Faulk B5-01
G. I. Goldberg H0-12
K. K. Holliday B5-18
J. R. James H0-17
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W. E. Remsen H0-17
F. V. Roeck H0-17
R. C. Smith H9-03
W. W. Soper B5-18
C. Ward H0-01
N. A. Werdel H0-12

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Attendees
R. L. Donahoe X9-06
Document and Info Services H0-09

The objectives of this meeting, as described by Walter E. Remsen, BHI Project Engineer, are to focus on the comments and reach agreement from RL and the regulators on the responses to the comments. Comments which may be controversial are the specific parameters in use with RESRAD and institutional controls. The ultimate goal is to get these technical issues resolved so the RDR can be issued. Some tables may have to be changed as a result of agreements and would need to be checked. The target date for completion of the RDR is 9/23/97.

A review of the comments follows:

The discussion and agreements that were made at this meeting are in *italics*.

EPA Comments:

1. **Page 2-6, Section 2.1.2.5, 1st paragraph**

The rational for why the 100 times rule is being applied to all contaminants should be provided. It is unclear by the text provided on when the RESRAD model will be used and when it will not be applied to help determine groundwater protection. Please clarify this section.

Response: **Comment accepted. The text will be modified to reflect the fact that the 100 times rule will be applied only to nonradioactive contaminants when modeling using RESRAD does not demonstrate that higher residual soil concentrations are protective of groundwater and the river. The 100 times rule will not be applied to radioactive contaminants. Rather, for radioactive contaminants, the RESRAD model will be used to determine residual soil concentrations that are protective of groundwater and the river (i.e., concentrations in soil that meet the groundwater/DAF remedial action goals in water and also meet a 4 mrem/yr dose). The text indicates that RESRAD was used to determine which residual contaminants in soil reach groundwater using the conceptual model identified in the RDR/RAWP. All references to applying the 100 times rule to radioactive contaminants will be removed. RESRAD will be used on a site-specific basis to determine which contaminants potentially impact groundwater and the river. The section will be revised to reflect this intent.**

EPA did not agree with the response to this comment and further discussion was needed. The standard rule is to use the 100 times rule and will allow for leaving a higher level of contamination. It was agreed that the standard rule using the 100 times rule would be used first, then a site-specific would be used based on conditions if warranted.

Comment #2 and 3 were acceptable to both EPA and Ecology and no further discussion was needed.

4. **Page 3-3, Section 3.1.4**

This section should be expanded to provide the rational on how debris will be sampled. This rational should also be provided in the Sampling and Analysis Plan.

Response: **Comment noted. (Note: this text was not revised from Rev. 0) The sampling of debris is beyond the scope of this document and is determined through the DQO process leading up to the preparation of a Sampling and Analysis Plan. The current 100 Area SAP does not address burial ground sampling specifically; however, the same cleanup criteria would apply to the area once the anticipated cleanup has been completed and verification is needed. Sampling of debris would mainly be for waste profiling, not verification. ERC anticipates an update to the 100 Area SAP Instruction Guide will be needed to address the sampling of burial grounds for waste acceptance. This effort has already been started to address concerns at D Area and is currently in the form of a calculation brief.**

EPA is expecting a section covering debris in the revised Sampling and Analysis Plan. EPA would like to see the revised RDR and revised SAP at the same time. It was pointed out that in order to revise the RDR with Group 3, schedule and milestones would have to be changed and volumes would have to be re-factored. Ecology did not agree with EPA and recognized the impact this would have on finalizing the RDR. It was discussed further and the BHI Project Engineer suggested that the revision of the SAP and the RDR may possibly be issued by 9/23/97. EPA said it was alright to issue as previously decided but he would not approve until the revised SAP was issued. The revised SAP will have a section covering debris.

5. **Page 3-6, Section 3.2.2, last paragraph**

The ERDF ESD has been approved. This section should be updated to reflect this.

Response: **Comment accepted. (Note: this text was not revised from Rev. 0) Text will be eliminated.**

This text has been revised and updated.

The response to Comment # 6 is acceptable to all parties.

7. **Appendix B, Table B-1**

Input parameter for the thickness of the contaminated zone should be changed to footnote that this will be calculated using site specific data. In addition Appendix B should be expanded to provide the rational on how the thickness of the contaminated zone will be determined.

Response: **Comment accepted. Footnote will be added to table stating: "The thickness of the contaminated zone and the thickness of the uncontaminated zone will be determined on a site-specific basis for cleanup verification calculations."**

Text to be added to section 5.0 "ASSUMPTIONS": "The input values for the thickness of the contaminated zone and the thickness of the uncontaminated zone will be determined on a site-specific basis. If best available information (process knowledge, site characterization, monitoring data, or other sources) indicates contamination does not extend to ground water, half the distance from surrounding grade to groundwater for shallow zone verification, and half the distance from the bottom of the excavation to groundwater for deep zone verification will be used. If the same information indicates contamination does extend to groundwater, the input value for shallow zone verification will be the distance from surrounding grade to groundwater, and the distance from the bottom of the excavation to ground water for deep zone verification."

After some discussion it was stated by RL that further discussion off-line needed to occur on this comment. A meeting to discuss this comment was scheduled for Wednesday, September 10.

Ecology Comments:

General Comments:

Comment #1 was appreciated and noted by the ERC.

1. The planned use, implementation, and importance of institutional controls needs to be discussed in this document. These controls prohibit exposure in the rural residential scenario, reducing risk. The document also needs to acknowledge the importance of separation between soil contamination and ground water. The risks calculated from the rural residential scenario are limited by the inability of contaminants to migrate to ground water and by institutional controls. These factors need to be documented.

Response: **Comment noted. Sections refer to use (p.2-2 3rd. RAO), implementation (p. 2-9 sec. 2.1.5), importance (p. 2-10 first bullet). Further discussion of these would be possible through a sensitivity analysis of different institutional controls and how they would eliminate or reduce potential risk from exposure. This discussion is not planned at this time.**

There is a need to revise the text that would include information on "deed restrictions". It was suggested that examples of "deed restrictions" could be put into the text. EPA stated that a paper had been written on "institutional controls" and this would be provided to RL and may be of use for further clarification on this comment.

Specific Comments:

Comment # 1 was acceptable to all parties.

2. **Page 2-3, Section 2.1.2.1, first paragraph, first sentence**, add "from the grade surrounding the waste site and assuming the waste site will be completely backfilled." after "[15 ft]" inside the parentheses. This will document how the excavation to 15 feet is being defined.

Response: **Comment accepted. Agree it is important to point out where 4.6 m (15 ft) begins but further discussion on backfill is needed.**

EPA stated that the measurement of 15 feet should start where contamination is first indicated. EPA suggested the language from the Record of Decision (ROD) be used in the RDR for clarification of where the 15 feet is to begin for excavation. After a break, the ROD language was provided by RL and all agreed to its use.

Comment # 3 and # 4 were both acceptable to all parties.

5. **Page 2-6, Section 2.1.2.5, first paragraph**, does applying the 100 times rule to radionuclides comply with the 4 mrem/yr MCL? Are the radionuclide specific DCGs less or more than the 100 times rule concentrations?

Response: **Comment accepted. Applying the 100 times rule to radionuclides does not necessarily comply with the 4 mrem/yr MCL. The radionuclide specific remedial action goals based on 1/25th of the DCG require lower concentrations in soil than those required by the 100 times rule. All references to applying the 100 times rule to radionuclides will be removed from the document. Associated values in Tables 2-5, 2-6, and 2-7 will be changed. See response to EPA comment #1.**

See EPA Comment #1, new tables will need to be generated and RL will review before they are included into the revision of the document on 9/23/97.

6. **Page 2-10, Section 2.1.5, third paragraph, third bullet**, how are the need for deed restrictions being recorded? How is risk of direct exposure being calculated?

Response: **Comment accepted. (Note: this text was not revised from Rev. 0) Text will be added stating that the requirement for deed restrictions will be documented in the site close-out verification package based on RESRAD modeling. The ultimate implementation of deed restrictions will be dealt with in the public review process as indicated in the ROD.**

Some text has already been added and will insert more detail into the text.

7. **Page 2-27, Table 2-7**, Second Remedial Action Objective - Protection of Groundwater/Columbia River, was some depth of clean soil between contamination and ground water assumed in calculating these numbers?

Response: **Yes, 6 meters of clean soil between contamination and groundwater was assumed in calculating which contaminants reach groundwater. The conceptual model applied is illustrated on page C-4 in Appendix C. The text will be revised to indicate that the model is a generic model applicable to the 100 Area, and the contaminated zone will be identified as 50% of the vadose zone below 4.6 m (15 ft). All references to 116-C-1 and the use of 6 meters will be removed.**

It was agreed that this comment is similar to EPAs #7 comment and will be discussed off-line.

The response to comment # 8, # 9, # 10 and # 11 was acceptable to all parties.

In summary:

- *The issue concerning the 15 ft starting point will be resolved by inserting the language from the ROD into the RDR..*
- *A hierarchy will be developed for guidance on input to RESRAD for depth of contamination.*
- *The tables would be re-evaluated.*
- *A redline/strikeout will be sent via cc:mail to RL and the regulators (prior to 9/16/97).*
- *The close-out modeling issue is deferred to an off-line meeting for further discussion.*

The meeting was adjourned.

Attachment: Comment/Response Package for Remedial Design Report/Remedial Action Work Plan

WER:cw

August 29, 1997

Comment/Response
for the
Remedial Design Report/Remedial Action Work Plan for the 100 Area, Rev. 1, Draft A

EPA Comments:

1. **Page 2-6, Section 2.1.2.5, 1st paragraph**

The rational for why the 100 times rule is being applied to all contaminants should be provided. It is unclear by the text provided on when the RESRAD model will be used and when it will not be applied to help determine groundwater protection. Please clarify this section.

Response: **Comment accepted. The text will be modified to reflect the fact that the 100 times rule will be applied only to nonradioactive contaminants when modeling using RESRAD does not demonstrate that higher residual soil concentrations are protective of groundwater and the river. The 100 times rule will not be applied to radioactive contaminants. Rather, for radioactive contaminants, the RESRAD model will be used to determine residual soil concentrations that are protective of groundwater and the river (i.e., concentrations in soil that meet the groundwater/DAF remedial action goals in water and also meet a 4 mrem/yr dose). The text indicates that RESRAD was used to determine which residual contaminants in soil reach groundwater using the conceptual model identified in the RDR/RAWP. All references to applying the 100 times rule to radioactive contaminants will be removed. RESRAD will be used on a site-specific basis to determine which contaminants potentially impact groundwater and the river. The section will be revised to reflect this intent.**

2. **Page 2-9, Section 2.1.5, 1st paragraph**

This section discusses balancing factors and when they might be applied. It appears that #2 is incorrect. The statement currently reads that balancing factors will be invoked if residual contamination is present below the engineered structure. It should be modified to state that balancing factors may be invoked when residual contamination is left below the engineered structure is shown to impact groundwater or the Columbia River.

Response: **Comment accepted. (Note: this text was not revised from Rev. 0) Text will be revised to: (2) where residual contamination is present below 4.6 m (15 ft) or below the engineered structure, and ...**

The first bullet in Section 2.1.5 will be revised to: Contaminant concentrations below 4.6 m (15 ft) or below the engineered structure will be

required to meet the criteria for protection of the groundwater and the Columbia River, as stated in RAO number 2 in Section 2.1. For residual contamination below 4.6 m (15 ft) or below the engineered structure shown to impact groundwater or the Columbia River, the balancing factors may be invoked.

3. **Page 2-22, Table 2-2**

The values shown for uranium 233/234, uranium 235, and uranium 238 appear to be incorrect for the soil concentration corresponding to 15 millirem. The values provided are extremely conservative. Please provide the rational for these look up values.

Response: **Comment noted. The single radionuclide soil concentration look up values corresponding to 15 mrem/yr dose for uranium isotopes presented in Table 2-2 are correct. The values are those determined using RESRAD and the input parameters identified for direct exposure. The input parameters used are identified in Table B-1 of Appendix B (p. B-3). The RESRAD output file identifying the look up values are in the RDR/RAWP calculation brief (0100X-CA-V0003) as part of the project file. The addition of 0.76 m/yr irrigation had an impact on these values.**

4. **Page 3-3, Section 3.1.4**

This section should be expanded to provide the rational on how debris will be sampled. This rational should also be provided in the Sampling and Analysis Plan.

Response: **Comment noted. (Note: this text was not revised from Rev. 0) The sampling of debris is beyond the scope of this document and is determined through the DQO process leading up to the preparation of a Sampling and Analysis Plan. The current 100 Area SAP does not address burial ground sampling specifically; however, the same cleanup criteria would apply to the area once the anticipated cleanup has been completed and verification is needed. Sampling of debris would mainly be for waste profiling, not verification. ERC anticipates an update to the 100 Area SAP Instruction Guide will be needed to address the sampling of burial grounds for waste acceptance. This effort has already been started to address concerns at D Area and is currently in the form of a calculation brief.**

5. **Page 3-6, Section 3.2.2, last paragraph**

The ERDF ESD has been approved. This section should be updated to reflect this.

Response: **Comment accepted. (Note: this text was not revised from Rev. 0) Text will be eliminated.**

6. **Page 3-10, Section 3.5 last paragraph**

Change the word goal to responsibility in the second to the last sentence.

Response: **Comment accepted. Text will be revised to: ... agency's responsibility is to determine...**

7. **Appendix B, Table B-1**

Input parameter for the thickness of the contaminated zone should be changed to footnote that this will be calculated using site specific data. In addition Appendix B should be expanded to provide the rational on how the thickness of the contaminated zone will be determined.

Response: **Comment accepted. Footnote will be added to table stating: "The thickness of the contaminated zone and the thickness of the uncontaminated zone will be determined on a site-specific basis for cleanup verification calculations."**

Text to be added to section 5.0 "ASSUMPTIONS": "The input values for the thickness of the contaminated zone and the thickness of the uncontaminated zone will be determined on a site-specific basis. If best available information (process knowledge, site characterization, monitoring data, or other sources) indicates contamination does not extend to ground water, half the distance from surrounding grade to groundwater for shallow zone verification, and half the distance from the bottom of the excavation to groundwater for deep zone verification will be used. If the same information indicates contamination does extend to groundwater, the input value for shallow zone verification will be the distance from surrounding grade to groundwater, and the distance from the bottom of the excavation to ground water for deep zone verification."

Ecology Comments

General Comments

1. The document is better organized than its predecessor. The text now flows in a logical manner through the various steps of design and action operations.

Response: **Comment noted. Thank you.**

2. The planned use, implementation, and importance of institutional controls needs to be discussed in this document. These controls prohibit exposure in the rural residential scenario, reducing risk. The document also needs to acknowledge the importance of separation between soil contamination and ground water. The risks calculated from the rural residential scenario are limited by the inability of contaminants to migrate to ground water and by institutional controls. These factors need to be documented.

Response: **Comment noted. Sections refer to use (p.2-2 3rd. RAO), implementation (p. 2-9 sec. 2.1.5), importance (p. 2-10 first bullet). Further discussion of these would be possible through a sensitivity analysis of different institutional controls and how they would eliminate or reduce potential risk from exposure. This discussion is not planned at this time.**

Specific Comments

1. **Page 2-2, Section 2.1.1**, Remedial Action Objective (RAO) #2, the point of compliance was discussed in the ROD on pages 25 and 26 (EPA 1995). Please delete the reference to MTCA and the quotation of WAC 173-340-[6][b], then quote the ROD language in RAO #2 on the point of compliance.

Response: **Comment accepted. The text will be revised to: The ROD defines the point of compliance for soil cleanup levels protective of groundwater as *a designated point of compliance beneath or adjacent to the waste site in groundwater. The location and measurement of the point of compliance is to be defined by EPA and Ecology. Monitoring for compliance will be performed at the defined point* (EPA 1995, page 25).**

2. **Page 2-3, Section 2.1.2.1, first paragraph, first sentence**, add "from the grade surrounding the waste site and assuming the waste site will be completely backfilled." after "[15 ft]" inside the parentheses. This will document how the excavation to 15 feet is being defined.

Response: **Comment accepted. Agree it is important to point out where 4.6 m (15ft) begins but further discussion on backfill is needed.**

3. **Page 2-4, Section 2.1.2.2, second paragraph, third bullet**, delete "all." Drinking water ingestion should not be included because there is not a domestic water well in the exposure scenario.

Response: **Comment noted. (Note: this text was not revised from Rev. 0) The**

residential scenario has always included the ingestion of groundwater. A quick sensitivity analysis has been performed (see below) to assess the impact of turning off this pathway. This has been considered part of the institutional controls (i.e. - no domestic wells) in previous reasoning. If this is indeed a consideration for the exposure scenario, the ERC would support the regulatory agencies in facilitating this revision.

Not including the drinking water pathway or not allowing any use of contaminated groundwater increases the soil concentration corresponding to 15 mrem/yr for Tc-99 and the uranium isotopes by approximately 4 to 150 times.

4. **Page 2-6 and 2-7, Section 2.1.2.5**, the text is unclear exactly which contaminant standard will be used and where it will be applied. There is discussion on applying the 100 times ground water rule, but to which standard, MCL or AWQC? As an example, for Cr^{+6} the 100 times MTCA value for protection of groundwater in soil gives a value of 8.0 ppm. Yet the 100 times AWQC, times the 1:1 dilution factor gives a value of 2.2 ppm for protection of the Columbia River in soil. Will the most restrictive value for a given contaminant be applied to all waste sites?

Response: **Comment noted. No modification of the referenced text is necessary. The 100 times rule is applied to both the dilution-attenuation factor (DAF) remedial action goals for protection of the river and the groundwater remedial action goals for protection of groundwater. The current procedure is to apply the most restrictive value for a given contaminant in soil (p. 2-5 sec. 2.1.2.3 last sentence). However, if residual contamination below 4.6 m (15 ft) or below the engineered structure is shown to impact groundwater, and the balancing-factors process is used to determine that potentially impacting the groundwater is preferable to removing the residual contamination, then the value protective of the river would be applicable.**

The verification section of the text (Goal Attainment, section 3.6) will be revised to more fully explain the site close-out verification process including the requirements to meet remedial action goals protective of groundwater and the river, to meet 4 mrem/yr, and to use the 100 times rule when appropriate.

5. **Page 2-6, Section 2.1.2.5, first paragraph**, does applying the 100 times rule to radionuclides comply with the 4 mrem/yr MCL? Are the radionuclide specific DCGs less or more than the 100 times rule concentrations?

Response: **Comment accepted. Applying the 100 times rule to radionuclides does not necessarily comply with the 4 mrem/yr MCL. The radionuclide specific remedial action goals based on 1/25th of the DCG require lower concentrations in soil than those required by the 100 times rule. All references to applying the 100 times rule to radionuclides will be removed from the document. Associated values in Tables 2-5, 2-6, and 2-7 will be changed. See response to EPA comment #1.**

6. **Page 2-10, Section 2.1.5, third paragraph, third bullet**, how are the need for deed restrictions being recorded? How is risk of direct exposure being calculated?

Response: **Comment accepted. (Note: this text was not revised from Rev. 0) Text will be added stating that the requirement for deed restrictions will be documented in the site close-out verification package based on RESRAD modeling. The ultimate implementation of deed restrictions will be dealt with in the public review process as indicated in the ROD.**

7. **Page 2-27, Table 2-7**, Second Remedial Action Objective - Protection of Groundwater/Columbia River, was some depth of clean soil between contamination and ground water assumed in calculating these numbers?

Response: **Yes, 6 meters of clean soil between contamination and groundwater was assumed in calculating which contaminants reach groundwater. The conceptual model applied is illustrated on page C-4 in Appendix C. The text will be revised to indicate that the model is a generic model applicable to the 100 Area, and the contaminated zone will be identified as 50% of the vadose zone below 4.6 m (15 ft). All references to 116-C-1 and the use of 6 meters will be removed.**

8. **Page 3-2, Section 3.1.2, first paragraph of the page, first sentence**, delete "soil."

Response: **Comment accepted. The word "soil" will be deleted from the text.**

9. **Page 3-5, Section 3.2.1.1, second sentence**, delete "above" insert "below."

Response: **Comment rejected. The word "above" is correct for the context of the sentence.**

10. **Page 3-13, Section 3.6.5, second paragraph**, unrestricted future use needs to include a discussion of assumptions about institutional controls (e.g., well drilling prohibitions and excavation restrictions) when required because of direct exposure concerns.

August 29, 1997

Response: **Comment noted. (Note: this text was not revised from Rev. 0) See response to Ecology general comment #2.**

11. **Page 3-21/22, Figure 3-3**, delete "(100 X DAF Remedial Action Goals)." When modeling calculates residual soil contaminant concentrations above the 100 times rule values as protective, DOE should apply them as remedial action objectives.

Response: **Comment noted. The comment is correct; for nonradioactive contaminants, if modeling calculates residual soil contaminant concentrations above the 100 times rule values, then those values should be used as remedial action goals. The figure will be revised to reflect the verification process in detail including the use of the 100 times rule for nonradioactive contaminants.**

FINAL COMMENTS AND RESPONSES TO RDR/RAWP
REV 1, DRAFT B

EPA comments received by cc:Mail on 10/1/97

Comment 1. The use of deed restrictions is peppered throughout the document. It has come to my attention that deed restrictions are basically worthless when it comes to institutional controls and therefore we probable will not use them. I recommend changing all the text that refers to deed restrictions to either just restrictions or easements.

Response 1: Comment noted. Deed restriction language will be used in this version of the RDR with the understanding that it may be reconsidered in future revisions.

Comment 2: I still have a concern regarding the uranium look up values calculated using RESRAD. Given that we dumped millions of gallons of water on these sites you would think we would see uranium in the groundwater. However, I do not think this is the case and would recommend you add the same flexibility on rad contaminants as is one non-rad (i.e. may be determined on a case by case basis). I would hate to see uranium drive 100 Area cleanup.

Response 2: The following text will be added as a footnote to lookup tables 2-5, 2-6, and 2-7:

"Values in the table are lookup values based on the generic site model. Site-specific remedial action goals will be calculated for site close-out verification using site-specific information."

Department of Ecology comments received by cc:Mail 10/16/97

Comment 1: I read the responses and the revised text. The only question I have is in regard to the approach for characterizing depth of contamination. Is it more cost effective to excavate test pits at a number of levels rather than do a borehole? Has anyone determined the cost of running excavation equipment to step down in a contaminated site? Besides these costs, what about the safety of the workers? I just don't want to see the avoidance of using boreholes, when site information warrants, effect cost effectiveness and worker safety.

Response 1: The sampling hierarchy will be slightly modified to account for the worker safety and cost effectiveness of subsurface sampling as follows:

1. Assume Worst Case: Concentrations of residual contamination are uniform from the bottom of the excavation to groundwater. If modeling using this assumption indicates that this is protective of groundwater and the river, no further evaluation will be performed.

2. Site-Specific Information: Use process knowledge, historic sampling data, remediation data, etc., to determine profile. If available site-specific information is sufficient, no further evaluation is required.

3. Analogous Site Information: Compare site to other sites for which profile has been determined to see if appropriate analogies can be made. The factors considered could include site stratigraphy, depth to groundwater, volume of liquid disposed, and type of contaminants. If available analogous site information is sufficient, no further evaluation is required.

4. Subsurface Sampling: The safest, most cost effective method (trenching, bore holes, etc.) will be used to obtain site specific data. The data obtained from subsurface sampling is not intended to meet statistical criteria for representative sampling, but will provide a qualitative measure of the extent of contamination below the site. Location will be determined on a site by site basis by DOE using data collected during excavation.

It is anticipated that through data collection in two or three subsurface sampling events, information will be gained in order to determine if Option 4 is a viable option to verify the conceptual model to allow for site close out. The Tri-Parties will evaluate the information to determine whether or not to continue this practice.