Colorado Department of Health

Review and Comment

Draft Phase I RFI/RI Workplan for OU 10
November, 1991

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General Comments:

1) As is indicated in the following comments, it appears that this workplan has not been formulated with the benefit of the latest methodologies that the regulatory agencies have approved in other RFP Operable Units. For instance, the conceptual model presented in this workplan is very sketchy and not on par with the equivalent sections in Workplans for OUs 3, 5, and 6. The Field Sampling Plan (FSP) is not consistent with several other sampling plans, particularly in the area of subsurface soil sampling. When preparing the final version of this workplan, every effort should be made to make this plan both complete and consistent with other workplans.

2) An issue that has become crucial in the other plant-site OUs, and may well affect FSP implementation in this OU, is equipment accessibility. For the investigations planned for this OU, accessibility could be a problem for drilling rigs. Before the final version of this workplan is prepared, please assess the impact this problem may have on the proposed FSP and modify the plan appropriately.

3) IHSS 124 (124.1, 124.2, and 124.3) has been moved to OU 9 since it is more properly a part of the Original Process Waste Line system. Therefore, all sections of this workplan that concern IHSS 124 can be removed (sections 2.1.1, 2.2.1, and 7.3.1).

Specific Comments:

Executive Summary, page ES-2: The last paragraph on this page gives the four steps in which the RFI/RI field program will be conducted. Several items presented in this paragraph concern the Division. First, installation of monitoring wells is given highest priority. At this point in the investigation, it is unclear to us

where the monitoring wells should go, how they should be screened, or even if monitoring wells are the appropriate tool to be used. Later in the document, DOE states that these wells are needed to establish the groundwater gradient and gradient direction at each IHSS. However, most of the IHSSs in this OU are only getting one well, which cannot, by itself, determine these parameters. In addition, the inclusion of groundwater monitoring in this Phase I investigation is not required. Phase I needs only to investigate the "source and soils" per IAG Section I.B.11.

Second, Step 4 states that groundwater sampling will be undertaken downgradient of hot-spots with a BAT sampler. In the FSP, the Division found no mention of the BAT sampler in the IHSS specific plans, only in the introduction. In the IHSSs where the BAT sampler could potentially be used, text describing the planned strategy is required (this could take the form of a technical memorandum). Again, this is not a Phase I issue and could be delayed to the Phase II investigation. In any event, please be sure that this section of the Executive Summary is consistent with the remainder of the text.

Figure 1.3-4: Previous workplans have used a more accurate stratigraphic column. Please replace this version with the version used in the other workplans.

Section 2.0: General Comment 1: Each IHSS discussed in this section has a subsection entitled "Nature and Extent of Contamination." In many of these subsections, contaminant levels are compared to "Background." Please add a section to the text that explains how background was determined and/or where the values for background are presented. In addition, please explain how these values tie in to, and coordinate with, the site-wide Background Geochemical Report.

Section 2.0: General Comment 2: Each IHSSs discussed has a subsection entitled "Previous Investigations." In many of these subsections text similar to following can be found:

> "Subsequent to submittal of the Closure Plan, soil samples were obtained in 1988 from the approximate locations shown in Figure X. Only 40 percent of the proposed soil samples were collected while awaiting final approval of the Closure Plan."

The Division has found it difficult to interpret the meaning of the text. Please explain whether or not the remaining samples were ever collected and analyzed, and whether Figure X represents only those samples that were collected.

Section 2.1.3.1: The second paragraph on page 2-23 refers to a "cleanup" of this IHSS that occurred at some point in the past. Please expand the explanation of this cleanup in the text and include where the cleanup took place, what was cleaned up, and where cleanup materials were placed.

Section 2.1.15.1: The text states that all material will be removed from the 904 Pad by October, 1991. Please revise the text to indicate the present condition of Pad 904 and indicate whether the materials were, in fact, removed.

Section 2.1.15.3: Please update the geological information presented in this section to conform with the latest interpretations and data.

Section 2.1.16.3: Please refer to the previous comment and apply it to this section.

Section 2.2: General Comment 1: A pathway flowchart diagram was not included in this section and needs to be added (the Division suggests moving Figure 4.1-1 to Section 2.2). In addition, the pathways that will be addressed in Phase I versus Phase II need to be delineated. The Division has attached both a pathway flowchart diagram that has been used in other OUs and a modified version that represents the pathways we feel can be addressed in the Phase I investigation (please see attached Figures A and B). Previous staff level discussions concerning other OUs have concluded that Phase I RFI/RI Reports for each RCRA OU should include Baseline Risk Assessment calculations for each pathway that has been quantifiably investigated.

When these diagrams have been included in the text, the remainder of Section 2.2 should be revamped. The Division suggests the following changes:

1) Any discussion of sources should include all sources of contamination. This would include both the original source (tanks, spills, stored waste, etc.) which could be termed "primary" and any presently contaminated media (soil, groundwater, sediment, etc.) which could be termed "secondary." It is important that the terms "primary" and "secondary" only refer to the chronologic occurrence of the sources and not a speculation of their relative risk contribution. To be entirely consistent with workplans from other OUs, the term "primary" should be replaced by "historical", and the term "secondary" should be replaced by "current."

2) Any discussion of release mechanisms should include all release mechanisms that are reasonable given the conditions and contaminants at a site. Until the data is collected, analyzed, and the risk evaluated, confining the discussion to certain pre-conceived mechanisms is inappropriate at this point.

3) A similar point to those above can be made about the discussions concerning migration pathways. Text discussing pathways should cover all possible pathways.

Incorporation of the above ideas would greatly expand the existing discussions in the text. Therefore, the Division suggests that the pathways be referred to by number and that similar IHSSs be grouped

together so that only one discussion of sources, types of contamination, release mechanisms, and contaminant migration pathways would need to be prepared for each type of IHSS. In addition, it is only necessary to discuss those items which are specific to the Phase I investigation.

The Division does not believe that it is useful to comment on each individual subsection of Section 2.2. There are problems with each subsection relative to the above comments.

Section 3.0: The Division will withhold comments to this section until the site-wide potential ARAR issues have been resolved. We would like to point out, however, that due to the slow progress that has been made on the site-wide ARARs to date, the Division may withhold approval of this workplan until a more diligent effort on the ARARs is forthcoming.

Table 4-1: The fourth bullet on the first page of this table (Characterize groundwater flow regime . . .) needs to be expanded to include groundwater sampling and analysis. While not required as a Phase I activity, the wells will be there and might as well begin establishing a statistically significant data set in support of the Phase II RFI/RI. Groundwater contaminant data will also help all of us more completely understand any source and soil contamination.

The first bullet on the second page of the table also needs to be expanded to include the sampling and analysis that will be done in boreholes which are drilled in rad hotspots or soil gas plumes. In addition, the radiation survey will be done with the HPGe detector, not the FIDLER detector indicated.

Additional bullets need to be added to this table. The first could be entitled "Characterize the integrity of any remaining tanks within the IHSSs as well as material remaining in the tanks." Sampling activity associated with this bullet would include drilling and sampling boreholes along the outside of any tank locations, inspection of the tanks, and sampling any residual material remaining in the tanks.

The second additional bullet could be entitled "Characterize surface water in the IHSSs." The FSP outlines water samples to be taken, when appropriate, but this table omits this sampling type.

Section 7.0: General Comments

1) As mentioned previously, the Division is unclear about the usage of the term "background" as it applies to soil sampling in the Field Sampling Plan (FSP). Normally, to support closure under the Resource Conservation and Recovery Act (RCRA), soil background would need to be established in an uncontaminated area of the plant. However, at a complex site such as Rocky Flats, it may be

very difficult to establish the natural background levels for a specific hazardous waste management unit because of variations in natural background levels and the existence of wide-spread contamination that is not related to the specific hazardous waste unit. In such circumstances where it can be demonstrated that there is contamination from sources other than the hazardous waste unit, closure of the unit would involve removal of all contamination that exceeds the level of contamination from other sources. The remaining wide-spread contamination may be addressed through the corrective action process. In addition, as is always true, when clean closure cannot be attained, the unit must get a post-closure care permit and go into post-closure monitoring. From a practical standpoint, the FSP for each IHSS must be comprehensive enough to establish both the surrounding contamination levels as well as any excess contamination from the IHSS so that a decision on closure can be made. The Division makes this a general comment so that DOE can determine, prior to the submittal of the final version of the workplan, whether the existing plan can establish these parameters at each IHSS.

2) Previously approved soil sampling programs in other OUs have made an effort to distinguish between **soil cores** that will be collected to verify the soil gas survey (drilled to and sampled from a depth comparable to the depth that the soil gas samples were taken) and **soil borings** which help establish the nature and extent of any contamination (drilled to bedrock, sampled in various composite lengths depending on sample suite). The soil cores are randomly located on a percentage of the soil gas grid points. The number and location of soil borings is determined after the soil gas survey, radiation survey, and surficial soil data has been analyzed. The soil boring strategy is then submitted as a technical memorandum (TM 1) and usually includes borings in radiation hot-spots, plumes identified in the soil gas survey, and areas of other anomalous contamination. Please keep in mind that the Phase I investigation must completely establish the nature and extent of soil contamination. (Examples of borehole sampling programs from OU 2 are attached as Figures C and D.)

3) Surficial soil samples should be added whenever stained soil and/or stressed vegetation is observed. In addition, the term "hot-spot" used in the workplan should be defined so that it is clear that it applies to radioactive contamination in the traditional sense and other contamination in a relative sense.

4) Even though groundwater is technically not a Phase I issue, the Division recommends that if groundwater monitoring wells are drilled, they be drilled in an up- or down-gradient location from each IHSS. At a minimum, post-closure monitoring requires one monitoring well up-gradient from a unit and three monitoring wells down-gradient. If these Phase I wells are properly placed, they will serve both the goals stated in the workplan and the requirements of RCRA groundwater monitoring. It is the opinion of

the Division that the location for these wells should be chosen based on information and data collected while drilling the soil borings. These borings can help identify the groundwater gradient and gradient direction so that monitoring well placement can be optimized. A final decision on the location and strategy for monitoring well placement could be submitted as another technical memorandum (TM 2).

5) At several points in this FSP, reference is made to a "mobile lab." The latest understanding of the Division was that funding for a mobile lab was not available. Please clarify this issue.

6) Most of the IHSSs in this OU present problems that can be investigated with a similar strategy. The Division has attached to these comments generic diagrams (Figures E and F) that represents an investigation methodology which we believe makes sense and is consistent with other OU field sampling programs. These figures illustrate how we visualize the implementation of the preceding general comments. They create a staged implementation that utilizes the Observational Approach.

7) The data tables presented in the text should either be consolidated to fit within the appropriate subsection or removed from Section 7 and added as an appendix.

Section 7.2: As mentioned previously, the specific locations and IHSSs where the BAT sampler will be used need to be delineated in the subsections of section 7.3 to the greatest extent possible.

The last paragraph of this section states that soil gas and surficial soil sampling will not be used in smaller, paved sites. The following portions of the FSP render this point moot since these techniques will be used in all OU 10 IHSSs. Therefore, this section of the text can be removed.

Table 7-1: This table needs to be modified based on incorporation of the attached comments.

Section 7.3.2: The Division suggests that this investigation be expanded to include all four of the tanks located in this tank farm, particularly from the discussion presented in the HRR. As presented, part of this investigation will be to evaluate any leaks from Tank #4. However, other than incidents of known over-filling, the likelihood that Tank #4 leaked is no more or less than any of the other tanks. Furthermore, if an investigation of Tank #4 discovers contamination, it will be impossible to definitively attribute it to Tank #4 when three other tanks are in the immediate vicinity with similar storage histories.

To support RCRA closure, an inspection of the IHSS 129 tanks must be included in the FSP along with the sampling of any residues remaining in the tanks. Please refer to the protocols outlined in

the Phase I RFI/RI Workplan for tank inspections and sampling in OU 9 (Original Process Waste Lines).

It will be necessary tc closely investigate the competency (both present and past) of these tanks. To establish the presence or absence of leaked contaminants, it will be necessary to drill boreholes along each side of each tank. Please see the investigation protocols outlined for below-grade tanks in the OU 9 Workplan. Please add appropriate inspections, sampling, and borings.

We further suggest that the soil gas grid be tightened to 10' due to the overall size of each tank. We also question whether five surficial soil samples represent a statistically significant sample.

Section 7.3.3: It is not clear from the text why sediment and surface water samples are not applicable here. This IHSS covers a large area and is probably surrounded by drainage ditches or gutter that could be sampled. If this is, in fact, not the case and these sample types are inappropriate, disregard this comment.

Section 7.3.5: From the data presented in Section 2.1.5.4, a radiation survey for this IHSS is required.

Section 7.3.7: Sediment and surface water samples may be appropriate in this IHSS, particularly in any drainage along the road just south of the site.

The soil gas survey needs to extend northward far enough to surround the building with at least one ring of sample locations.

Section 7.3.9: Based on the waste storage history of this site in Section 2.1.9.1, a soil gas survey is needed to investigate this IHSS. In addition, to completely characterize the soil contamination, two samples located in the interior of the IHSS are probably not sufficient. According to the HRR, this investigation should be expanded westward at least to IHSS 208 and southward to the westward extending wing of Bldg 444.

Section 7.3.10: Analyses of samples from this IHSS need to include a pH determination.

Section 7.3.12: Analyses of samples from this IHSS need to include a pH determination.

Section 7.3.14: Investigations of other cargo containers within this OU have not included soil gas surveys. It is unclear to the Division why a soil gas survey is proposed in this IHSS.

Section 7.4.1: This section is inadequate to assure consistent and useable data. The collection method preferred by the Division for

surficial soil samples of the type expected in OU 10 is a "modified" RFP method (this method is explained in detail in Technical Memorandum 5 for the Phase III RFI/RI investigation for OU 1). This method uses the equipment described in OPS GT.8 for the RFP method and adds the use of a 1 meter by 1 meter template to collect 5 subsamples which are then composited for analysis. The Division has endorsed this method because it gathers more representative samples and collects enough material to do all necessary analyses (the use of sampling polygons in TM 5 would have to be modified in OU 10). This would obviate the need to collect the "grab" samples described in this section of the text. Using this modified RFP method will also assure that the data collected for this investigation will be comparable (PARCC) to data collected in other OUs. In addition, the surficial soil samples to be collected in this workplan should lend themselves to this sampling method.

The Division would like to add that EMD OP GT.8 does not satisfactorily delineate a methodology for gathering non-radionuclide surficial soil samples. Both rad and non-rad samples will be necessary to investigate the IHSSs in OU 10. In order to completely characterize soil contamination in OU 10, it may even be necessary to add vertical soil profile sampling.

Section 7.4.3: The Division believes that the soil gas survey samples should be collected from a depth of approximately 5 feet. This is the depth we have agreed to in other OU investigations and minimizes the chance for atmospheric leakage into the sample chambers.

Section 7.4.4: The drilling procedure and purpose for the soil borings need to be consistent with investigations in other OUs. For instance, soil borings are always drilled 5 to 6 feet into bedrock. They are sampled differently above and below the water table and are sampled differently depending on their purpose (source characterization versus plume delineation). For the purposes of this Phase I investigation for OU 10, the source characterization method would seem the most appropriate. It is stated in this section that bedrock samples will be collected during drilling, but the IHSS specific sections of the FSP say that samples will be collected to within 1 foot of the ground water table. Please clarify these apparent contradictions within the text. (Again, refer to attached Figures C and D. Including this type of diagram in the workplan would be very helpful.)

Section 7.4.7: This section states that groundwater monitoring wells will be sampled according to EMD OPS GW.6. However, Section 4 (DQOs) does not include any criteria for these samples. Please make this section consistent with Section 4.

In addition, text needs to be added at some point which describes that a minimum of four quarterly sampling rotations is needed to

support the RFI/RI Report.

Section 7.5.2: This section needs to include the detailed analytical program that is associated with each sample type. Please see attached Figures G and H for the Division's recommendations regarding this issue.

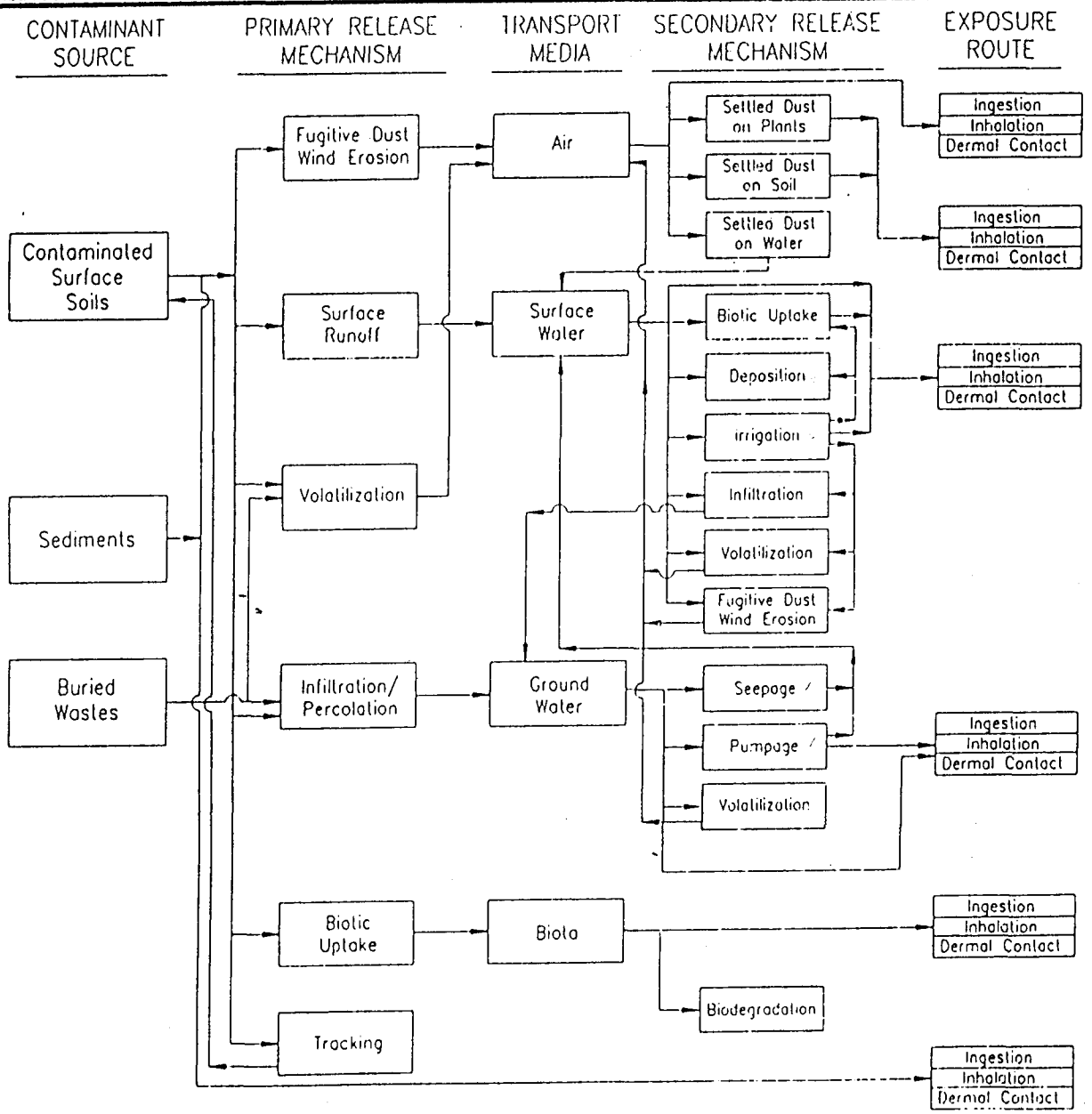


FIGURE A

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 6
PHASE I RFI/RI WORK PLAN

RISK ASSESSMENT
CONCEPTUAL MODEL

FIGURE 2-16

December 1991

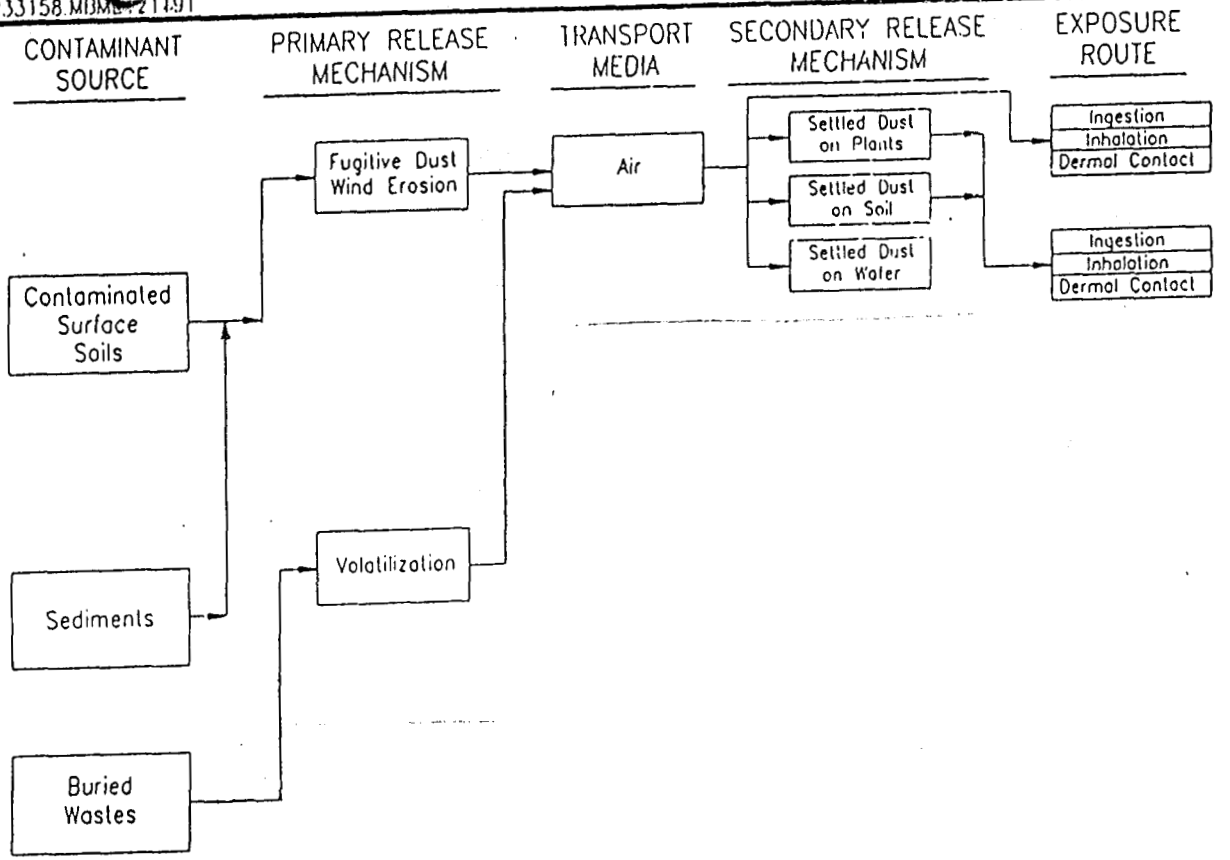


FIGURE B

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 6
PHASE I RFI/RI WORK PLAN

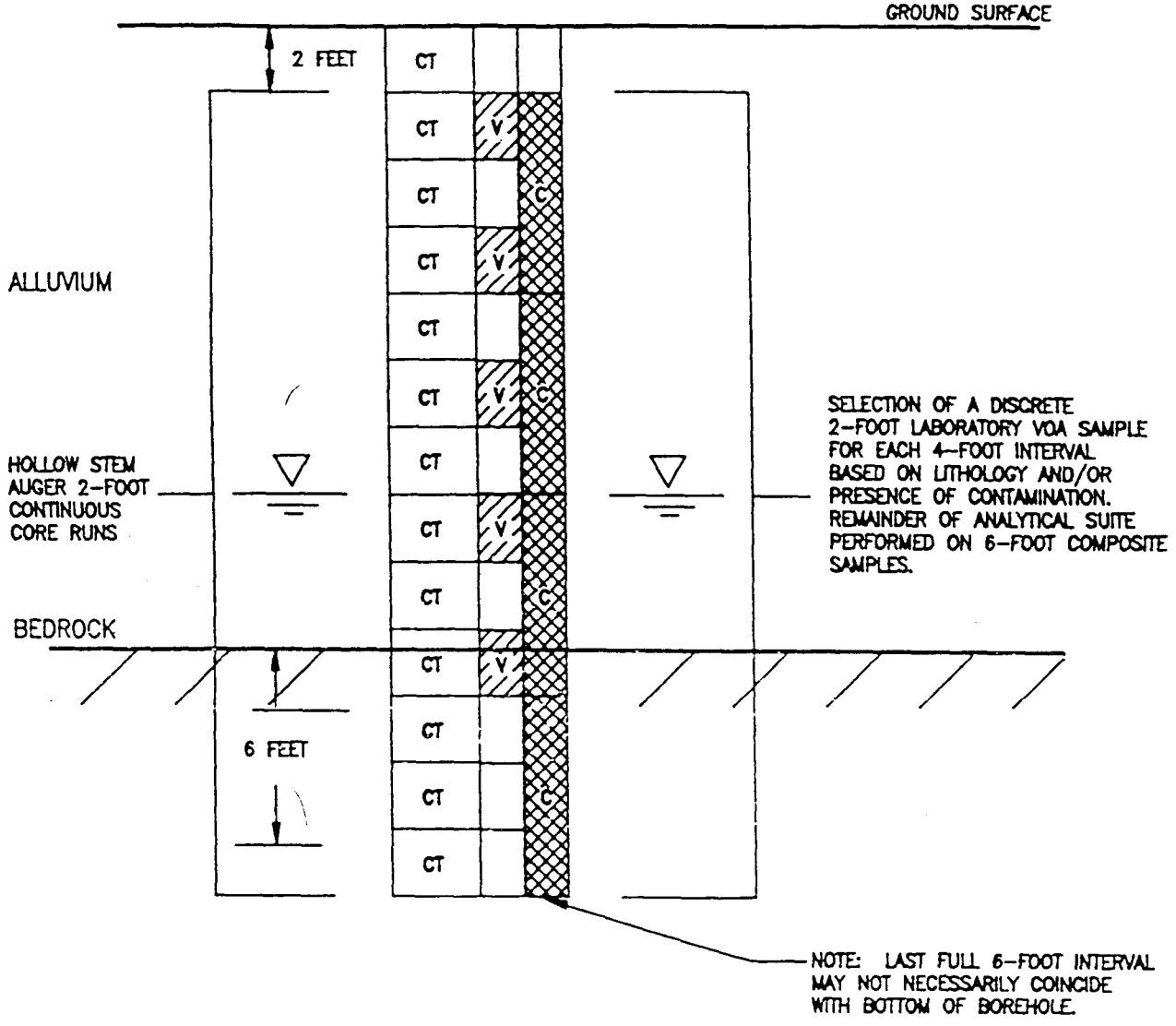
RISK ASSESSMENT
CONCEPTUAL MODEL

FIGURE 2-16

December 1991

FIGURE C

TYPICAL SOURCE CHARACTERIZATION
BOREHOLE IN ALLUVIUM



LEGEND

- CT — 2-FOOT CONTINUOUS HOLLOW STEM AUGER CORE RUN
- V — DISCRETE 2-FOOT LABORATORY SAMPLE FOR VOLATILE ORGANIC ANALYSIS
- C — COMPOSITED 6-FOOT INTERVALS FOR LABORATORY ANALYSIS OF REMAINDER OF ANALYTICAL SUITE

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT NO. 2
PHASE II RFI/RI WORK PLAN (ALLUVIAL)

LITHOLOGIC AND CHEMICAL SAMPLING FOR SOURCE CHARACTERIZATION BOREHOLES IN ALLUVIUM

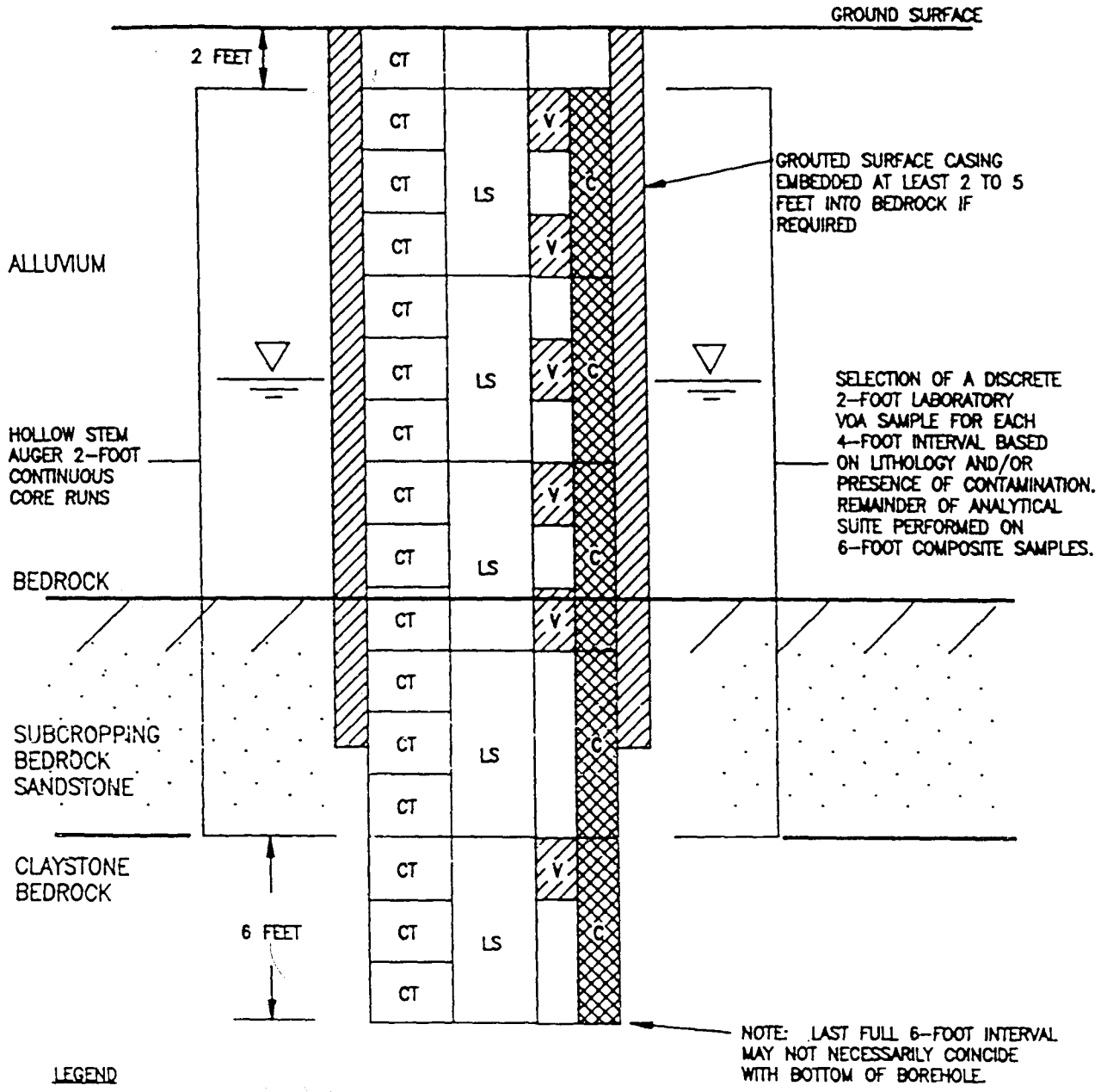
FIGURE 5-4

August, 1991

RO3138.CWp)-060791

FIGURE D

TYPICAL SOURCE CHARACTERIZATION BOREHOLE IN SUBCROPPING SANDSTONE



LEGEND

- CT — 2-FOOT CONTINUOUS HOLLOW STEM AUGER CORE RUN
- LS — LABORATORY SAMPLE FOR CHEMICAL ANALYSIS
- V — DISCRETE 2-FOOT LABORATORY SAMPLE FOR VOLATILE ORGANIC ANALYSIS
- C — COMPOSITED 6-FOOT INTERVALS FOR LABORATORY ANALYSIS OF REMAINDER OF ANALYTICAL SUITE.

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT NO. 2
PHASE II RFI/RI WORK PLAN (ALLUVIAL)

LITHOLOGIC AND CHEMICAL SAMPLING FOR SOURCE CHARATERIZATION BOREHOLES IN SUBCROPPING SANDSTONE

FIGURE 5-5

August, 1991

R33140.CWp]-080791

FIGURE E

OPERABLE UNIT 10
Typical IHSS Investigation

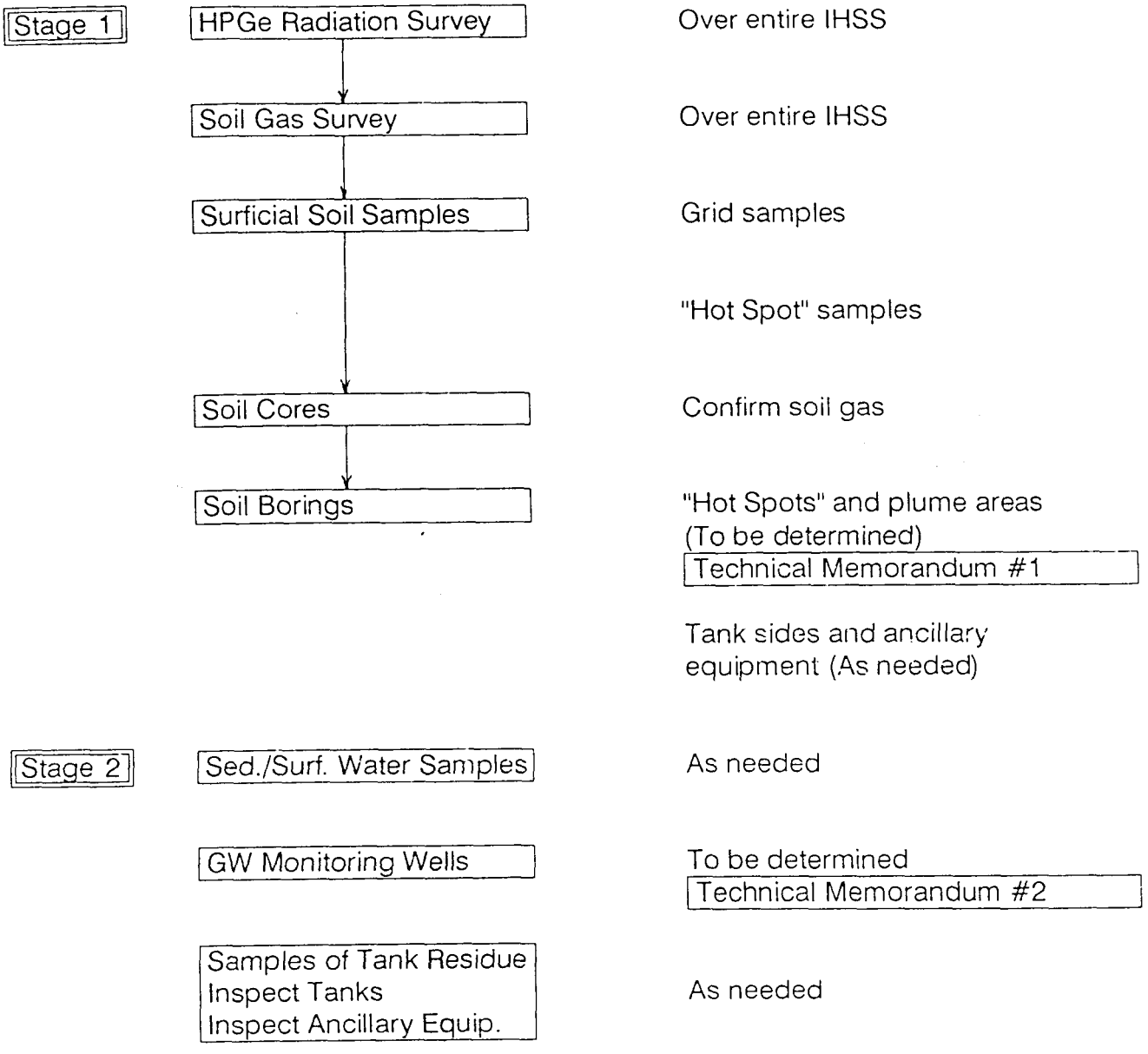


FIGURE F

Table 7-1

Phase I Investigation
Operable Unit 10

	Activity	Purpose	Location	Sample Number
1.	Radiation Survey	Identify areas of anomalous radiation readings	Entire IHSS area	IHSS dependent
2.	Soil Gas Survey	Locate plumes of volatile organics	Entire IHSS area - grid spacing IHSS dependent	IHSS dependent
3.	Soil Cores	Verify soil gas readings	1 random sample/?? soil gas samples; taken at depth of soil gas probe	IHSS dependent
4.	Surficial Soil Samples	a) Characterize Rad survey hot-spots	Within hot-spots	2 smpls/hot-spot
		b) Characterize surface contamination	On grid thruout IHSS	IHSS dependent
5.	Soil Borings	a) Characterize subsurface conditions and contamination	2 borings/hot-spot and borings in surface staining	To be determined Tech. Memo. #1
		b) Transect and sample plumes identified by soil gas	3 borings transecting each plume 1 boring at highest VOA reading and 2 add'l borings continuing downgradient from the first	To be determined Tech. Memo. #1
6.	Sample Sediment and Surface Water	Characterize surface conditions	IHSS area - as appropriate	IHSS dependent
7.	Install Groundwater Monitoring Wells	Begin to establish groundwater parameters	IHSS dependent	To be determined Tech. Memo. #2
8.	Inspect Tanks and Ancillary Equipment	Establish tank integrity	IHSS dependent	IHSS dependent
9.	Sample Tank Residue	Determine what remains in tanks	IHSS dependent	IHSS dependent

FIGURE F

Phase I Analytical Program
OU 10

IHSS	Sample Type	Media	Total U	Total Cr	Be	H3	Nitrate	Gross	Gross	U 233/234	U 235	U 238	Pu 239/240	Am 241	Cs 137	Sr 89/90
124	Surficial Soil Samples (grid)	Soil	X		X			X	X	X	X	X	X	X		
	Surficial Soil Samples (rad hotspots)	Soil	X					X	X	X	X	X	X	X	X	X
	Surficial Soil Samples (other hotspots)	Soil														
	Soil Cores (confirm soil gas)	Soil														
	Soil Borings (soil gas plumes)	Soil														
	Soil Borings (rad hotspots)	Soil			X			X	X				X	X		
	Soil Borings (tank sides)	Soil	X		X			X	X	X	X	X	X	X	X	X
	Sediment	Sediment	X		X			X	X	X	X	X	X	X		
	Surface Water	Water	X	X	X			X	X				X	X		
	Ground Water	Water	X	X	X	X		X	X				X	X		
	Tank Residue	Sludge	X	X	X			X	X				X	X		
129	Surficial Soil Samples (grid)	Soil														
	Surficial Soil Samples (other hotspots)	Soil														
	Soil Cores (confirm soil gas)	Soil														
	Soil Borings (soil gas plumes)	Soil														
	Soil Borings (tank sides)	Soil														
	Ground Water	Water														
	Tank Residue	Sludge														
170	Surficial Soil Samples (grid)	Soil	X		X		X	X	X	X	X	X	X	X		
	Surficial Soil Samples (rad hotspots)	Soil	X					X	X	X	X	X	X	X	X	X
	Surficial Soil Samples (other hotspots)	Soil														
	Soil Cores (confirm soil gas)	Soil														
	Soil Borings (soil gas plumes)	Soil					X									
	Soil Borings (rad hotspots)	Soil			X		X	X	X				X	X		
	Sediment	Sediment	X		X			X	X	X	X	X	X	X		
	Surface Water	Water	X	X	X			X	X				X	X		
	Ground Water	Water	X	X	X		X	X	X				X	X		
174	Surficial Soil Samples (grid)	Soil	X		X		X	X	X	X	X	X	X	X		
	Surficial Soil Samples (rad hotspots)	Soil	X					X	X	X	X	X	X	X	X	X
	Surficial Soil Samples (other hotspots)	Soil														
	Soil Cores (confirm soil gas)	Soil														
	Soil Borings (soil gas plumes)	Soil					X									
	Soil Borings (rad hotspots)	Soil			X		X	X	X				X	X		
	Ground Water	Water	X	X	X		X	X	X				X	X		
175	Surficial Soil Samples (grid)	Soil	X		X		X	X	X	X	X	X	X	X		
	Surficial Soil Samples (rad hotspots)	Soil	X					X	X	X	X	X	X	X	X	X
	Surficial Soil Samples (other hotspots)	Soil														
	Soil Cores (confirm soil gas)	Soil														
	Soil Borings (soil gas plumes)	Soil					X									
	Soil Borings (rad hotspots)	Soil			X		X	X	X				X	X		
	Ground Water	Water	X	X	X		X	X	X				X	X		

FIGURE G

IHSS	Sample Type	Media	Total U	Total Cr	Be	H3	Nitrate	Gross	Gross	U 233/234	U 235	U 238	Pu 239/240	Am 241	Cs 137	Sr 89/90
176	Surficial Soil Samples (grid)	Soil	X		X		X	X	X	X	X	X	X	X		
	Surficial Soil Samples (rad hotspots)	Soil	X					X	X	X	X	X	X	X	X	X
	Surficial Soil Samples (other hotspots)	Soil														
	Soil Cores (confirm soil gas)	Soil														
	Soil Borings (soil gas plumes)	Soil			X		X	X	X							
	Soil Borings (rad hotspots)	Soil	X		X		X	X	X	X	X	X	X	X	X	X
	Sediment	Sediment	X		X			X	X	X	X	X	X	X		
	Surface Water	Water	X	X	X			X	X				X	X		
	Ground Water	Water	X	X	X	X	X	X	X				X	X		
	Lysimeter	Water	X	X	X			X	X				X	X		
177	Surficial Soil Samples (grid)	Soil	X		X		X	X	X	X	X	X	X	X		
	Surficial Soil Samples (rad hotspots)	Soil	X					X	X	X	X	X	X	X	X	X
	Surficial Soil Samples (other hotspots)	Soil														
	Soil Cores (confirm soil gas)	Soil														
	Soil Borings (soil gas plumes)	Soil			X		X	X	X							
	Soil Borings (rad hotspots)	Soil	X		X		X	X	X	X	X	X	X	X	X	X
	Sediment	Sediment	X		X			X	X	X	X	X	X	X		
	Surface Water	Water	X	X	X			X	X				X	X		
	Ground Water	Water	X	X	X	X	X	X	X				X	X		
	Asphalt or Paving	Soil														
181	Surficial Soil Samples (grid)	Soil	X		X		X	X	X	X	X	X	X	X		
	Surficial Soil Samples (rad hotspots)	Soil	X					X	X	X	X	X	X	X	X	X
	Soil Borings (rad hotspots)	Soil	X		X		X	X	X	X	X	X	X	X	X	X
	Sediment	Sediment	X		X			X	X	X	X	X	X	X		
	Surface Water	Water	X	X	X			X	X				X	X		
	Ground Water	Water	X	X	X	X	X	X	X				X	X		
182	Surficial Soil Samples (grid)	Soil	X		X		X	X	X	X	X	X	X	X		
	Surficial Soil Samples (rad hotspots)	Soil	X					X	X	X	X	X	X	X	X	X
	Surficial Soil Samples (other hotspots)	Soil														
	Soil Cores (confirm soil gas)	Soil														
	Soil Borings (soil gas plumes)	Soil			X		X	X	X							
	Soil Borings (rad hotspots)	Soil	X		X		X	X	X	X	X	X	X	X	X	X
	Sediment	Sediment	X		X			X	X	X	X	X	X	X		
	Surface Water	Water	X	X	X			X	X				X	X		
	Ground Water	Water	X	X	X	X	X	X	X				X	X		
205	Surficial Soil Samples (grid)	Soil	X	X	X		X	X	X	X	X	X	X	X		
	Soil Borings	Soil	X		X		X	X	X	X	X	X	X	X	X	X
	Ground Water	Water	X	X	X	X	X	X	X				X	X		
206	Surficial Soil Samples (grid)	Soil	X	X	X		X	X	X	X	X	X	X	X		
	Soil Borings	Soil	X		X		X	X	X	X	X	X	X	X	X	X
	Ground Water	Water	X	X	X	X	X	X	X				X	X		

FIGURE G
(cont.)

IHSS	Sample Type	Media	Total U	Total Cr	Be	H3	Nitrate	Gross	Gross	U 233/234	U 235	U 238	Pu 239/240	Am 241	Cs 137	Sr 89/90
207	Surficial Soil Samples (grid)	Soil	X	X	X		X	X	X	X	X	X	X	X		
	Soil Borings	Soil	X	X	X			X	X	X	X	X	X	X	X	X
	Sediment	Sediment	X	X	X			X	X	X	X	X	X	X		
	Surface Water	Water	X	X	X			X	X				X	X		
	Ground Water	Water	X	X	X	X	X	X	X				X	X		
208	Surficial Soil Samples (grid)	Soil	X	X	X		X	X	X				X	X		
	Surficial Soil Samples (rad hotspots)	Soil	X	X				X	X	X	X	X	X	X		
	Soil Borings (rad hotspots)	Soil	X	X	X			X	X	X	X	X	X	X	X	X
	Sediment	Sediment	X	X	X			X	X				X	X		
	Surface Water	Water	X	X				X	X				X	X		
	Ground Water	Water	X	X		X	X	X	X				X	X		
210	Surficial Soil Samples (grid)	Soil	X		X		X	X	X				X	X		
	Surficial Soil Samples (rad hotspots)	Soil	X		X			X	X	X	X	X	X	X		
	Soil Borings (rad hotspots)	Soil	X		X			X	X	X	X	X	X	X	X	X
	Ground Water	Water	X	X	X	X	X	X	X				X	X		
213	Surficial Soil Samples (grid)	Soil	X		X		X	X	X	X	X	X	X	X		
	Surficial Soil Samples (rad hotspots)	Soil	X					X	X	X	X	X	X	X	X	X
	Soil Borings (rad hotspots)	Soil	X		X			X	X				X	X		
	Sediment	Sediment	X		X			X	X	X	X	X	X	X		
	Surface Water	Water	X	X	X			X	X				X	X		
	Ground Water	Water	X	X	X	X	X	X	X				X	X		
	Asphalt or Paving	Soil	X					X	X				X	X		
214	Surficial Soil Samples (grid)	Soil	X					X	X	X	X	X	X	X		
	Surficial Soil Samples (rad hotspots)	Soil	X					X	X	X	X	X	X	X	X	X
	Soil Borings (rad hotspots)	Soil	X		X			X	X				X	X		
	Sediment	Sediment	X		X			X	X	X	X	X	X	X		
	Surface Water	Water	X	X	X			X	X				X	X		
	Ground Water	Water	X	X	X	X	X	X	X				X	X		
	Asphalt or Paving	Soil	X					X	X				X	X		

FIGURE G
(cont.)

Phase I Analytical Program
OU 10

IHSS	Sample Type	Media	TAL Metals	TOC	TCL Vols	TCL Semi V	TCL Pest	Filtered: Total U	Pu 239/240	Cs 137	Sr 89/90	Am 241	Pb	Total Cr	TAL Metals	Be	Anions TDS
124	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Surficial Soil Samples (rad hotspots)	Soil															
	Surficial Soil Samples (other hotspots)	Soil	X		X	X	X										
	Soil Cores (confirm soil gas)	Soil			X	X											
	Soil Borings (soil gas plumes)	Soil	X*		X**	X*											
	Soil Borings (rad hotspots)	Soil	X*														
	Soil Borings (tank sides)	Soil	X*		X**	X*											
	Sediment	Sediment	X		X	X	X										
	Surface Water	Water	X		X	X		X	X	X	X	X	X	X			X
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			X
	Tank Residue	Sludge	X		X	X											
129	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Surficial Soil Samples (other hotspots)	Soil	X		X	X	X										
	Soil Cores (confirm soil gas)	Soil			X	X											
	Soil Borings (soil gas plumes)	Soil	X*		X**	X*											
	Soil Borings (tank sides)	Soil	X*		X**	X*											
	Ground Water	Water	X		X	X											
	Tank Residue	Sludge	X		X	X											
170	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Surficial Soil Samples (rad hotspots)	Soil															
	Surficial Soil Samples (other hotspots)	Soil	X		X	X	X										
	Soil Cores (confirm soil gas)	Soil			X	X											
	Soil Borings (soil gas plumes)	Soil	X*		X**	X*											
	Soil Borings (rad hotspots)	Soil	X*														
	Sediment	Sediment	X		X	X	X										
	Surface Water	Water	X		X	X		X	X	X	X	X	X	X			X
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			X
174	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Surficial Soil Samples (rad hotspots)	Soil															
	Surficial Soil Samples (other hotspots)	Soil	X		X	X	X										
	Soil Cores (confirm soil gas)	Soil			X	X											
	Soil Borings (soil gas plumes)	Soil	X*		X**	X*											
	Soil Borings (rad hotspots)	Soil	X*														
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			X
175	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Surficial Soil Samples (rad hotspots)	Soil															
	Surficial Soil Samples (other hotspots)	Soil	X		X	X	X										
	Soil Cores (confirm soil gas)	Soil			X	X											
	Soil Borings (soil gas plumes)	Soil	X*		X**	X*											
	Soil Borings (rad hotspots)	Soil	X*														
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			X

FIGURE H

IHSS	Sample Type	Media	TAL Metals	TOC	TCL Vols	TCL Semi V	TCL Pest	Filtered: Total U	Pu 239/240	Cs 137	Sr 89/90	Am 241	Pb	Total Cr	TAL Metals	Be	Anions TDS
176	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Surficial Soil Samples (rad hotspots)	Soil															
	Surficial Soil Samples (other hotspots)	Soil	X		X	X	X										
	Soil Cores (confirm soil gas)	Soil			X	X											
	Soil Borings (soil gas plumes)	Soil	X*		X**	X*											
	Soil Borings (rad hotspots)	Soil	X*														
	Sediment	Sediment	X		X	X	X										X
	Surface Water	Water	X		X	X		X	X	X	X	X	X	X			X
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			
	Lysimeter	Water	X		X	X											
177	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Surficial Soil Samples (rad hotspots)	Soil															
	Surficial Soil Samples (other hotspots)	Soil	X		X	X	X										
	Soil Cores (confirm soil gas)	Soil			X	X											
	Soil Borings (soil gas plumes)	Soil	X*		X**	X*											
	Soil Borings (rad hotspots)	Soil	X*														
	Sediment	Sediment	X		X	X	X										X
	Surface Water	Water	X		X	X		X	X	X	X	X	X	X			X
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			
	Asphalt or Paving	Soil	X			X	X										
181	Surficial Soil Samples (grid)	Soil	X	X	X	X	X										
	Surficial Soil Samples (rad hotspots)	Soil															
	Soil Borings (rad hotspots)	Soil	X*		X**	X*											
	Sediment	Sediment	X		X	X	X										X
	Surface Water	Water	X		X	X		X	X	X	X	X	X	X			X
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			
182	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Surficial Soil Samples (rad hotspots)	Soil															
	Surficial Soil Samples (other hotspots)	Soil	X		X	X	X										
	Soil Cores (confirm soil gas)	Soil			X	X											
	Soil Borings (soil gas plumes)	Soil	X*		X**	X*											
	Soil Borings (rad hotspots)	Soil	X*														
	Sediment	Sediment	X		X	X	X										X
	Surface Water	Water	X		X	X		X	X	X	X	X	X	X			X
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			
205	Surficial Soil Samples (grid)	Soil	X	X	X	X	X										
	Soil Borings	Soil	X*		X**	X*											
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			X
206	Surficial Soil Samples (grid)	Soil	X	X	X	X	X										
	Soil Borings	Soil	X*		X**	X*											
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			X

FIGURE H (cont.)

								Filtered									
IHSS	Sample Type	Media	TAL Metals	TOC	TCL Vols	TCL Semi V	TCL Pest	Total U	Pu 239/240	Cs 137	Sr 89/90	Am 241	Pb	Total Cr	TAL Metals	Be	Anions TDS
207	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Soil Borings	Soil	X*		X**	X*	X*										
	Sediment	Sediment	X		X	X	X										
	Surface Water	Water	X		X	X											
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			X
208	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Surficial Soil Samples (rad hotspots)	Soil															
	Soil Borings (rad hotspots)	Soil	X*		X**	X*											
	Sediment	Sediment	X		X	X	X										
	Surface Water	Water	X		X	X		X	X	X	X	X	X	X			X
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			X
210	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Surficial Soil Samples (rad hotspots)	Soil															
	Soil Borings (rad hotspots)	Soil	X*		X**	X*											
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			X
213	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Surficial Soil Samples (rad hotspots)	Soil															
	Soil Borings (rad hotspots)	Soil	X*		X**	X*	X*										
	Sediment	Sediment	X		X	X	X										
	Surface Water	Water	X		X	X											
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			X
	Asphalt or Paving	Soil	X			X											
214	Surficial Soil Samples (grid)	Soil	X	X		X	X										
	Surficial Soil Samples (rad hotspots)	Soil															
	Soil Borings (rad hotspots)	Soil	X*		X**	X*	X*										
	Sediment	Sediment	X		X	X	X										
	Surface Water	Water	X		X	X											
	Ground Water	Water	X		X	X	X	X	X	X	X	X	X	X			X
	Asphalt or Paving	Soil	X			X											
	BAT Samples	Water	X		X	X	X	X	X	X	X	X	X	X			X
	Lysimeter Samples	Water	X		X	X	X	X	X	X	X	X	X	X			X

X* – Sample taken from a 6' composite
X** – Sample taken from a 2' composite

FIGURE H (cont.)