START

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 10

9002772 0009638

Hanford Project Office
P.O. Box 550, A7-70
Richland, Washington 99352

JUL 02 RECD

REPLY TO ATTN OF: A7-70

June 28, 1990

JUL 1990 RECEIVED EDMC

James D. Goodenough
Operable Unit Manager
U.S. Department of Energy
P.O. Box 550, A6-95
Richland, Washington 99352

Re: Review of the Draft Remedial Investigation/Feasibility Study Work Plan for the 100-BC-1 Operable Unit, Hanford Site, Richland, Washington

Dear Mr. Goodenough:

Enclosed are comments from the U.S. Environmental Protection Agency, The Washington Department of Ecology and our contractors on the Draft Remedial Investigation/Feasibility Study Work Plan for the 100-BC-1 Operable Unit, Hanford Site, Richland, Washington.

We have one major concern pertaining to the integration of data gathered to support the In-Situ Vitrification Demonstration of 116-B-6A into the 100-BC-1 Work Plan. At your earliest convenience we wish to discuss the inclusion of this information into the work plan with DOE, WHC, and representatives of the ISV Demonstration Project. A WordPerfect, Version 4.2, diskette is provided for your use.

If you have any questions, please contact me at (509) 376-9529.

Sincerely,

Doug

Douglas R. Sherwood
Unit Manager

RECEIVED JUL 05 1990 CORRESPONDENCE CONTROL

Enclosure

cc: G. Hofer, EPA
L. Goldstein, Ecology
D. Lacombe, PRC
L. Powers, WHC
W. Staubitz, USGS
Administrative Record (100-BC-1 Operable Unit)

COMMENTS ON THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY

WORK PLAN FOR THE 100-BC-1 OPERABLE UNIT

HANFORD SITE, RICHLAND, WASHINGTON

Introduction

The Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) and their contractors have completed the initial review of the Remedial Investigation/Feasibility Study Work Plan for the 100-BC-1 Operable Unit, Hanford Site, Richland, Washington. It should be noted that this work plan was submitted to the regulatory agencies nearly three months prior to the scheduled June 1990 delivery date. The purpose of this early submission was to allow for concurrent review by DOE and the regulatory agencies. Concurrent reviews are expected to eliminate a revision cycle in the early preparation of the work plan. Early submittal of this work plan for review represents a postive step toward streamlining the work plan preparation process. This work plan also attempts to incorporate some of the aspects of the RI/FS streamlining process discussed among the three parties. Several of the comments relate to issues currently under revision as part of the streamlining process.

General Comments

Overall, this work plan is well written and well researched and contains an appropriate level of source related groundwater information to bridge the gap between source and groundwater operable units. However, it appears that risk assessment discussion still represent a continuing weakness in work plan preparation. A consistent approach to risk assessment for all operable unit investigations is required, but this problem is not confined to 100-BC-1.

The preliminary risk assessment contains several weaknesses. The discussion of the characteristics of preliminary contaminants of concern is imbalanced: too lengthy concerning nonradioactive constituents for which concentration levels are not currently available; and incomplete for the radioactive chemicals used in the risk characterization. Secondly, the values used to estimate exposure doses should be tabulated to allow for independent review of the risk calculations. Finally, the preliminary risk assessment methodology for radioactive contaminants is not completely applicable for estimating the health risks to the general population. The method incorrectly estimates of dose equivalents to humans from external exposure to radionuclides, and compares the estimated values with established radiation standards and/or criteria. This methodology was developed to regulate occupational exposures for adult workers only. The estimated health risks to the general population should be based on the age averaged lifetime excess cancer incidence per unit of external exposure or unit of intake.

9 0 1 1 8 8 3 0 6 0 2

The 100-BC-1 work plan identifies two "new sites". These sites require unique site names and numbers. Although this is not specifically work to be performed for 100-BC-1, it is necessary to have assigned site designations in the work plan.

A significant body of data was generated as part of the In-Situ Vitrification Demonstration at 116-B-6-1 crib. Data collected during this investigation includes contaminated soil and groundwater analyses for a wide range of radionuclides and hazardous substances. Battelle Pacific Northwest Laboratory has published the "Treatability Investigation Work Plan for the 116-B-6A Crib ISV Demonstration Project", PNL-7284, by B. E. Campbell et al. in March 1990. EPA acknowledges that much of this information was not available during work plan preparation, but since data gathered for this report represents the only hazardous substance analyses on contaminated soil, its inclusion in the work plan is required.

In previous discussions with Westinghouse Hanford Company (WHC) and the U.S. Department of Energy (DOE) on air releases from production reactors, EPA and Ecology were informed that stack emissions data would soon be declassified. Stack emissions data may be valuable in understanding the source term in 100-BC-1, but it is unlikely to influence substantially the scope of the field investigations. Therefore, it was considered that stack emissions information would be reviewed and compiled for inclusion into the Phase I Remedial Investigation Report as part of the Source Data Compilation Task or within the Air Investigations Task. Please include a review of this data within the scope of the work plan.

Overall, the SAP provided most of the information required. However, several items should be addressed and clarified. Through the SAP, documents are referenced without proper citation. All supporting documents should be cited and included in the reference section. This is particularly necessary because more than one work plan and QAPP appear to be referenced. Also, in many of the tables, most methods and corresponding information lack complete citations. For each parameter or parameter group, the correct method must be referenced and its source cited. The citations should also include the revision date. Current revisions of EPA documents should be used.

Both the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP), state that the Data Quality Objectives (DQO) will "be revised" after the investigation begins, without explaning why this is necessary. The text of both the FSP and QAPP depends heavily on tables. These tables should be readdressed after reviewing support documentation. Several required documents are not included in the reference lists. There are omissions, incorrect information, and inconsistencies between tables.

All QAPPs must be prepared using a document control format in which information is placed in the upper righthand corner of each document page (1983).

Cesium is misspelled as "Caesium" throughout the document. This should be corrected.

100-BC-1 OPERABLE UNIT

SPECIFIC COMMENTS

Work Plan

1-1 **Deficiency:** Section 1.1, p. 1-2

The discussion of potential future use of the 100-BC-1 operable unit is inconsistent with the Draft Environmental Impact Statement on Decomissioning of Eight Surplus Production Reactors at the Hanford Site, Richland, Washington (DOE/EIS-0119D).

Recommendation:

Incorporate the substitive portions of the land use and exposure sections of the impact statemnt for consistency.

1-2 **Deficiency:** Section 1.2, p. 1-3

In the description of data gathering goals, it is stated that releases to groundwater will be addressed in the 100-BC-5 work plan and that the goals of 100-BC-1 are directed towards identifying the nature, extent, and concentration of contaminants in the vadose zone. Releases of contaminants from the vadose zone to groundwater is shown as the primary exposure pathway of the site conceptual model shown in Figure 3-17 and quantifying this release should be noted as falling within the scope of the 100-BC-1 RI/FS.

Recommendation:

Clarify the text of Section 1.2 and in particular the first bullet on p. 1-3 to note that quantification of contaminant releases from the vadose to groundwater is a data gathering goal of the 100-BC-1 RI/FS.

1-3 **Deficiency:** Section 1.2, Figure 1-3

The third bulleted item under "RI/FS Work Plan" is "Set Remedial Action Objectives". While preliminary remedial action objectives (RAO) can be identified in the RI/FS work plan, the RAOs that are used in the feasibility study should be in the FS report after the risk assessment is completed in the RI.

Recommendation:

Change Figure 1-3 to include RAOs as part of the FS tasks.

2-1 **Deficiency/Recommendation:** Section 2.1.4.1.1, p. 3-13

ph is written as "PH". This should be corrected.

2-2 **Deficiency:** Section 2.1.4.1.1, p. 2-14

The last sentence states the concentrations of radionuclides in the reactor cooling water were low during normal operations; however, low is not defined.

Recommendation:

Include actual values of typical cooling water radiation levels or a discussion of the monitoring capabilities used to measure radiation levels in reactor cooling water during normal operations.

2-3 **Deficiency/Recommendation:** Section 2.2.2.2.1, p. 2-26

The word "vadose" is misspelled as "vandose".

2-4 **Deficiency:** Section 2.2.3.2.4, p. 2-28

The shallow groundwater system beneath the 100-B/C Area is likely not recharged by losing reaches of the Columbia River north of the area, but rather west of the area.

Recommendation:

Change the wording to read "west of the area," and be sure to include the comma to make it clear that deep percolation of precipitation and snowmelt is not associated with losing reaches of the Columbia River.

2-5 **Deficiency:** Section 2.2.5.4, p. 2-32

The 7-inch actual average annual evapotranspiration noted here exceeds the 6.3-inch average annual precipitation noted in Section 2.2.5.1. What is the source of the additional .7-inch of evapotranspiration? Also, it is noted in the first sentence that mean annual evapotranspiration for the Tri-Cities is about 29-inches. This is likely the potential evaportranspiration and should be noted as such.

Recommendation:

Clarify the noted discrepancies. Also note that a more current reference, U.S. Geological Survey Water Resources Investigations Report, 88-4105, by H.H. Bauer, and J.J. Vaccaro indicates that mean annual potential evaportranspiration in the vicinity of the Tri-Cities and the Hanford Site is approximated by 42-inches.

2-6 **Deficiency/Recommendation:** Figure 2-3

Include a legend with this figure to interpret elevation units and other markings.

2-7 **Deficiency:** Figures 2-7 through 2-14

These geologic and well construction logs lack information that would help interpret the geology and hydrogeology of the formation.

Recommendation:

Add well logs for new wells drilled for ISV Demonstration to assist in geologic interprettion and supply additional geologic data on existing wells as available.

3-1 **Deficiency:** Section 3.1.1, p. 3-2

The three contaminant release areas of major concern are listed in the middle of this page. However, the discussion on the following pages do not explain the importance of these waste groupings.

Recommendation:

The identification these major release areas appears to be related to process activities and geographic areas. Explain the significance of these groups prior to a site-by-site evaluation.

3-2 **Deficiency:** Section 3.1, Table 3-1, p. 3-3

The 116-B-11 Basin Sludge Burial Trenches described on page 3-11 should be included in this table.

Recommendation:

These trenches need to be entered into the WIDS data base and given distinct site numbers. Inclusion in the Summary Table of Sources is required.

3-3 **Deficiency/Recommendation:** Figure 3-4

Sample boring "A" in this figure is in the 116-B-3 Pluto Crib. The text at the top of page 3-29 states that this sample location is actually in the 116-B-4 Crib. If this is true, the figure should be changed to avoid confusion.

3-4 **Deficiency/Recommendation:** Sections 3.1.1.3.9 and 3.1.1.3.10, p. 3-32

The locations of Crib 116-B-12 and the Battery Acid Sump should be presented in Figure 3-1.

3-5 **Deficiency:** Section 3.1.3.2, p. 3-43

In the second paragraph, it is stated that pesticides, herbicides, and semivolatile organics have not been detected in the groundwater in the 100-B/C Area. However, there is no information presented in this work plan or in 100-BC-5 to indicate that, if any, organic constituents were sampled for and from which wells the samples were collected.

Recommendation:

Include a table in the work plan that contains a list of organic constituents that have been analyzed for in the 100-B/C Area and the wells from which the samples were taken and in the text include a description of the time period in which the samples were taken.

3-6 **Deficiency:** Section 3.1.3.3.1, p. 3-47

We do not agree with the interpretation of persistent tritium concentrations. Diffusion from low permeability sediments is driven by a concentration gradient and should show a decreasing trend over time. Taking into account the 12-year half-life decay of tritium and the relatively constant concentration observed in groundwater, it appears that the release from the tritium source is actually increasing in time. We, therefore, conclude that the interpretation contained in the work plan is not correct. An alternate hypothesis is that the source of tritium is within the vadose zone and that tritium is being released to groundwater as a result of recharge from infiltrating precipitation.

Recommendation:

Reconsider the tritium hypothesis and propose a more likely alternate. Adjust the work plan approach to test the most likely hypothesis, for example, drill through the 116-B-5 crib and measure tritium in the porewater samples.

3-7 **Deficiency/Recommendation:** Section 3.1.3.3.1, p. 3-47

The notation for nitrate (NO^3) should be NO_3. Please revise.

3-8 **Deficiency:** Section 3.1.3.3.8, p. 3-53

The slightly higher temperatures measured in well 699-72-88, are likely not due to mixing with surface waters of the Columbia River. The water temperature measured in this well (Figure 3-11) ranges between about 18 and 22^{0}C. The Columbia River has a mean temperature of about 10.5^{0}C as measured below Priest Rapids Dam and exceeds 18^{0}C for only about 57 days each year. It, therefore, appears unlikely

that the Columbia River would elevate groundwater temperatures consistently above 18^{0}C as shown in Figure 3-11, but would rather have the opposite effect especially during the high spring flows when river waters are cool.

Recommendation:

Revise the text with a more plausible explanation for the temperature discrepancies. Could well 699-72-88 be affected by the same thermal plume as wells 699-65-83 and 699-67-86?

3-9 **Deficiency:** Section 3.1.7.2, p. 3-59

A groundwater mound is noted to have existed in the past in the 100-B/C Area and to have potentially influenced the distribution of contaminants in the lower part of the vadose zone, yet no data are presented in the work plan that show the extent of the mound.

Recommendation:

Using the best available information, include a figure showing the height and lateral extent of the groundwater mound in the 100-B/C Area. Include this figure in both the 100-BC-1 and 100-BC-5 work plans so that the data collection networks can be evaluated with respect to the expected distribution of contaminants resulting from this mound.

3-10 **Deficiency:** Section 3.1.7.2, p. 3-59

The present conceptual model assumes that infiltration and recharge are on the order of a few tenths of an inch per year in the 100-B/C Area. We believe that is not supported by the most current information on recharge at Hanford. The waste management units in the B/C Area are generally overlain by coarse soils with little or no vegetation. Under these conditions there may be substantial infiltration and recharge on the order of 60 percent of annual precipitation, or about 4-inches per year.

Recommendation:

As stated in the conceptual model, contaminants may reach groundwater via infiltrating precipitation. This may be an important contaminant migration pathway and as such should be a major focus of the 100-BC-1 RI/FS. Include a more detailed discussion of infiltration and recharge in the conceptual model using the most current information available from Westinghouse and Battelle sources. Also include infiltration and recharge as a data gap requiring further work to confirm the conceptual model in Section 4.1.2.1.

3-11 **Deficiency:** Section 3.1.7.7, p. 3-60

This section needs to be revised to acknowledge past stack emission as a potential source of surface contamination available for resuspension.

Recommendation:

Revise section to acknowledge past air releases and potential resuspension of previously contaminated surface soils.

3-12 **Deficiency:** Section 3.3.3.3, p. 3-73

The information given in the contaminant mobility section does not reflect the existing knowledge of contaminant mobility at Hanford.

Recommendation:

Review existing documents on contaminant mobility, like the Hanford Defense Waste-Environmental Impact Statement and use site specific values for mobility. One specific examples of inconsistency between this section and existing data can be made for uranium. Uranium forms a highly mobile, negatively charged anion in the presence of the high carbonate groundwaters at Hanford.

3-13 **Deficiency:** Section 3.3.5.1, p. 3-75

The discussions of the risk assessment scenarios appears to be incomplete and inconsistent with those scenarios used in NEPA documents for Hanford.

Recommendation:

Review the available environmental impact statements and develop consistent scenarios.

3-14 **Deficiency/Recommendation:** Section 3.3.5.1, p. 3-75

Cite the reference source for the allowable limit for radiation workers (5 rem/year).

3-15 **Deficiency/Recommendation:** Section 5.3.8, p. 5-52

The last sentence should also include the reference "EPA (1989c)".

3-16 **Deficiency:** Figure 3-15

Figure 3-15 incorrectly indentifies the location of the 100-F sloughs as that is the Wahluke Slope Ponds and wasteway.

Recommendation:

Remove the designation from the figure.

3-17 **Deficiency:** Figure 3-17

As noted previously, quantifying the release of contaminants from the vadose to groundwater should be a primary focus of the 100-BC-1 RI/FS. However, in Figure 3-17, the site risk assessment conceptual model does not show infiltration as an activity that is associated with the 100-BC-1 operable unit.

Recommendation:

The infiltration block in Figure 3-17 should be shaded to indicate that it is an activity that is associated with the 100-BC-1 operable unit.

3-18 **Deficiency:** Figure 3-18

We do not see how this figure constitutes a vadose zone model. If anything, it appears to be a rough sketch of the hydrologic cycle, and a poor one at that. Recharge is shown to occur only at the upper elevations of Gable Butte when, in fact, the majority of recharge probably occurs at the basalt, sand/gravel, interface shown in the figure. Also, no recharge is shown to occur through the unconsolidated deposits when, in fact, some recharge is likely to occur, and quantifying this recharge should be a major focus of the 100-BC-1 RI/FS. A gravel/fine sand with clay interface is also shown to occur within the basalts. If this is an interflow zone, the dip is incorrect, but more likely it is just an error. Evaportranspiration is also missing from the figure. What is the fate of distributed inflow shown in the figure? Also, what is the present conceptual model of contaminant distribution within the vadose zone?

Recommendation:

Characterizing the distribution of contaminants within the vadose zone and quantifying their potential movement to groundwater is a primary objective of the 100-BC-1 RI/FS. Therefore, a complete and accurate conceptual model of the vadose zone should be included within the work plan. Completely revise Figure 3-18 and include the most accurate information on the physical make up, water balance, and distribution of contaminants within the vadose zone. Use this conceptual model in describing the identification of data gaps in Section 4.1.2.

4-1 **Deficiency/Recommendation:** Section 4.1.1, p. 4-2

The list of waste categories should include mixed waste, since mixed waste poses special remediation problems that are not entirely the same as those for hazardous or radioactive wastes.

4-2 **Deficiency/Recommendation:** Section 4.1.1.4, p. 4-3

The statement that discusses PCB contamination is unclear as to whether no data was taken or none was supplied to the work plan authors. Please clarify.

4-3 **Deficiency:** Section 4.1.2.1, p. 4-5

The existing data of contamination in the vadose zone indicates that contamination extends below the depth of past sampling. We, therefore, have little idea of the extent of contaminants with depth. In the second bullet on p. 4-5, the data gap is noted to pertain to only the shallow vadose zone when, in fact, we have more and better information on the extent of contamination in the shallow vadose zone than at depth.

Recommendation:

Include the whole vadose zone in the second bullet.

4-4 **Deficiency:** Section 4.1.2.2, p. 4-5 and 4-6

Important information to be used as input to unsaturated flow and solute transport models includes the quantity of infiltration and recharge, the soil unsaturated hydraulic conductivity and its relation to matric potential or moisture content, and the relation between the matric potential and moisture content of the soil. This information will be required for the baseline risk assessment, but is not noted here.

Recommendation:

Include a description of soil hydraulic characteristics data required for the baseline risk assessment.

4-5 **Deficiency:** Section 4.1.2.2, p. 4-6

The last sentence of the section states that "Specific computer models for describing the flow of contaminants in the vadose zone will be identified and used following evaluation of the above data." It makes little sense to us to select a model after collecting and evaluating input data. It makes better sense to consult the appropriate models, evaluate them with respect to the site conceptual model, note their data rquirements, and devise a data collection network that will provide data that are compatible.

Recommendation:

Consult with the Westinghouse Performance Assessment Group. Familiarize yourself with unsaturated flow and transport models being developed and bench marked for Hanford. Specifically note the appropriate models in the work plan and describe their data requirements.

4-6 **Deficiency:** Section 4.2.1, p. 4-9

No discussion is presented in this section on either the past stack emissions or the 116-B-6A ISV Demonstration.

Recommendation:

Revise this section to discuss other existing data.

4-7 **Recommendation:** Table 4-1

The soil/vadose zone data needs:

1) Replace hydraulic conductivity/transmissivity with unsaturated hydraulic conductivity-matric potential relationship.

2) Add matric potential - soil moisture content relationship.

3) Add infiltration or recharge (precipitation-evaportranspiration).

4-8 **Deficiency:** Section 4.2.8, p. 4-11 and Table 4-2, p. 4-17

A complete field/laboratory screening procedure using XRF and head-space GC/MS procedures was devised and approved in the 300-FF-1 RI/FS work plan. In this procedure it was agreed that field/laboratory screening would be conducted in Stage I sampling and that the results would be statistically compared to full CLP analyses before applying the field/laboratory screening procedures in Stage II sampling. This preliminary Stage I test is not noted in this work plan.

Recommendation:

Review the field/laboratory screening procedure in the 300-FF-1 RI/FS work plan and in appropriate Westinghouse guidance documents, and incorporate the approved strategy in this work plan.

4-9 **Deficiency/Recommendation:** Table 4-3

Sufficient data is not available on the water holding capacity of 100 Area sediments. Withdraw this statement.

5-1 **Deficiency:** Section 5.3.1.6, p. 5-16

GPR is noted to be effective to depths of about 15 feet. In the coarse dry soils found at Hanford, this technique has been shown to be effective to a much greater depth.

Recommendation:

Investigate the past application of GPR at Hanford. Revise the wording of this section, and consider using GPR for applications deeper than 15 feet if appropriate.

5-2 **Deficiency/Recommendation:** Section 5.3.1.7, p. 5-17

The limitations of soil vapor surveys should be clearly stated. For example, moisture in the soil can affect the results and may indicate groundwater contaminations, such as floating hydrocarbon product, and not necessarily soil contamination. Also, because this area has not been used much in 20 years, there may not be any volatile compounds left to detect.

5-3 **Deficiency/Recommendation:** Section 5.3.1.9, p. 5-18

If possible, it would be valuable to attach a simple radiation survey meter to the remote video survey unit to identify highly radioactive locations within the piping. Evaluate the feasibility of such a request.

5-4 **Deficiency/Recommendation:** Section 5.3.3.10.3, Table 5-2, pp. 5-21 and 5-22

For complete characterization, samples from the effluent discharge lines should be field screened for organics. Because Section 3.1 states that potentially hazardous chemical constituents were added to the process waters at the 100 B/C complex, a quick field screen for organic compounds may be beneficial.

5-5 **Deficiency:** Section 5.3.3, p. 5-25

The objective of Stage I drilling is to determine the nature and vertical extent of contamination beneath high priority waste management units. Drilling directly through the waste management units will better accomplish this objective than will the proposed offset drilling. Drilling through the waste management units has been successfully accomplished in the past at Hanford and is proposed for the 200-BP-1 and 300-FF-1 RI/FSs.

Recommendation:

Drill directly through the waste management units for Stage I drilling. Do offset drilling in Stage III as planned to determine lateral extent of contamination.

5-6 **Deficiency:** Table 5-2

Footnote "a" contains the list of radionuclide analyses for source sampling. This list does not contain many of the radionuclides proposed for analyses in the Stage I sampling program as shown in Table 5-8.

Recommendation:

Source sampling should provide the broadest range of analyses in the RI/FS. Therefore, expand the list of constituents noted in Footnote "a" to include those listed in Table 5-8. Based on the results of Tasks 1a and 1j, the list of constituents for the borehole sampling program (Table 5-8) may be shortened.

5-7 **Deficiency:** Section 5.3.3.3.1, p. 5-33 and Section 5.3.3.3.3, p. 5-45

The state objective of Stage II drilling is to complete source characterization and to determine the potential for contamination migration to groundwater. Stage II drilling is proposed for areas in which contamination was observed to penetrate deeper than could be sampled with a backhoe, about 15 feet. Yet, Stage II drilling is proposed to extend to only 30 feet. We see no reason to stop until the full vertical extent of contamination is characterized.

Recommendation:

If contaminants are still present at 30 foot depth, then drilling and sample collection for Stage II holes should continue until either contamination is no longer found or until the water table is intercepted. We note that this approach is described on p. FSP-35. Include a similar description in Sections 5.3.3.3.1 and 5.3.3.3.3 for clarity.

5-8 **Deficiency:** Section 5.3.3.31, p. 5-39

Boreholes will be drilled in Stage I to 10 feet below the water table, but no aquifer material samples are proposed to be collected. Saturated sediments directly below waste management units are likely to be the most contaminated part of the aquifer and may serve as a source for groundwater contamination. Saturated sediment samples collected from these boreholes will provide the best material for conducting desorbtion experiments.

Recommendation:

As noted in the comments to the 100-BC-5 RI/FS work plan, saturated sediment samples should be collected from the Stage I boreholes

9 0 1 1 8 3 0 6 1 4

drilled directly through selected was management units. These samples should be used in an evaluation of degree of contamination of the aquifer matrix, and for desorbtion experiments. This activity is largely within the scope of the 100-BC-5 RI/FS and should be noted in Section 5.3.3.3.2 of the 100-BC-1 work plan and more fully described in the 100-BC-5 work plan.

5-9 **Deficiency:** Section 5.3.8.2, p. 5-54

It is our understanding that a standard set of flow and solute transport models has been selected for use in all Hanford RI/FSs and that these models are being bench marked. The 100-B/C Area should be relatively similar to other 100 Areas and the same set of flow and transport models should be applicable to each of the 100 Area. The appropriate models are not specifically discussed in this work plan.

Recommendation:

In order to compare the results of different operable unit RI/FSs, we recommend using a standard set of flow and transport models in each RI/FS. These models should be specifically noted in the work plan in the description of the Exposure Assessment, Section 5.3.8.2 in this work plan.

5-10 **Deficiency/Recommendation:** Section 5.4, p. 5-56

For clarity, state that the 100-BC-1 feasibility study (FS) will concentrate on source control options, while the 100-BC-5 FS will concentrate on groundwater remediation.

5-11 **Deficiency:** Section 5.4.3, p. 5-58

The example "hypothetical groundwater situation" may not be appropriate for a source operable unit work plan.

Recommendation:

The example should be for a hypothetical source control action.

5-12 **Deficiency:** Section 5.4.4, p. 5-58

The text identifies two steps that will be taken to reduce the list of technologies, however, only one step is provided.

Recommendation:

Include the second step.

100-BC-1 OPERABLE UNIT

FIELD SAMPLING PLAN COMMENTS

1. **Deficiency:** Section 2.4.1 and 2.4.2, p. FSP-7

   The term "background" should be defined before the radiation survey is used to identify anomalies.

   Recommendation:

   Any determination of background radiation from outside a source operable unit boundary should be evaluated against off-site background soil samples. This is due to the potential for distant surface contamination by air transported contaminants beyond the physical operable unit boundaries. Choosing background area is based on the absence of radiation related operations is not sufficient. The on-site background condition is further questioned due to overlapping boundaries of radiation producing operations as potential sources of airborne radioactive contaminants from other units.

2. **Deficiency/Recommendation:** Section 2.4.2, p. FSP-7

   Explain why a "9514-ft^2" area outside of the 100-BC-1 operable unit will be selected as background for the surface radiation survey.

3. **Deficiency:** Section 2.4.4., p. FSP-9

   The range of values for an "anomaly" is not identified.

   Recommendation:

   Given the wide range of limitations stated for the various types of radiation detection equipment described, a reasonable range should be defined to identify anomalous readings.

4. **Deficiency/Recommendation:** Section 2.7.2, p. FSP-14

   According to the text, "It is not necessary to perform a soil vapor survey at all seven septic tanks if results are negative for the trial tank." This may be true, however, measurements should be taken in all tanks using screening instrument such as a photoionization detector (Hnu) or an organic vapor detector to substantiate this claim.

5. **Deficiency/Recommendation:** Sections 2.7.4 and 2.8, pp. FSP-16 and FSP-17

   The exact methods and instruments used for the soil vapor surveys and the mercury vapor surveys should be stated and approved prior to use.

6. **Deficiency:** Section 2.7.5, p. FSP-16

The methods to be used for soil vapor samples are not described in sufficient detail.

Recommendation:

References should be given to an approved method or other established methods that use a bag or other container for sampling volatile organic compound vapors. Discuss whether vapors from such compounds will remain in a vapor state at a representative concentration in the air in a tedlar bag (at ambient pressure and temperature, and over time). An alternative to "containing" the samples would be to use an organic vapor analyzer (OVA) with a flame ionization detector (FID), combined with a gas chromatograph in the field. This would give screening information only.

7. **Deficiency:** Section 2.10.2, p. FSP-19

The text describes how samples will be screened in the field but does not indicate what compounds or analytes will be screened for.

Recommendation:

Specify the type of screening.

8. **Deficiency/Recommendation:** Table FSP 4-2, p. FSP-25

The parameters listed under "Primary Data Gap" and the terms "VOA", "TCL", and "RAD" should be defined, beyond explaining the initials. Specific parameter lists should be referenced.

9. **Deficiency:** Table FSP 4-1, p. FSP-29

In Footnote "a", it is noted that a large body of existing data on soil characteristic curves has been collected by PNL. To the best of our knowledge, there is very little existing data on soil characteristic curves for the Hanford Site, and none at all for 100 Area soils.

Recommendation:

Present the appropriate data in an appendix or provide the appropriate references. If appropriate data are not found to exist, include in the work plan a description of how such data will be provided. Also, add the unsaturated hydraulic conductivity to pressure head relationship to the list of soil physical parameters in Table FSP-4-1.

9 0 1 1 8 8 3 0 6 1 7

10. **Deficiency:** Section 4.3.1, p. FSP-35

It is not specifically stated what criteria will be used to distinguish contamination or the lack of contamination when making the determination of whether to stop or continue drilling a Stage II borehole.

Recommendation:

Specifically describe the appropriate criteria.

11. **Deficiency:** Figure 6-1

There is a 3 month lag between completing Stage I drilling and beginning Stage II drilling. The selection of sites for Stage II drilling is largely based on the results of Tasks 1j, Source Sampling, and 3b, Test Pit Sampling, and is largely independent of the results of Stage I drilling. We, therefore, see no need to delay the field investigation and critical path for 3 months to completely analyze Stage I results before beginning Stage II drilling.

Recommendation:

Advance the schedule for Stage II drilling by 3 months, advance the initiation of Task 7c, Soil Data Evaluation, by 2 months to begin at the completion of Task 3b, Test Pit Sampling, and adjust the critical path accordingly.

100-BC-1 OPERABLE UNIT

QUALITY ASSURANCE PROJECT PLAN

1. **Deficiency/Recommendation:** Table of Contents

A distribution list of names should follow the Table of Contents.

2. **Deficiency/Recommendation:** Section 2.0, p. QAPP-3

Include a project organizational chart.

3. **Deficiency/Recommendtion:** Section 3.0, p. QAPP-5

Clarify the sentence "Once methods are approved in compliance with standard procurement control procedures (as noted in Section 4.1), Table QAPP 3-1 shall be revised to reference approved detection limits, precision, and accuracy criteria as project requirements."

The sentence appears to contradict Table QAPP 3-1, which presents well established CLP SOW (1988a, 1988b) detection limits, and precision and accuracy criteria.

4. **Deficiency/Recommendation:** Section 3.0, p. QAPP-5

The percent completeness given is "at least 90 percent". This does not agree with the 95% given in Table QAPP 3-1.

5. **Deficiency:** Table QAPP 3-1, pp. QAPP-6 through QAPP-15

Several errors in this table must be addressed. For example the analytical methods listed are not properly described or referenced. "NA" is listed in several columns and not explained. For many "NAs", values do not exist from EPA methods. Also, the "Category" parameter descriptions are not specific.

All CLP methods should be referenced to either the CLP SOW for either organics and inorganics (1988a, 1988b). Non-CLP methods should also be referenced correctly. Specific parameters lists, such as CLP SOW volatiles TCL (1988a), should be given. It is not clear whether CLP SOW pesticide/PCB TCL (1988a) parameters are included in "Organic Scan". Target detection limits should be contact required detection limits (CRDL) for all CLP parameters, TAL, and TCL (1988a, 1988b).

6. **Deficiency/Recommendation:** Section 4.2.2, p. QAPP-17

The information on sample container requirements in this document should be presented in a table. At minimum the specifications should meet the CLP User's Guide (1988a).

7. **Deficiency/Recommendation:** Table QAPP 4-1, pp. QAPP-19 and QAPP-20

Several procedure documents relevant to the RI/FS are designated as "In preparation". Explain

8. **Deficiency/Recommendation:** Section 5.1, p. QAPP-21

Include a copy of the chain-of-custody form in this section.

9. **Deficiency/Recommendation:** Section 7.0, p. QAPP-23

Explain the sentence "Once individual laboratory statements ... approved detection limits, precision and accuracy criteria as project requirements". The statement does not agree with the information in Table QAPP 3-1 or information in other sections.

Change "equipment blank" to "equipment rinsate blank", and "trip blank" to "VOA trip blank". The trip blank will be analyzed for volatile organic compounds only; one VOA trip blank should be used for every cooler shipped.

11. **Deficiency/Recommendation:** Section 9.0, p. QAPP-26

The last word should be "less" instead of "greater". "Matrix spike" should be changed to "matrix spike/matrix spike duplicate (MS/MSD)" and be defined consistent with EPA documents (1988a, 1988b).

12. **Deficiency/Recommendation:** Section 9.0, p. QAPP-27

The last word should be "less" instead of "greater".

13. **Deficiency/Recommendation:** References

Several documents are missing. None of the CLP documents are included (see references attached).

14. **Deficiency/Recommendation:** Appendix C, p. QAPP C-3

The precision definition should be changed to be consistent with the CLP SOW (1988b). The definition should include relative percent difference (RPD).

15. **Deficiency/Recommendation:** Appendix C, p. QAP C-4

"Trip blank" should be changed to "VOA trip blank".

ADDITIONAL REFERENCES

EPA* 1989. Risk Assessment Guidance for Superfund, Volume II, Environmental Manual, EPA/540/1-89/001.

EPA 1988a. U.S. EPA Contract Laboratory Program, Statement of Work for Organic Analysis. Office of Solid Waste and Emergency Response, December 1988.

EPA 1988b. U.S. EPA Contract Laboratory Program, Statement of Work for Inorganic Analysis. Office of Solid Waste and Emergency Response, December 1988.

EPA 1988c. User's Guide to the Contract Laboratory Program, U.S. EPA Office of Solid Waste and Emergency Response, December 1988.

EPA 1986. Test Methods for Evaluating Solid Wastes, SW-846, third edition. Office of Solid Waste and Emergency Response.

EPA 1983. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, QAMS-005/80, December 29, 1980. Office of Monitoring Systems and Quality Assurance, Office of Research and Development. EPA-600/4-83-004.

*U.S. Environmental Protection Agency

CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
D. R. Sherwood, EPA	J. D. Goodenough, DOE-RL	9002772

Subject: REVIEW OF THE DRAFT REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN FOR THE 100-BC-1 OPERABLE UNIT, HANFORD SITE, RICHLAND, WASHINGTON

INTERNAL DISTRIBUTION

Approval	Date	Name	Location	w/att
		Correspondence Control	A3-01	X
		President's Office	B3-01	
		M. R. Adams	H4-55	X
		B. A. Austin	B2-20	X
		R. J. Bliss	B3-04	X
		L. C. Brown	H4-51	X
		C. DeFigh-Price	B2-20	X
		K. R. Fecht	H4-56	X
		V. W. Hall	B2-15	X
		K. L. Hoewing	B3-06	X
		W. L. Johnson	H4-55	X
		R. E. Lerch (Assignee)	B2-35	X
		H. E. McGuire	B2-35	X
		K. Parnell	H4-18	X
		D. E. Simpson	B3-51	X
		J. L. Waite	B2-35	X
		S. A. Wiegman	B2-19	X
		T. M. Wintczak	B2-15	X
		R. D. Wojtasek	B2-15	X
		EDMC	H4-22	X
		TPAI File (DH)	B2-35	X

RECEIVED
JUL 05 1990
CORRESPONDENCE CONTROL