



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

033112

0044730

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

JUN 20 1996

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



Dear Messrs. Alexander and Sherwood:

TRANSMITTAL OF 100 AREA REMEDIAL DESIGN REPORT/REMEDIAL ACTION WORK PLAN DOE/RL-96-17, REV. 0 (ENCLOSURE 1), AND 100-BC-1, 100-DR-1, AND 100-HR-1 SAMPLING AND ANALYSIS PLAN, DOE/RL-96-22, REV. 0 (ENCLOSURE 2) FOR FINAL APPROVAL

The U.S. Environmental Protection Agency (EPA), the State of Washington, Department of Ecology (Ecology), the U.S. Department of Energy, Richland Operations Office (RL), and Bechtel Hanford, Inc. (BHI) have completed comment resolution on the subject documents. The final completed documents are enclosed for your approval. Formal response to comments from EPA and Ecology are also enclosed (Enclosure 3). The comment responses include formal comments received and a brief description of major verbal comments/resolution made during discussions; editorial comments are not included.

RL would like to express their gratitude to Messrs. Dennis Faulk, Keith Holliday, Kevin Oates, and Jerry Yokel for their work on these documents. Their dedication to challenging the status quo and working with RL and BHI in evaluating technically sound alternatives, was paramount to the success of finding cost effective solutions.

BHI is currently planning on starting transfer of the 116-B-4 French Drain bulk and bagged waste from temporary storage in the 100-BC Area to the Environmental Restoration Disposal Facility beginning July 1, 1996. Because approval of these documents are required prior to start of remedial action, formal approval is requested by no later than June 28, 1996.

Also provided as Enclosure 4 is a Hanford Facility Agreement and Consent Order Change Control Form for review and signature. This change control form establishes milestones for remedial actions in the 100-BC-1, 100-HR-1, and 100-DR-1 Operable Units (OU). Note that the proposed milestone for start of remedial action in the 100-BC-1 OU is July 31, 1996, however, the intention is to begin excavation at the 116-C-1 Trench, on or near, July 15, 1996. A milestone for start of remedial actions in the 100-DR-1 OU is proposed for December 31, 1996.

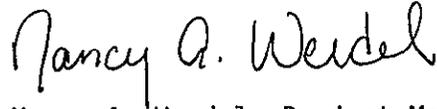
Messrs. Alexander and Sherwood

-2-

JUN 20 1996

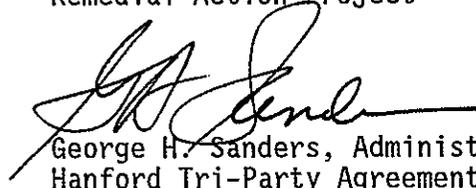
Should you have any questions regarding these documents, please contact Ms. Werdel on 376-5500.

Sincerely,



Nancy A. Werdel, Project Manager  
Remedial Action Project

NAP:NAW



George H. Sanders, Administrator  
Hanford Tri-Party Agreement

Enclosures: As stated

cc w/encls:  
D. Faulk, EPA  
K. Oates, EPA  
K. Holliday, Ecology  
M. Wilson, Ecology  
S. Balone, EM-442

cc w/encl 4:  
R. Morrison, WHC

cc w/o encls:  
V. Dronen, BHI  
G. Van Sickle, BHI

Change Number <b>M-16-96-01</b>	<b>Federal Facility Agreement and Consent Order Change Control Form</b> <small>Do not use blue ink. Type or print using black ink.</small>	Date <b>May 30, 1996</b>
------------------------------------	---	-----------------------------

Originator **Nancy Werdel** Phone **376-5500**

Class of Change  
 I - Signatories       II - Executive Manager       III - Project Manager

Change Title **Remedial Action Milestones, 100-BC-1, 100-HR-1 and 100-DR-1 Operable Units.**

Description/Justification of Change

This change request establishes milestones for remedial action and disposal of investigative derived waste for 37 waste sites in the 100 Area of the Hanford Site. This action is required by the Interim Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units (EPA, 1995). The following milestones are to be added to the Hanford Facility Agreement and Consent Order:

<u>Number</u>	<u>Milestone</u>	<u>Due Date</u>
M-16-08A	INITIATE REMEDIAL ACTION, 100-BC-1 OPERABLE UNIT.	07/31/1996
M-16-07A	INITIATE REMEDIAL ACTION, 100-DR-1 OPERABLE UNIT.	12/31/1996
M-16-26A	INITIATE REMEDIAL ACTION, 100-HR-1 OPERABLE UNIT.	09/30/1998
M-16-08B	COMPLETE REMEDIATION AND BACKFILL OF 15 WASTE SITES AND PROCESS EFFLUENT PIPELINES IN THE 100-BC-1 OPERABLE UNIT AS DEFINED IN THE REMEDIAL DESIGN REPORT/REMEDIAL ACTION WORK PLAN FOR THE 100 AREA (DOE/RL-96-17).	10/31/1998

(continued on next page)

Impact of Change

These milestones represent initiation and completion of remedial action for high priority liquid waste disposal sites in the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units and disposal of investigative derived wastes from remedial investigations at these waste sites.

Affected Documents

Hanford Federal Facility Agreement and Consent Order Action Plan Appendix D, Major and Interim Milestones; Remedial Design Report/Remedial Action Work Plan for the 100 Area (DOE/RL-96-17).

Approvals		
DOE	<u>6/19/96</u> Date	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved
EPA _____	Date _____	<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved
Ecology _____	Date _____	<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved

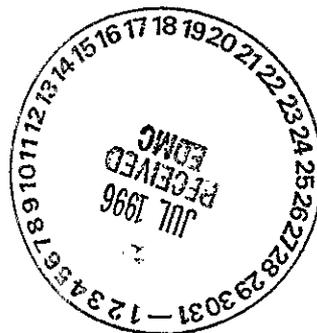
<u>Number</u>	<u>Milestone</u>	<u>Due Date</u>
M-16-07B	COMPLETE REMEDIATION AND BACKFILL OF 15 WASTE SITES AND PROCESS EFFLUENT PIPELINES IN THE 100-DR-1 OPERABLE UNIT AS DEFINED IN THE REMEDIAL DESIGN REPORT/REMEDIAL ACTION WORK PLAN FOR THE 100 AREA (DOE/RL-96-17).	09/30/1999
M-16-26B	COMPLETE REMEDIATION, BACKFILL AND REVEGETATION OF 37 WASTE SITES IN THE 100-BC-1, 100-DR-1, AND 100-HR-1 OPERABLE UNITS AS DEFINED IN THE REMEDIAL DESIGN REPORT/REMEDIAL ACTION WORK PLAN FOR THE 100 AREA (DOE/RL-96-17).	10/31/2000
M-15-35	COMPLETE INVESTIGATIVE DERIVED WASTE DISPOSAL FOR 37 WASTE SITES INCLUDED IN THE INTERIM RECORD OF DECISION FOR THE 100-BC-1, 100-DR-1, and 100-HR-1 OPERABLE UNITS.	09/30/1996

033112

ENCLOSURE 3

**RESPONSE TO COMMENTS ON  
100 AREA REMEDIAL DESIGN REPORT/REMEDIAL ACTION WORK PLAN  
(DOE/RL-96-17, REV. 0), AND  
100-BC-1/DR-1/HR-1 SAMPLING AND ANALYSIS PLAN  
(DOE/RL-96-22, REV. 0)**

**JUNE 1996**



**Responses to General Comments on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

Comments in regular typeface. **Responses in bold.**

There are several areas that are not addressed in this document that are typically considered as fundamental to RD/RA work plans including the following:

Process Flow Chart for Pre-remedial Activities. The document would greatly benefit from a simple flow chart that shows the steps required to "get to the field". Such as, award of RA subcontract, RA submittals, readiness review, sampling strategy, etc., as well as who are the key participants and areas where DOE and regulatory approvals are required. This will be important for the current and future procurements under this action. In addition, this would help to describe the overall management of the remediation beyond the generic description of activities in Section 3.0.

**A new "introductory" paragraph (as follows) will be inserted directly after the section heading for Section 3.0. The paragraph includes a reference to a new flow chart; the flow chart will summarize the schedule, identify key activities and documents, and designate where regulatory agency approvals are required.**

*Initiation of full scale remedial action to accomplish the goals set forth in the ROD requires completion of numerous interdependent tasks. Key tasks are illustrated in the flow chart presented in Figure 3-1. Activities or documents requiring regulatory agency approval are appropriately designated.*

**Existing Figures 3-1, 3-2, and 3-3 (and their associated references) will be renumbered as Figures 3-2, 3-3, and 3-4, respectively.**

Cost Information. There is no cost information provided in the document. The RD/RA Work Plan should have some level of detail for preliminary cost estimates (using the latest rollups) and the key inputs to the cost model. This information can be used as a baseline versus what experience shows us the RA subcontractor is capable of executing. It is likely that the RA Sub will be more efficient (less costly) than predicted. With an established baseline in the RD/RA Work Plan, acceleration of Milestones becomes a benchmark to measure against.

**Section 3.2 will be retitled as follows "3.2 Project Schedule and Cost." A new subsection will be inserted as follows:**

***Section 3.2.3 Project Cost***

***Table 3-1 presents current cost estimates for the remedial actions specified in the ROD. Note that the cost estimates in Table 1 differ from those presented in the ROD; this is the result of recent revisions to the cost estimating models to reflect a better understanding of the scope and level of effort required for remediation in the 100 Areas.***

**Responses to General Comments on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

Comments in regular typeface. Responses in bold.

There is no discussion of Public Involvement in the event that the balancing factors need to be invoked. Recommend adding the public involvement plan that was developed to support RD/RA be included as an appendix.

**A new paragraph will be added after the last bullet in Section 2.1.5 (Balancing Factors), as follows:**

***In the event that consideration of balancing factors leads to the recommendation to leave contaminated soils or debris in place at a waste site, the Tri-Parties will initiate public involvement prior to making a decision. The process will be as described for an ESD in the Public Involvement Plan (Appendix F).***

**The existing public involvement plan will be updated and included as "Appendix F: Public Involvement Plan." The table of contents will be correspondingly updated.**

There is no discussion of data management provided in the document. A detailed discussion on how information will be managed should be included.

**A second paragraph will be added to the end of Section 3.4.2 (Sampling and Analysis Plan), as follows:**

***Protocols for management of analytical data developed to support remedial action are specified in Section II.3.10 of the SAP (DOE/RL-96-22). The data management process starts with the use of the project's past practice data as input to the Data Quality Objectives (DQO) process and tracks the remedial action project sample data flow through collection, analysis, verification/validation, and storage in site data management databases. Both the past practice and remedial action project data are managed under documented configuration control procedures and procedures are in place for the integrated sample data management processes.***

**Responses to General Comments on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

Comments in regular typeface. **Responses in bold.**

A discussion on how investigation derived waste will be dispositioned is required. In addition, disposition of IDW should be put into the schedule detailed in Figure 3-1.

**The schedule (was Figure 3-1; now is Figure 3-2) will be updated to show shipping of ROD-covered investigation derived wastes (IDW) to ERDF. Also, a new bullet will be added to the end of the list of bullets in Section 3.2.2, as follows:**

- \* *In anticipation of the Tri-Parties signing an ESD to the ERDF ROD to authorize disposal of Environmental Restoration Program investigation-derived wastes (IDW) in the ERDF, the DOE has developed an integrated schedule for disposal of these wastes. The schedule presented in Figure 3-2 illustrates this activity (i.e., for those wastes associated with the 100 Area ROD). If Tri-Party decisions regarding management of IDW change, this element of the schedule will be updated.*

**Also, a new sentence was added to the third bullet of Section 3.5 as follows:**

*The minor change to manage IDW associated with the waste sites addressed by the ROD is being planned at this time, as shown on the project schedule (Figure 3-2).*

Does DOE plan to include appendices to the RDR/RAWP such as the Sampling Analysis Plan, Site Health and safety Plan, Addendum to Contractor Quality Control Plan, Environmental Protection Plan, Preliminary Design Report, technical specifications, vendor supplied information and calculations, operations and Maintenance Manual and other details including drawings. If not, how will this information be provided?

**There is currently no plan to include all of the documents listed in the comment as appendixes to the RDR/RAWP. As requested in another general comment (above), a flow chart communicating what the key activities and documents are will be added as new Figure 3-1.**

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
1.	The acronym <i>ESD</i> will be reassigned from "environmental sites database" to "explanation of significant difference" throughout the document.
2.	To remedy the implication that CERCLA stopped the Cold War (and hence Hanford's defense mission), the third sentence of the first paragraph on page 1-1 will be modified by replacing " <i>This mission was changed in July 1989 when the Hanford Site...</i> " with " <i>In July 1989, the Hanford Site...</i> "
3.	<p>To clarify the discussion regarding these "additional sites," the third sentence of Section 1.3 will be deleted and the following text will be inserted at the end of the paragraph:</p> <p style="text-align: center;"><i>It is expected that remedial action will also address sites adjacent to and within the area affected by remediation of the high priority sites listed in the ROD. These additional sites will be identified during detailed design for each group of sites. (Detailed design includes estimating the dimensions of the excavated high priority waste sites and identifying potential overlap of excavated areas with other waste sites.) Before any of these additional sites are remediated, DOE will obtain concurrence from the appropriate regulatory agencies.</i></p> <p>Section 2.2.2 identifies the 1607-D-2 septic system as an additional site. To revise Section 2.2.1 to include reference to 128-B-1 as another potential site in this category, the following text will be added to the end of the first paragraph in Section 2.2.1:</p> <p style="text-align: center;"><i>Although not included in the Group 1 Remedial Design package, it may be determined during remediation that the 128-B-1 Burning Pit should also be removed (i.e., due to its proximity to the 116-C-1 Process Effluent Trench). Review and concurrence of the regulatory agencies will be obtained prior to proceeding with such action.</i></p> <p>A complete list of these "additional sites" will not be available until completion of detailed design for all sites listed in the ROD.</p>
4.	The fourth sentence of 1.3.1 will be reworded as follows: " <i>The 100 D/DR Area contains two reactors: the D Reactor within the 100-DR-1 OU, and the DR Reactor within the 100-DR-2 OU.</i> " The fourth sentence of 1.3.2 will be reworded as follows: " <i>The 100 B/C Area contains two reactors: the B Reactor within the 100-BC-1 OU, and the C Reactor within the 100-BC-2 OU.</i> "

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
5.	<p>New titles will be substituted as follows:</p> <p style="text-align: center;"><i>Figure 1-1. 100-DR-1 Operable Unit Waste Sites Identified in Interim Action Record of Decision</i>  <i>Figure 1-2. 100-BC-1 Operable Unit Waste Sites Identified in Interim Action Record of Decision</i>  <i>Figure 1-3. 100-HR-1 Operable Unit Waste Sites Identified in Interim Action Record of Decision</i></p> <p>Figure 1-2 will be corrected to show 116-B-3 in the correct location.</p>
6.	<p>English units will be added to Table 1-1, as follows: Insert "(Feet)" after "Meters" in the headings to the third and sixth columns. Insert "(LCY)" after "LCM" in the headings to the fourth and fifth columns. Do appropriate conversions for each table entry and include quantity in English units in brackets below the quantity as currently shown in SI units. Insert "(LCY - Loose Cubic Yards)" after "LCM - Loose Cubic Meters" in Footnote 2.</p> <p><b>Editorial Correction:</b> Table 1-1 will be retitled as "Waste Sites Identified in the Interim Action Record of Decision for the 100-BC-1 100-HR-1, and 100-DR-1 Operable Units."</p>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
7.	<p>Re Table 1-1: A new footnote (#5) will be added to the table and keyed to the volume for 116-H-4 on page 1-8:</p> <p style="padding-left: 40px;">5. <i>The 116-H-4 Pluto Crib was excavated in 1960. The excavated material was buried in the 118-H-5 burial ground. No records document what volume of material was excavated. No contaminants of concern were identified at the 116-H-4 Pluto Crib site, during historical sampling; additional sampling will be performed during remedial action.</i></p> <p>The data sheet for the 116-H-4 Pluto Crib (p. A-34) will be updated to reflect information from the 100-H Area Technical Baseline Report (BHI-00127 Rev, 00), as follows: insert the following text at the bottom of pA-34:</p> <p style="padding-left: 40px;"><i>Note: The 116-H-4 Pluto Crib site is an inactive, mixed liquid waste site that operated from 1950 to 1952 to receive about 1,000 L of contaminated cooling water from reactor process tubes containing ruptured fuel elements. After its use was discontinued in 1952, this pluto crib was covered with about 10 feet of soil and marked with permanent concrete monuments. The pluto crib was uncovered and exhumed in 1960, during construction of the 105-H confinement system, so that the 117-H Filter Building could be constructed at the same location. Wastes from the site were moved to the 105-H Thimble Pit (118-H-5), where they are now buried. Because little information could be located to characterize the pluto crib's exhumation and reburial, it is unclear how much contaminated soil was removed.</i></p>
8.	<p>The word "underlying" will be deleted from the first sentence in Section 2.1.1..</p>
9.	<p>The second sentence in Section 2.1.1 will be reworded to read: "The RAOs, identified in the ROD apply to contaminants in soils, structures, and debris."</p> <p><b>Editorial Correction:</b> Insert "below" after the word cited in the fourth sentence of Section 2.1.1. Insert "each citation" after the word "following" in the fifth sentence.</p>
10.	<p>Please see response to Comment 12.</p>
11.	<p>Please see response to Comment 12.</p>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
12.	<p>A new paragraph will be added to the end of 2.1.2 as follows:</p> <p style="text-align: center;"><i>The third RAO will be achieved through the following requirements:</i></p> <ul style="list-style-type: none"> <li>* <i>Achieving the requirements to meet the first two RAOs</i></li> <li>* <i>Removing waste sites to the bottom of the engineered structure</i></li> <li>* <i>Providing institutional controls, as required, in the event that DOE relinquishes control of the site. (See Section 2.1.5).</i></li> </ul>
13.	<p>The Method A cleanup level is used only for lead. A Method B cleanup level for lead is not available. It would not be possible to calculate concentrations for which there is not a CLARC II value (such as for lead). CLARC II values are based on all available EPA toxicity values (i.e. Reference Doses for noncarcinogens and slope factors for carcinogens); if there is no value for an analyte in CLARC II, there are no toxicity values available to calculate such a value. In the case of lead, there is no Reference Dose or slope factor, and allowable concentrations in soil are based on achieving a blood-lead level in children of 10 micrograms per deciliter (ug/dL), which is the allowable blood-lead level currently recommended by EPA and the U.S. Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR). EPA has developed the Integrated Exposure-Uptake Biokinetic (IEUBK) Model for estimating lead cleanup levels at Superfund sites. There are two alternatives for addressing this comment: 1) continue to use the MTCA Method A value for lead, and add a statement to the text that this is the only occasion that MTCA Method A is used as a cleanup standard, or 2) use the IEUBK model as a basis for estimating a soil cleanup level for lead (the MTCA Method A value is more conservative than the cleanup levels provided by the IEUBK model). Per discussion with the agencies, the MTCA Method A value will be used.</p>
14.	<p>The second bullet in Section 2.1.2.2 will be modified by deleting <i>"for 350 days per year."</i></p> <p><b>Editorial Correction:</b> Section 2.1.2.2, second paragraph -- The word <i>"requirement"</i> will be added after "The 1000-years."</p> <p>Examples of "other radiation protection standards" will be added to the end of the second paragraph by changing the period at the end of the last sentence in the second paragraph of Section 2.1.2.2 to a semicolon and adding the following new text:</p> <p style="text-align: center;"><i>for example, standards employed under the Uranium Mill Tailings Radiation Control Act (UMTRA) and the National Emissions Standards for Hazardous Air Pollutants (NESHAP).</i></p>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
15.	<p>The "open-ended statement" will be eliminated by deleting the first sentence and "<i>As a result,</i>" from the beginning of the second sentence of the third paragraph of Section 2.1.2.2.. With these changes, the paragraph will begin with the sentence "<i>Radionuclide measurement techniques must distinguish site contamination from naturally-occurring radionuclides.</i>" Also, a reference will be added at the end of the paragraph as follows: "<i>Background concentrations of radionuclides in soils at the Hanford site are published in (DOE-RL 1006).</i>" "Hanford Site Background: Part 2, Soil Background for Radionuclides (DOE/RL-96-12 Draft A)" will be added to the reference list as (DOE-RL 1996).</p>
16.	<p>The last paragraph will be reworded as follows:</p> <p style="text-align: center;"><i>RESRAD has been used to calculate concentrations in soil of individual radionuclides that correspond to a dose rate of 15 mrem/yr; these concentrations are presented in Table 2-2. The values in Table 2-2 assume that a single radionuclide contributes the entire dose and were calculated using default assumptions; they are intended for use in screening evaluations of sampling and analytical data in the field. The expectation is that most sites will have multiple radionuclides driving the cleanup; therefore, a cumulative dose of 15 mrem/yr would potentially result in individual radionuclide concentrations that are lower than the values presented in the table. During the verification process, site specific assumptions will be used in RESRAD to verify that residual radionuclide concentrations achieve the proposed cleanup standard. The default assumptions used in RESRAD for preparing Table 2-2 are presented in Appendix B. Section 3.6 describes the goals attainment process in detail.</i></p>
17.	<p>Concentrations protective of groundwater were developed as follows: 1) rely on promulgated values (available for: Ra-226 in 40 CFR 141.15 and for tritium and Sr-90 in 40 CFR 141.16); 2) calculate concentrations in water corresponding to 4 mrem/yr using the procedure defined in 40 CFR 141.16; 3) calculate the concentration corresponding to 4 mrem/yr from the DCG (calculated as 1/25th of the DCG). As shown in the attached spreadsheet, for some radionuclides the DCG values were lower than the MCL as calculated according to the method in 40 CFR 141.16. Use of the lowest value is health conservative, which is why the MCL was not used in all cases.</p> <p>The 4 mrem/yr is not part of the 15 mrem/yr RAO for the rest of the site. EPA has stated in its draft radionuclide soil cleanup standard that the 15 mrem/yr dose is based on exposure through pathways other than ingestion of groundwater. The standard states clearly that cleanup of groundwater is to achieve MCLs (4 mrem/yr).</p>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
18.	<p>Per EPA and Ecology verbal comments, the Summer's Model has been replaced by RESRAD.</p> <p>The second paragraph in Section 2.1.2.3 will be replaced as follows:</p> <p style="padding-left: 40px;"><i>Waste site-specific concentrations in soil that are protective of groundwater are calculated from the groundwater remedial action goals in Table 2-3 and site-specific data such as waste site dimensions and depth to water table. Appendix C provides a description of the methodology to be used for modeling protection of groundwater. The RESRAD model using the groundwater pathway options, will be used to perform the site specific calculations for both radionuclides and non-radioactive metals concentrations that are protective of groundwater.</i></p> <p style="padding-left: 40px;"><i>To develop a design basis for estimating contaminated soil volumes and predicting required analytical quantitation limits, representative soil cleanup levels protective of groundwater were calculated based on the values in Table 2-3 and the geometry of the 116-C-1 trench. These soil cleanup levels are summarized in Table 2-4. Actual cleanup verification will rely on site specific calculations.</i></p> <p>The <math>K_d</math> values were obtained from reviews of the literature and are presented in Table C-1. Site-specific testing has not been performed for <math>K_d</math> values.</p>
19.	<p>Section 2.1.2.4, third paragraph, first sentence: <i>"Appendix C"</i> will be changed to <i>"Appendix D."</i></p> <p>Same paragraph: The following new sentence will be inserted after the second sentence: <i>(A dilution factor of two was assumed in the calculations.)</i></p> <p>Same paragraph, last sentence: This sentence will be split into two sentences, with the second sentence starting with <i>"Contaminants detected in groundwater...."</i> In the (new) last sentence, replace <i>"are"</i> with <i>"include."</i></p> <p>Section 2.1.2.4, first paragraph needs to be corrected as follows: Add <i>"(or, if more restrictive for radionuclides, 1/25th of the DCG)"</i> to the end of the first sentence and third sentence.</p>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
20.	The text "EPA's" will be replaced by the words "NRC and EPA" in this bullet. As requested in the comment, a word search will be conducted on the word "proposed" to check for other instances requiring modification.
21.	The following text will be inserted after the first sentence in the last paragraph of Section 2.1.4:  <i>The concentrations represent values that individually equate to a 15 mrem/yr dose. For radionuclides, the expectation is that most sites will have multiple radionuclides driving the cleanup, therefore a cumulative dose of 15 mrem/yr would potentially result in individual radionuclide concentrations that are lower than these "look-up" table values.</i>
22.	This term "marginally contaminated" was previously agreed to by legal personnel at DOE and EPA. Please see response to comment 23.
23.	The following text will replace the last bullet in Section 2.1.5:  * <i>For areas where lateral movement of contaminants, low radionuclide levels or small quantities of waste disposed would generate marginally contaminated material to be disposed of in ERDF, where it can be demonstrated that radionuclide concentrations will result in achieving an acceptable risk range within a reasonable period of time, the balancing factors may be invoked.</i>
24.	This information (i.e., on removal of the engineered structure) is presented in Section 2.1.3 (Application of Remedial Action Goals); not necessary
25.	The following will be added as the fourth and fifth bullets in the first paragraph of Section 2.1.6.1 (Chemical Specific ARARs):  * <i>National Emissions Standards for Hazardous Air Pollutants (NESHAP) (40 CFR 61)</i> * <i>National Primary and Secondary Ambient Air Quality Standards (40 CFR 50)</i>  The last two paragraphs of both Section 2.1.6.1 and Section 2.1.6.2 will be deleted.

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
26.	<p>The bullet on Designation of Dangerous Waste in Section 2.1.6.2 will be updated to reflect the most recent data from the BC Area. The last four sentences of this bullet will be deleted (i.e., beginning with the sentence, "The TCLP test will be performed ..." and replaced with the following text:</p> <p style="text-align: center;"><i>After recognizing the existence of a worst-case waste form and the need to verify its LDR status, a sludge sampling and analysis program was performed. Samples were collected from the 116-B-5, the 116-B-13 and 116-B-14 sludge trenches, the 116-C-5 retention basin, and the C-107 diversion box; TCLP and total metals analysis were performed on each sample. Based on the results of this sampling and analysis program, it is the opinion of the Tri-Parties that LDR wastes will not be encountered in significant quantities.</i></p>
26.	<p>(#26 Continued) The bullet on Land Disposal Restrictions in Section 2.1.6.2 will be also be updated. The third sentence of this bullet will be deleted (i.e., <i>If TCLP tests do not confirm...</i>) and replaced with the following two sentences:</p> <p style="text-align: center;"><i>As also indicated above, TCLP testing to date indicates that LDR wastes will not be encountered in significant quantities [see Appendix C of SAP (DOE/RL-96-22)]. Nevertheless, if LDR wastes are encountered, the requirements of 40 CFR 268 will be applied.</i></p> <p>The ERDF WAC document is referenced in Section 2.1.6.4 under the subheading ERDF Waste Acceptance Criteria. To avoid duplication and problems with having to rev RDR/RAWP to keep up with any changes in criteria, will not include table.</p>
27.	<p>The justification of why we are not performing treatment is presented in Section 2.1.7; the bullet for "Miscellaneous Units" will be revised to include reference to Section 2.1.7 and the rationale presented in Section 2.1.7 for no treatment will be upgraded. The text following the underlined portion of the bullet will be replaced with:</p> <p style="text-align: center;"><i>As explained in Section 2.1.7, neither treatment for volume reduction nor treatment to address LDR wastes is anticipated at this time. As a consequence, the remedial actions described in this report are not envisioned to require the use of miscellaneous units to store or treat hazardous wastes.</i></p> <p>Description of the changes to upgrade the discussion in Section 2.1.7 is presented in the response to Comment 31.</p>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
28.	The words " <i>as a requirement to meet the ARAR</i> " will be added to the end of the last sentence.
29.	The SAP does not address ambient air monitoring; the project will follow the air notification process prescribed under the general Hanford site air permit issued to DOE.
30.	<i>"and a goal of 4 mrem/yr"</i> will be deleted from second paragraph of Section 2.1.6.4.
31.	<p>The following changes will be made to Section 2.1.7 to better explain the rationale for not including treatment in the design to implement the ROD.</p> <p>First paragraph; the following text will be inserted after the first sentence, and the last sentence of the paragraph will be deleted:</p> <p style="padding-left: 40px;"><i>Appropriate treatment, as described in the ROD, is soil washing or thermal desorption to "minimize the amount of material to be transported to the ERDF for disposal." Required treatment is any treatment required to comply with legal requirements; of primary concern are LDR-related treatment requirements. However, as described in the following paragraphs, evaluations of existing historical and analytical data and technology demonstrations have resulted in the conclusion that soil treatment will be neither appropriate at this time for volume reduction nor will it likely be required for addressing LDR wastes. Should LDR material be encountered, it will be temporarily stored within the area of contamination and disposed of in accordance with applicable regulations (Section 2.1.6.2).</i></p>
31	<p>(#31 cont'd) First bullet (i.e. on Thermal Desorption); replace existing text with the following:</p> <p style="padding-left: 40px;"><i>The ROD requires that, as appropriate, wastes contaminated with organic chemicals be treated using thermal desorption to reduce volumes requiring disposal in the ERDF. Also, if concentrations of organic chemicals exceed ERDF waste acceptance criteria or LDR criteria, then thermal desorption would be required. However, evaluation of existing historical and analytical data indicates that organic chemicals are not expected at the interim action ROD wastes sites nor are concentrations likely to be in excess of the ERDF waste acceptance criteria. Therefore, thermal desorption will not be included in the detailed design for remedial action.</i></p>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
31.	<p>(#31 cont'd) Second bullet (i.e., on Soil Washing); replace existing text with the following:</p> <p><i>The ROD requires that, as appropriate, contaminated soils be treated using soil washing to reduce volumes requiring disposal in the ERDF. A soil washing pilot plant was constructed in the 100-DR-1 Operable Unit and a treatability test was performed to investigate the feasibility of soil washing (DOE/RL-95-46). Using data from the test, DOE performed a comprehensive economic analysis to compare the relative costs of soil removal and direct disposal in ERDF with soil removal, soil washing, and disposal of the contaminated fraction in ERDF. The report documenting the analysis (BHI-00624) concluded that removal and disposal is less expensive than removal, soil washing, and disposal, although the difference between the two alternatives is small and within the estimated margin of error of the estimate. Fundamentally, the projected reduction in volumes requiring disposal at the ERDF (and associated cost savings) do not offset the extra costs of constructing and operating the soil washing facility. The report recommended that soil washing not be included in remedial action plans at this time and that actual remedial action costs be monitored and incorporated into a future update of the economic model.</i></p>
31.	<p>(#31 cont'd) Third bullet (i.e., on Required Treatment): The bullet will be replaced with the following text:</p> <ul style="list-style-type: none"> <li>• <i><u>Required Treatment:</u> Treatment will be required for LDR material unless a treatability variance or ARAR waiver is requested by DOE and approved by the regulatory agencies. The expected condition is that toxicity characteristic suspect waste may exist. After recognizing the need to better understand the likelihood of encountering LDR wastes during remedial action, a sludge sampling and analysis program was performed (see Section 2.1.6.2). Based on the results of this sampling and analysis program, it is the opinion of the Tri-Parties that LDR wastes will not be encountered in significant quantities. Nevertheless, if LDR wastes are encountered, the requirements of 40 CFR 268 will be applied. A contingency plan addressing how LDR wastes will be handled has been prepared (BHI, 1995). Should LDR material be encountered, it will be temporarily stored within the area of contamination and disposed of in accordance with applicable regulations (Section 2.1.6.2). The contingency plan will be implemented if and when LDR wastes are detected. If treatment is required to address LDR wastes, DOE will obtain regulatory agency approval.</i></li> </ul>
32.	Please see response to Comment 31.
33.	Please see response to Comment 31.
34.	Please see response to Comment 31.

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
35.	Please see response to Comment 31.
36.	Delete the words <i>"and manageable work packages."</i>
37.	Group 1, Group 2, etc. designations are used for remedial design only. Different designations will be used for remedial action.
38.	The symbol in question on Figure 2-1 will be revised.
39.	<p>Re comments on Table 2-1:</p> <ul style="list-style-type: none"> <li>* <i>"Hexavalent"</i> will be inserted after <i>"Chromium"</i> in the left column.</li> <li>* Manganese is included because it is identified in the ROD.</li> <li>* In Note 1, "January 1995" will be changed to <i>"February 1996"</i> also the entry "1.43" for Arsenic will be updated to "1,67<sup>2</sup></li> <li>* It is not stated that PQLs equate to CRQL/CRDLs. Use of the term PQL is consistent with MTCA.</li> <li>* Re Method A, please see response to Comment 13.</li> </ul>
40.	<p>Notes will be added to tables as follows:</p> <ul style="list-style-type: none"> <li>* Table 2-2: <i>Note: Reference Appendix B for RESRAD methodology used to develop values in this table.</i></li> <li>* Table 2-4: <i>Reference Appendix C for methodology used to develop values in this table.</i></li> <li>* Table 2-5: The full citation for the NBS document will be added to the table notes.</li> <li>* Table 2-6: <i>Reference Appendix C for methodology and Appendix D for dilution/attenuation model methodology used to develop values in this table.</i></li> </ul> <p>Regarding background: The background documents have been used only to identify levels of chemical carcinogens (such as arsenic) with background levels that are less than a concentration corresponding to 10<sup>-6</sup>. The 15 mrem/yr concentration value for a particular radionuclide represents the dose associated only with that radionuclide. Since the radionuclides contributing to background and the risk-drivers are different, it is possible to look at only the 15 mrem/yr increment above background. This would not be the case if a radionuclide also found in background, such as Ra-226, was also a significant risk driver in soil. (Reference response to Comment 15.)</p>
41.	The RESRAD model was refined during remedial design and values were recalculated.

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
42.	According to the SDWA Hotline, the document referenced in the comment (EPA-570/9-76-003) has been superseded and is not consistent with the assumptions for calculating MCLs presented in 40 CFR 141.16. (Please reference Section 2.1.2.3 for the methodology used.)
43.	The text of Appendix D will be revised to provide the information requested in the comment and to generally clarify the discussion of methods used to calculate concentrations in soil that achieve surface water criteria.
44.	Delete the first two sentences and replace with the following sentence:  <i>Remediation, in accordance with the interim action ROD, requires soil excavation, treatment as appropriate or required, disposal, and backfilling. Clean overburden can be segregated and stockpiled onsite for backfill purposes.</i>
45.	The second paragraph of Section 3.1.1 will be deleted.
46.	Add the following sentence to the end of the third paragraph of Section 3.1.2:  <i>In the unlikely event that a container cannot be decontaminated with the normal equipment and techniques available at the decontamination station, an evaluation will be made of what advanced techniques would be appropriate and these will be implemented.</i>
47.	Add the following sentence to the end of the fifth paragraph of Section 3.1.2:  <i>Additional information on the in situ analytical system is presented in the SAP.</i>
48.	Although the Tri-Parties feel that LDR wastes will not be encountered in significant quantities, a soil treatment storage area will be designated as an element of contingency planning. To eliminate confusion that may be caused on this point in the RDR/RAWP, the first sentence in the sixth paragraph of Section 3.1.2 will be reworded as follows:  <i>Dust control is maintained on the haul roads, at the excavation site, and at the clean soil storage area, as well as at the contingency storage area for soils potentially requiring soil treatment.</i>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
49.	<p>The first sentence of the seventh paragraph of Section 3.1.2 will be deleted and replaced with the following:</p> <p style="text-align: center;"><i>When remedial action objectives have been met and verified, site backfill will be authorized.</i></p>
50.	<p>Section 3.1.2 and 3.1.3 will be generally updated to reflect the latest information available on material handling and transportation systems. This update will address the concerns raised in the comment regarding the number of containers and "intermodal" terminology .</p>
51.	<p>To address the comment as well as correct the reference to "remotely operated twist locks," the first two sentences of the third paragraph of Section 3.1.3 will be deleted and replaced with the following text:</p> <p style="text-align: center;"><i>Haul trailers are used to transport the containers from the excavation area to the container transfer facility, as well as to the ERDF.</i></p> <p>Also the second sentence of the fourth paragraph of Section 3.1.3 will be deleted.</p>
52.	<p>Will delete the word "are" after the word "trailer" in the third sentence of the fourth paragraph of Section 3.1.3.</p>
53.	<p>Will eliminate duplication by deleting the last sentence in paragraph four of Section 3.1.3. Also address earlier concern of confusion over LDR treatment by modifying the first sentence in same paragraph by inserting the phrase "(if required) at" before the words "the LDR material storage area."</p>
54.	<p>Section 3.1.3 will be generally updated to reflect the latest information available on material handling and transportation systems, including appropriate description of haul trucks.</p>
55.	<p>Please see response to Comment 56.</p>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
56.	<p>The second paragraph of Section 3.1.4 will be deleted and replaced with the following text:</p> <p><i>During excavation, soils are monitored for both radiological and chemical constituents; however, for the following reasons, gamma-emitting radiological constituents are used as the primary "indicator" contaminants to guide excavation:</i></p> <ul style="list-style-type: none"> <li>• <i>Data indicate that, in general, when gamma-emitting radionuclide concentrations are less than cleanup criteria, concentrations of non-radiological constituents are also less than cleanup criteria.</i></li> <li>• <i>Gamma-emitting radionuclide contaminants are readily detected with field instruments at levels specified for cleanup, whereas alpha- and beta-emitting radionuclides and chemical constituents are not.</i></li> </ul> <p><i>Upon initial completion of excavation at each waste site, cleanup verification sampling and analysis will be performed to confirm attainment of cleanup criteria for all contaminants of concern. If analytical results indicate that cleanup criteria have not been achieved, then excavation will resume with appropriate analyses as guidance."</i></p>
57.	<p>The fourth sentence of Section 3.1.5 will be replaced with the following text: <i>"If containers cannot be adequately decontaminated here (e.g., removal of exterior surface contamination). They are moved to the decontamination facility were more aggressive decontamination techniques are used."</i></p>
58.	<p>Section 3.1.6: The following text will be added to the end of the paragraph <i>"by the truck drivers. (The DOE is electing to comply with U.S. Department of Transportation regulations, for waste shipped within the Hanford Site boundaries; these regulations require the driver to carry such documentation.)"</i></p>
59.	<p>Insert the following new sentence after the first sentence of the first paragraph in Section 3.2.</p> <p style="text-align: center;"><i>A draft schedule for remedial action is illustrated in Figure 3-2.</i></p>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
60.	<p>The following text will be added to the end of Section 3.2.1.3:</p> <p style="text-align: center;"><i>Subcontractor oversight occurs through administration of subcontract documents. Project specifications and procedures define the "how to" of excavation, material handling, analytical system operation, data gathering and overall daily conduct of operations. Worker health and safety and radiological control requirements are included in site health and safety plans and permits.</i></p>
61.	<p>The first sentence of Section 3.2.1.4 will be deleted. Also, in the last sentence of Section 3.2.1.4, "<i>environmental sites database (ESD) and mapping system.</i>" will be replaced with "<i>Waste Identification Data System (WIDS).</i>"</p>
62.	<p>The words "<i>was given the authority</i>" will be replaced with the word "<i>committed</i>" in the first sentence of Section 3.2.2.</p>
63.	<p>The text "<i>(see Figure 3-2)</i>" will be added at the end of the second bullet in Section 3.2.2.</p>
64.	<p>The second to last bullet in Section 3.2.2 will be reworded as follows:</p> <p style="text-align: center;">* <i>If waste sites are added, upon regulatory agency review and approval, the schedule will be updated and the additional waste sites will be integrated into the remedial action.</i></p>
65.	<p>See response to General Comments re Public Involvement Plan.</p>
66.	<p>Delete the text "<i>Sampling and analysis plans</i>" and replace with the text "<i>The SAP (DOE, 1996b) will</i>" in the first and third sentences of Section 3.4.2. Replace the text "<i>Sampling and analysis plans are</i>" with "<i>The SAP will be</i>" in the last and second to last sentences of Section 3.4.2. In the last sentence of Section 3.4.3, replace the word "<i>will</i>" with the word "<i>may.</i>"</p>
67.	<p>The last sentence of Section 3.4.4 will be deleted and replaced with the following sentence "<i>The mitigation action plan will be developed by DOE in coordination with the trustees.</i>"</p>
68.	<p>The first bullet of the third paragraph in Section 3.5 will be replaced with the following bullet:</p> <ul style="list-style-type: none"> <li>• <i>A 50 percent increase in the total cost of remediation of sites addressed in the ROD.</i></li> </ul>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
69.	<p>The third bullet of the third paragraph in Section 3.5 will be replaced with the following bullet:</p> <ul style="list-style-type: none"> <li>• <i>The addition of 100-Area investigation derived waste not associated with the sites in this document.</i></li> </ul>
70.	<p>The third bullet of the fourth paragraph will be deleted. A new bullet will be added to the three bullets in the second paragraph as follows:</p> <ul style="list-style-type: none"> <li>• <i>The granting of a treatability variance if it is technically impractical to meet the LDR treatment standard.</i></li> </ul>
71.	<p>A new third bullet will be added to the fourth paragraph as follows:</p> <ul style="list-style-type: none"> <li>• <i>Stabilization of waste in place in the 100 Area instead of excavation and disposal of soil at ERDF.</i></li> </ul>
72.	<p>A final sentence will be added to the end of Section 3.6 as follows:</p> <p style="text-align: center;"><i>"Details regarding verification sampling and analysis may be found in the SAP (DOE, 1996b).</i></p>
73.	<p>A final sentence will be added to the end of Section 3.6.3 as follows:</p> <p style="text-align: center;"><i>"Details regarding verification sampling and analysis may be found in the SAP (DOE, 1996b).</i></p>
74.	<p>Section 3.6.5, second paragraph: The following text will be inserted after the fourth sentence (ends with word "basement"):</p> <p style="text-align: center;"><i>[Wastes left in place at depths greater than 4.6 m (15 feet) that are protective of groundwater will have institutional controls applied (e.g. deed restrictions for well drilling and deep excavation).]</i></p>
75.	<p>"Co-137" will be deleted from the second paragraph of Section 3.6.8. The following sentence will be added after the first sentence:</p> <p style="text-align: center;"><i>"Remediation to minimize further release of Cr6+ to the Columbia river is a primary concern in the 100-D, 100-H, and 100-K areas."</i></p>
76.	<p>The word "<i>model</i>" will be replaced with the word "<i>factors</i>" in the first sentence of the third paragraph of Section 3.6.8.</p>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
77.	Section 3.8: The second sentence of the first paragraph will be deleted and the following text will be added to the end of the last sentence (same paragraph): <i>as well as final clean up verification under CERCLA.</i> "
78.	Please see response to Comment 77.
79.	Please see response to Comment 77.
80.	"Summers" will be changed to "Summary" on Figure 3-3.
81.	<p>The following changes will be made to Appendix A:</p> <ul style="list-style-type: none"> <li>• COCs will be added</li> <li>• Designation of shallow, intermediate, or deep will be made</li> </ul> <p>116-DR-1 and 116-DR-2 are on the same page (A-8).</p> <p>The seven sites with no contaminated volume: 116-H-4 has already been excavated; 116-D-9 and 116-B-12 have no contaminated volume.</p>
82.	<p>As suggested, the first sentence of the third paragraph on Page B-1 (i.e., The regulatory agencies...) will be replaced with the following text:</p> <p style="text-align: center;"><i>A primary goal of the ROD signed in September, 1995 by the Tri-Parties is to achieve cleanup levels that would not restrict the future use of the land in the 100 Area. This goal was identified by the Future Site Uses Working Group and was strongly emphasized by many Stakeholders during the development of the Proposed Plan and during Public Comment on that plan.</i></p>
83.	<p>The transport algorithm in RESRAD assumes that there would be sediment transport to a small surface water body such as a pond. This does not reflect the arid climate at the Hanford site and the Columbia River as the receiving water body. The sensitivity analysis of the FFS shows that surface runoff would be an insignificant pathway of exposure.</p> <p>Calculation of the cumulative dose from residual contaminants following remedial action, and comparison of that dose with 15 mrem/yr is the basis for determining if remedial action has achieved the RAO for contaminants within the zone where direct contact could occur.</p>

**Responses to Specific Comment on  
Remedial Design Report/Remedial Action Work Plan for the 100 Area;  
Decisional Draft B**

No.	Response
84.	The number "14.6" for thickness of contaminated zone on Table B-1 will be replaced with the number "4.6."
85.	Irrigation has been added for the protection of groundwater and the Columbia River per discussions with EPA and Ecology.
86.	Summer's Model has been replaced with the RESRAD Model.
87.	Appendix D will be updated to provide requested detail.
88.	Insert the following text at the end of the note below Table D-2: <i>"A dilution factor of 2 was used to calculate the values in this report."</i>
89.	Waste site 1607-D-2 is included in Group 2 Remedial Design because of its proximity to ROD waste sites. However, it is considered a "no action" site pending additional sampling. (See Section 2.2.2)
90.	<p>The schedule in Figure 3-2 is based on early start/late finish dates for each task. In addition to excavation time, each duration includes initial set-up and start-up time, clean up and breakdown time on the back end, and float. For 116-C-1 the float was removed and the equivalent of a late start was given to the subcontractor to ensure waste shipments no later than July 15. For this reason the duration of 116-C-1 seems relatively short. 116-B-13 and 116-B-14 are shown for a longer duration than will be required, allowing for the excavation of these sites in parallel with 116-B-11. A generous float was allowed for 116-B-1 to allow maximum flexibility to the subcontractor, since this site is very close to 116-B-11 and could create interferences. Actual excavation time was used for 116-B-5. Duration for 116-DR-9 is 276 days not 154 days. The simple rates for 116-D-7, 116-DR-1&amp;2, and 116-DR-9 are 182 l cm/day, 215 l cm/day, and 168 l cm/day respectively. Actual excavation rates are of course expected to be much higher, since these simple rates are calculated from durations derived from early start/late finish. A slightly higher production rate is expected at 116-DR-1&amp;2 since it does not contain the concrete structure like 116-D-7 and 116-DR-9. Production rates also vary due to overburden quantities and depth of excavation.</p> <p>Except for the pipelines, confidence is relatively high that sites listed as "zero" contaminated volume will not contain soils that exceed the remedial action goals. This is based primarily on process knowledge and historical information.</p>

Response to Formal Comments Submitted by EPA and Ecology DOE 96-22 Sampling and Analysis Plan	
COMMENTS	RESPONSE
<b>General Comments</b>	
1. The SAP should contain enough detail to cover all 37 sites listed in the interim ROD.	1. The SAP text will be modified and Table I-1 will be expanded to address all 37 sites listed by the interim ROD. Site-specific methodologies for the SAP were developed strictly on the initial 6 sites in the B/C area. Site-specific DQO, planning, and/or engineering may require modifications to some sections as the events occur. Modifications will be provided by page change or in an addendum to the SAP as appropriate. It is anticipated that modification would be limited to Sections I and II and that Section III is currently applicable to all 37 sites.
2. Number of samples required for final verification dropped from six to three. The explanation for each is lacking.	2. First value of six was based very loosely on Student's T relationship for a 95-percent confidence level and was strictly a starting point. Statistical reasoning for the three samples is outlined in II.3.1.2 through II.3.1.4 with backup in the appendix titled "Statistical Approach for Closeout and Overburden/Layback". The values given in the tables are starting points, assuming all the statistical assumptions hold true. The numbers may increase as the statistics of the measurements warrant.  No text change is required.
3. The correlation graphs were deleted in the April SAP. Correlate areas where there is sufficient data to see trends and note areas of data gaps. This could be useful information, so don't delete the effort.	3. Upon examination of the correlation graphs, it was determined that more data are needed to establish correlations; the past graphs do not present data in the region of interest and do not have sufficient data points to present reliable correlations. Establishing correlations would provide more effective excavation guidance and, for some sites, may reduce the analytical effort. During remedial actions data will be reviewed and correlations will be made if possible.  No text change required.

Response to Formal Comments Submitted by EPA and Ecology  
DOE 96-22  
Sampling and Analysis Plan

COMMENTS	RESPONSE
<p>4. The discussion of the statistical model used at the FMC in the April SAP should be reviewed in its entirety before approval for radiological cleanup. Detailed discussion of the FMC strategy must be provided. After review of this strategy, EPA and Ecology will determine if this sampling strategy is applicable to the 100 Areas conditions.</p>	<p>4. We would like to emphasize that the statistical basis for the FMC and the current SAP is identical to the methodology presented in the EPA guidance document, <i>Methods for Evaluating the Attainment of Cleanup Standards, Volume 1: Soils and Solids Media</i>. This document is referenced in appendix titled "Statistical Approach for Closeout and Overburden/Layback." Pages 6-1 to 6-10 in the EPA guidance document are the basis for and relevant to the statistical calculations.</p> <p>Reference to FMC will be removed from the text.</p>
<b>Specific Comments</b>	
<p>1. Page viii, "RESRAD" with explanation must be a typo. MTCA is the acronym for the Model Toxics Control Act. Volatile is misspelled volittle.</p>	<p>1. Changes will be made.</p>

Response to Formal Comments Submitted by EPA and Ecology  
DOE 96-22  
Sampling and Analysis Plan

COMMENTS	RESPONSE
<p>2. Page I-1, Section I.1, second and third paragraph. Paragraph two discusses the need to generate specific descriptions of work for each waste site. EPA and Ecology do not agree with this statement. The SAP should and does contain sufficient detail to be applicable for all 37 sites. If needed, change sheets can be produced for any wastes sites that fall outside the parameters detailed in the SAP.</p> <p>What is paragraph three trying to communicate? From the text provided it is difficult to determine. Please clarify.</p>	<p>2. "Description of work" is a misleading term. A site-specific "Field Execution Plan" is a better description of the details needed by the field samplers to complete their tasks. See general comment # 1 response for 37 incorporation of all 37 sites.</p> <p>Text will be modified as follows:</p> <p>After "...are discussed in the ROD (EPA, 1995). . ." in the text of the SAP, change text to say: "Table I-2 provides target closeout values for each COC. The values for the radionuclides are estimates for planning purposes and are based on data from similar sites in the 100-B/C area. The actual closeout values for radionuclides will be determined on a site-specific basis through the use of models. The use of target values is necessary to accomplish this sampling and analysis design. Refer to Section I.4 " Sampling and Analytical Strategies" for this Discussion."</p>
<p>3. Page I-2, Section I.1.2, second paragraph. This paragraph states that there are six sites in the BC-1 OU. This statement is not correct. There are 16 sites in the RD/RA work plan. In addition, as stated above, this SAP should cover all 37 sites. In the last sentence, this plan is referred to as a safety analysis plan. This should be changed to reflect that in fact this document is a sampling analysis plan!</p>	<p>3. See general comment #1 with regard to the 37 sites.</p> <p>Text will be modified to say: "Sampling and Analysis Plan"</p>

Response to Formal Comments Submitted by EPA and Ecology  
DOE 96-22  
Sampling and Analysis Plan

COMMENTS	RESPONSE
<p>4. Page I-2, Section I.1.2, Bullets. This section lacks specifics; the information provided has little value to the SAP. Information that needs to be added include contaminants of concern, waste site classification, waste profile if known.</p>	<p>4. The intent of this description is to provide background information for the specific contaminants of concern listed in Table I-1. This background information is useful in leading to the sampling and analytical strategies described later. Initial waste profiling/classification is not covered here since these will be established separately through process information and past history and data.</p> <p>Section will be modified as follows: Subsection I.1.2 will be changed to eliminate site specific descriptions. Table I.1 will be expanded to include all 37 sites. Table A-1 will be moved forward to this section.</p>
<p>5. Page I-5, Remedial Action Goals, last sentence. The term site closeout is incorrect. It would be more appropriate to say site verification or site cleanup. Site closeout will occur at a later date when the final ROD is written.</p>	<p>5. Although the final ROD is the basis for the deletion of sites from the NPL, the term "site closeout" is used to describe sites that have met the cleanup criteria and are awaiting deletion from the NPL via the final ROD. Sites designated as having accomplished "site closeout" are flagged as such in WIDS to indicate that these sites await only disposition in the final ROD.</p> <p>No text change required.</p>
<p>6. Page I-5, second to the last paragraph. Where did the 1,000 years come from? Please provide a reference.</p>	<p>6. The source of the 1,000 years is 40 CFR 196 (reference RDR/RAWP 2.1.2.2). This regulation is referenced in the responsiveness summary of the ROD, comment 35.</p> <p>Text will be modified as follows: For radiochemical constituents, EPA Radiation Site Cleanup Regulation, Notice of Proposed Rulemaking (40 CFR 196), would limit radiation doses from contaminated sites to 15 millirem per yr (mrem/yr) above natural background for 1,000 years following completion of cleanup.</p>

Response to Formal Comments Submitted by EPA and Ecology  
DOE 96-22  
Sampling and Analysis Plan

COMMENTS	RESPONSE
7. Page I-7, second paragraph, last sentence. Since the ROD was issued, the cleanup standard is no longer proposed. Recommend dropping the word proposed.	7. The word proposed will be removed.
8. Page I-9, last paragraph. Define "initially." The correlation discussion needs to be enhanced. It is not clear what the purpose of this sampling is.	8. See General Comment #3. This explanation will be incorporated into text. Text will be modified to reflect.
9. Page I-10, Disposal. This paragraph states precharacterization will be performed. This is not EPA and Ecology's understanding. Please clarify.	9. "Disposal Characterization" is used inappropriately and will be changed to waste monitoring. This term will also be incorporated as applicable elsewhere in the plan. Also the word proceed will be changed to during.
10. Page I-13, Section I.4.4. The statement regarding the criteria for rejecting imported backfill is not clear. What is the criteria? Some multiple of background? Make Sections I.4.4 and II.3.1.4 consistent. Also, there is no rationale for dropping metals and organics from the screening.	10. Borrow sites will be selected based on a clean site history, i.e., on that has no history of industrial activity. The gamma screening is simply an additional activity for increased confidence.  Text will be expanded to reflect.
11. Page I-13, Section I.4.5, Site Closeout. Change title to site verification. Also, define QTL and SFL.	11. Refer to comment resolution #5. QTL and SFL will be defined.  Acronym list will be updated.
12. The tables in the SAP and the RD/RA should be consistent. The SAP uses SI units with standard units in parentheses, the RD/RA does not. The SAP does a better job of consistent significant figures. Hanford cleanup documents have generally not used SI units.	12. The two documents will be made consistent. It is a requirement that SI units be used in DOE documents.  Tables will be modified as follows: For ease of use (Bq/g) will be removed from tables.

Response to Formal Comments Submitted by EPA and Ecology  
DOE 96-22  
Sampling and Analysis Plan

COMMENTS	RESPONSE
<p>13. Page II-1, Section II.2.4. Please clarify that the DQO process was internal to BHI, and no regulatory agencies were involved.</p>	<p>13. The DQO process for the 100-B/C Remedial Action sites described in Appendix C of this SAP was conducted internally by the ERC with input from the regulatory agencies in meetings during December 1995 and January 1996. Those inputs served to guide the internal DQO process, which was completed during meeting held March 29 and 30, 1996. Plans are underway to present the results of the internal DQO process to the regulatory agencies and DOE-RL formally with the objective of gaining their concurrence and approval. Appendix C will be removed from the SAP. Instead a final, stand-alone DQO Process Summary Report, as required by the ERC standard operating procedure (BHI-EE-01, Volume 1, EIP 1.2, Rev 1, 7/24/95), will result and be signed by all the decision makers. It will serve as documentation of the DQOs as agreed to by all parties and will serve as the basis for all subsequent sampling and analysis documents for the project. It will also provide the criteria by which to assess whether the ensuing data meets the project DQOs and to guide the project decisions.</p>
<p>14. Page II-4, Table II-2, where is percent recovery?</p>	<p>14. Percent Recovery determinations are made when the analytical technique is amenable to matrix spike additions. The recovery limits for matrix spiked analyses are shown in the Table II-2 "Accuracy" column. Analysis by gamma techniques (e.g. gamma energy analysis -GEA), particularly for solid matrices, do not routinely require matrix spikes. Accuracy assessment for GEA is normally checked by counting standard materials of similar matrix composition and is monitored statistically (<math>\pm 3 \sigma</math>). The control limits for GEA analysis will be added to the table.</p> <p>Table II-2 will be modified to reflect.</p>
<p>15. Page II-6, Section II.3.1.1, last paragraph. What is the rationale for sampling every 500 yards?</p>	<p>15. This frequency is not statistically derived but based on professional judgement within project cost and time constraints. The 500-cubic yard value is equated to roughly one excavators' efforts during a single shift.</p> <p>No text change required.</p>

Response to Formal Comments Submitted by EPA and Ecology  
DOE 96-22  
Sampling and Analysis Plan

COMMENTS	RESPONSE
16. Page II-7, Section II.3.1.2, FMC approach. This approach needs to be explained and the rationale for choosing this approach provided.	16. See comment resolution #4.
17. Page II-9, Table II-4, does this table refer to in situ or is it for inorganic nonradionuclides, etc.:	17. This table refers to all contaminants of concern, which include inorganics and radionuclides where appropriate.  No text change required.
18. Page II-11, Section II.3.4.1, the capability of the RCMS instrument is described; what is needed is the data on the calibration and correlation with sampling and analysis results. Please provide this information.	18. Instrument calibration data can be provided to the agencies during the RCMS demonstration test. This test is planned to occur within the next few weeks.  Correlation data will be generated during the initial performance of remedial actions at 100 BC. This data can be presented and shared with the agencies as it is gathered.  Text will be modified to reflect.
19. Page II-12. The dose factors to be used to convert micro-R measurements to concentrations should those in Federal Guidance Document No. 12 since these factors are used in RESRAD 5.61. There are some significant differences in these dose factors.	19. Failure of the HPGe detector could be overcome by using either the existing large area NaI detector and performing limited spectral analysis (focusing on 1 or 2 indicator peaks) or by using a micro-R meter where a "clean" soil reading ( $\mu\text{R/hr}$ ) has been determined using conversion factors such as those found in Federal Guidance Document No. 12 or by direct calibration against characterized Hanford soil.  The reference to the conversion factor proposed will be inserted into the text.
20. Page II-16, II-17, Figures 1 and 2. This figures are not legible. Please provide legible copies for regulator review.	20. Figures will be enlarged and provided.

Response to Formal Comments Submitted by EPA and Ecology  
DOE 96-22  
Sampling and Analysis Plan

COMMENTS	RESPONSE
21. Page III-1, Sampling objectives. As stated earlier, the regulators do not concur with precharacterization. What is the rationale for this work?	21. The term "characterization" will be changed to "monitoring," as appropriate and incorporated in the plan where applicable. See comment #9 above.
22. Page III-2, Table III-1, defer to the Draft DOH guidance for radiation closeout or explain confidence for not following this guidance.	22. Table III-1 and III-2 are based on the statistical design presented in Section II. Supplementing the statistics will be the use of in-situ measurements. Please see comment resolution #4.
23. Table A-1. The statement on <sup>99</sup> Tc that it was excluded because it had no dose impact because it is a low energy beta is not technically correct. <sup>99</sup> Tc is listed in the tables in the RD/RA. These two documents should be consistent. Also, what is the rationale for having Appendix A? Why not include this table in Section I?	23. Tc-99 is a soft beta emitter. Due to its high aqueous mobility, it is expected to have minimal dose impacts from the 100-BC area soils.  Documents will be consistent.  Appendix "A" will be moved to section I
24. Page B-1, what is the schedule to complete this section? EPA and Ecology will not approve the SAP without this information.	24. Appendix "B" was added to the SAP in outline form for information only.  Procedure outline will be removed.
25. Appendix C, General. There is an abundance of useful information in this appendix mixed in with a lot of DQO verbiage and redundant information. EPA and Ecology would like to discuss with DOE the information we find pertinent and include this information in the body of the document.	25. A meeting will be arranged; the DQO appendix will be removed from the SAP and issued as a stand alone document.  See comment # 13.
26. Page C-7, Remedial Action Goals. Remove the reference to 2018. This is not the agreement of the three agencies.	26. Change will be made.

Response to Formal Comments Submitted by EPA and Ecology  
DOE 96-22  
Sampling and Analysis Plan

COMMENTS	RESPONSE
27. Page C-9, ARARs. The ARARs discussion in the SAP should be consistent with the ARARs discussion in the RD/RA work plan.	27. Documents will be coordinated and consistent with the ROD.
28. Page E-3, Table E-1. Explain the values for the Deep Zone. Are these for all sites in the 100 Area and at what distance from the river?	<p>28. The values for the Deep Zone should be additionally footnoted as being derived from protection of groundwater. The protection of groundwater cleanup goals are calculated from the Summers model. Cleanup levels needed for protection of the Columbia River are substantially higher. The 116-C-1 (250 meter from the river) trench was used for calculating radionuclide-specific concentrations in soil corresponding to MCLs in groundwater at the request of EPA. Note that those concentrations are for purpose of estimating target volumes and determining needed quantification limits. The attainment of cleanup levels will be based on site-specific parameters during closeout analysis.</p> <p>Add to footnote a: Actual values will be developed on a site-by-site basis during closeout analysis.</p> <p>Revise footnote d to read: RDR/RAWP for 100 Area unless otherwise noted. The 116-C-1 trench located approximately 250 meters from the Columbia river was the representative site used to calculate values.</p>

Response to Formal Comments Submitted by EPA and Ecology  
DOE 96-22  
Sampling and Analysis Plan

COMMENTS	RESPONSE
<p>29. Page E-5, Section E.5. Explain the reason for taking a minimum of three samples for closeout. Does this apply to larger sites:</p>	<p>29. A minimum of three samples were recommended for deep-zone closeout based on the existing COC deep-zone data. These existing Dorian/Richards data suggest that all COCs are present at concentrations that represent a small fraction of the deep-zone cleanup levels. Because the expected concentrations are much lower than the cleanup standard, minimum sampling should be needed to document deep-zone closeout. Size of the site is not a direct factor in the statistical calculations, but size will impact variability of COCs and thus indirectly impacts the number of samples. In this case, the expected average COC concentrations is the most important factor to recommending a minimum of three samples for deep-zone closeout. Actual results, obtained during remediation, will be used to modify this plan as needed.</p> <p>No text change required.</p>
<p><b>Other Comments (does not include editorial comments)</b></p>	
<p>Remove the quantified sampling (1/500yds<sup>3</sup>)</p>	<p>The analytical work during the excavation will be limited to field measurements with discrete sampling only occurring if site conditions warrant. The text was modified throughout the document to accommodate changed.</p>
<p>All data tables should be filled in (i.e. remove all TBDs)</p>	<p>Comment incorporated.</p>
<p>Provide field screening coverage.</p>	<p>20% internal coverage during excavation will be performed. 50% coverage for boundary location will be performed. Text will be modified to reflect.</p>
<p>Revise COC lists.</p>	<p>Although a DQO process has not been completed for all 37 sites, the COC list will be revised to remove obvious COC that do not pose any risk.</p>

Response to Formal Comments Submitted by EPA and Ecology

DOE 96-22

Sampling and Analysis Plan

<b>COMMENTS</b>	<b>RESPONSE</b>
Provide better definition of decision units.	A table was added identifying the decision unit size relative to the size of the site.
RESRAD will be used to model protection of groundwater and the Columbia River	Summers was replaced with RESRAD