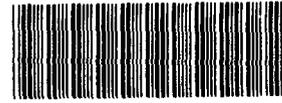


2012



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**RESPONSES TO COMMENTS
FROM
COLORADO DEPARTMENT OF HEALTH
AND
U.S. ENVIRONMENTAL PROTECTION AGENCY
ON DRAFT FINAL OU12 RFI/RI WORK PLAN**

**EG&G Rocky Flats
Rocky Flats Plant
Golden, Colorado**

October 5, 1992

ADMIN RECORD

A-OU12-000138

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LETTER COMMENTS

CDH-L1 Discussions of specific IHSSs in Sections 2 and 6 (and Table 6.1) should be subdivided, as indicated, to improve clarity for work plan review and subsequent implementation.

Response IHSS discussions have been subdivided as requested

CDH-L2 The staged approach alluded to in the work plan should be set forth formally in a manner comparable to the OU10 Work Plan.

Response The OU10 Work Plan was reviewed and the OU12 FSP has been reorganized and slightly revised to more closely resemble the staged approach in OU10. The stages outlined in this FSP are not identical to those in OU10, but reflect rationale discussed in past agency scoping meetings.

CDH-L3 The adequacy of the Field Sampling Plan (FSP) to address the Uranium Machine Tool Storage Area, Ingot Open Storage Area, the roof of Building 447, and the Sulfuric Acid Spill are questioned.

Response The FSP does not address the uranium machine tool storage area because it fully underlies Building 460. Additional surficial soil samples are included in the FSP for IHSS 1572 to address the ingot open storage area. The roof of Building 447 is not within the scope of OU12 and is therefore not addressed. Additional text is included in the sulfuric acid spill FSP to provide for additional sampling if necessary.

CDH-L4 The chromic acid release reported under UBC 444 should be included for investigation under this work plan.

Response. UBCs and PACs are not included in this work plan because they have not been formally added to OU12 using the procedures outlined in the IAG. The IHSSs to be investigated in the RFI/RI for OU12 are specified in the IAG. If appropriate, this work plan will be amended when a formal decision regarding PACs and UBCs is made. Currently, it is intended that the chromic acid spill in Building 444 will be addressed in D&D activities for Building 444. RCRA Contingency Plan Implementation Reports for the chromic acid spill are included in Appendix B. Chromic acid spilled onto the building floor, into the footing drains, and discharged to the water treatment plant.

CDH-L5 Determination of nature and extent of contamination, as well as obtaining data for a Baseline Risk Assessment, is to be a primary goal of the investigation (through a staged approach).

Response Comment noted. Text of the document reads accordingly.

CDH-L6 The exclusion of ground water from the site conceptual model is unacceptable and the model is incomplete.

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- Response The conceptual model has been revised as suggested by CDH.
- CDH-L7 The HPGe grid spacing and instrumental capabilities are questioned.
- Response Additional technical information on the HPGe detector is appended to this document in order to address agency concerns discussed in OU12 work plan comment review meeting of August 27, 1992.
- CDH-L8 Soil sampling procedures and sample splitting requirements are unclear to inconsistent and must be referenced to an amended SOP GT.8.
- Response Soil sampling procedures have been clarified and made consistent throughout the revised document. A DCN to SOP GT 8 has been prepared to reflect these sampling procedures.
- CDH-L9 Rationales for sampling activities and methodologies should be described.
- Response The rationale for planned sampling activities and selected methodologies is in Section 6.2 of the FSP

GENERAL COMMENTS

- CDH-G1 The Phase I RFI/RI Work Plan for OU10 is the first workplan to be finalized in which an investigation of varied IHSSs within the industrialized portions of the plant is presented. While it is not necessary for the OU12 Work Plan to be identical to the workplan for OU10, please refer to the final version for guidance. There were lengthy sets of comments and long discussions that set many ground rules for investigations in the industrialized portions of the plant and there should be no reason to re-invent the same concepts. Any presentation technique in the OU10 Workplan that would enhance the clarity and/or brevity of this workplan should be incorporated.
- Response. The OU10 RFI/RI Work Plan, which is focused toward defining sources of contamination and soil, was reviewed as guidance document in revising the field sampling plan for OU12. The OU12 FSP which is focused on defining nature and extent of contamination is designed in a similar, staged approach, as in OU10, although the number and frequency of formal technical memoranda are not as great. As agreed to by DOE and the agencies in scoping meetings, formal technical memoranda may not be required for each stage outlined in the OU10 work plan. Each technical memorandum proposed introduces review cycles that may cumulatively impact RFI/RI schedule, and their use should be applied to document primary decisions in RFI/RI Work Plan implementation.
- CDH-G2 The Division has repeatedly asked for a revision to SOP GT.8. The inconsistencies within the work plans for OUs 10, 11, 12, 13, and 14 for soil sampling reinforce the need for this revision. Inconsistency is also present in the HPGe programs and we have only been assured that an SOP is "under development." Unless and until SOP GT.8 is amended and an HPGe

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SOP is developed and both are approved, the Division will be unable to judge the adequacy of the FSP and will not approve the workplan

Response A Document Change Notice (DCN) has been prepared for SOP GT8 which includes the procedures described in Section 6.4 for radionuclide and nonradionuclide sampling in paved areas, and nonradionuclide sampling in exposed soil areas

Delays in preparation of the HPGe SOP have affected proposed FSPs for this and other OUs. Technical information on the operation, calibration, and data quality have been appended to this report, and contain information being drafted in the SOP

CDH-G3 This investigation must establish all of the parameters listed as requirements for RFI/RI Reports in the IAG - namely the nature, extent, concentration, and quantity of contamination as well as determination of the Baseline Risk Assessment. It is difficult for the Division to see how this can be assured given a vaguely defined staging of field sampling activities. Although the elements of a staged approach are evident, a clearer commitment to staging, comparable to OU10, is warranted. This should be very carefully planned to ensure that the IAG objectives are met.

Response. The FSP has been clarified to convey the multi-task approach proposed for OU12. The plan conveys the initial data to be collected to define presence or absence of contamination, and how that information guides effective and optimized placement of quantitative data, and provides guidance for the subsequent tasks presented in this work plan

CDH-G4 Portions of several of the OU12 IHSSs lie beneath buildings. Since these portions of the IHSSs cannot be investigated and evaluated, they will need to be monitored until the buildings are removed. Specifically, this means that a sufficient number of ground water monitoring wells will need to be installed to determine if any contaminated water migrates out of the unit. While monitoring of this type is not within the scope of the RFI/RI investigation, determination of the extent and location of any present or past release from the unit is within the investigation scope. Therefore, we urge DOE to consider how the FSP could be modified since the logistical implementation necessary to satisfy both of these concerns could be the same (i.e., installation of wells).

Response FSPs for OU12 IHSSs are designed using a multi-task approach to determine the nature and extent of potential contamination. In all instances, including those IHSSs partially covered with buildings, a provision for installing ground water wells applies if evaluation of data from field activities indicates the need. The buildings themselves will be addressed in D&D, and are not included in the OU12 FSP

CDH-G5 Each activity and sampling methodology proposed for use in this workplan needs to have a specific section of the text describing the rationale of each sampling strategy and preferred methodology. For example, it is not clear why the CDH soil sampling methodology is proposed for soil covered areas and the RFP grab method is proposed for soils beneath paved area. Not only should the work plan give instructions to the individuals who will ultimately

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implement the plan, but more importantly, it must demonstrate to the Division and EPA that the plan represents a sound design.

Response Rationale for each activity proposed in the work plan is provided in Section 6.2. Methods proposed for each activity are also described and available SOPs referenced

SPECIFIC COMMENTS

CDH-S1 **Section 1.2.** The first paragraph, page 4, refers to the Section 3 discussion of ARARs. Please revise the narrative to refer to the Benchmark concept that has been approved by CDH.

Response Text has been revised accordingly

CDH-S2 **Figure 1-10.** This figure does not depict the five mappable sandstones reported to be of the Arapahoe Formation but field mapped as Laramie Formation Sandstones (re: Section 1, page 21). A revised figure should reflect the latest interpretations on the stratigraphic assignment of the five sandstones with a caveat that the interpretation may change in the future.

Response Figure 4-53 from the Phase II Geologic Characterization Report has been reproduced in Figure 1-10 of this Work Plan. This figure correlates the five mappable sandstones with the most recent interpretation

CDH-S3 **Section 2.1.** The third paragraph, page 2, states that UBCs and PACs are not addressed in the work plan pending finalization of the HRR. Although some issues remain that may need to be addressed in the HRR quarterly updates, the HRR is final. DOE should consider which PACs may be logically and efficiently incorporated into this work plan versus their inclusion into potentially new operable units. (The Division, as specified in Section I.B.5 of the IAG Statement of Work (SOW), will review the HRR to determine whether DOE will be required to initiate new RFI/RI or amend existing RFI/RI Work Plans as specified by IAG, SOW, Section VI.A.)

Response UBCs and PACs are not included in this work plan because they have not been formally added to OU12 using the procedures outlined in the IAG. The IHSSs to be investigated in the RFI/RI for OU12 are specified in the IAG. If appropriate, this work plan will be amended when a formal decision regarding PACs and UBCs is made

CDH S-4 **Section 2.1.1.** The discussion of the West (IHSS 116.1) and South (IHSS 116.2) Loading Docks should be divided. The "back and forth" discussion of the two units is confusing. Although they are similar units, the knowledge of their histories is sufficiently different to warrant a separate discussion.

Response Text has been revised to discuss 116.1 in its entirety first and then discuss 116.2 in its entirety

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CDH S-5 Section 2.1.2. Discussion of the Cooling Tower Ponds should be subdivided. If necessary the discussion of IHSS location discrepancies may be included in Section 2.1 rather than redundantly in each new subsection.

Response Text has been revised in similar manner as described for Comment No CDH S-4

In paragraph 3, page 6, reference is made to various solutions used by Dowell in cleaning the Building 444 cooling tower. DOE must present "process knowledge" information on the types of solutions used. The oily sheen reported for the East pond (first paragraph, page 7) is of particular concern. If any solvents were used in the cleaning process of either cooling tower, soil gas surveys will be required in the Field Sampling Plan (FSP).

Response Process knowledge for "typical" cleaning solutions has been included. Solvents have not typically been used to clean cooling towers

CDH S-6 Section 2.1.3. In the second paragraph, page 7, Figure 2-12 is reported to be of a guardhouse. The photo, which is ineffectual, is of building 440. From the Division's perspective, a photo of IHSS 157.2 is not necessary. If a photo is included, it should be directed toward Building 444.

Response: The photograph has been replaced with a historical photo of the entire IHSS 157.2 area in 1969 (Figure 2-12)

Reference is made in the first paragraph, page 8, to a ditch south of Building 444 where radioactivity levels were two and three times background. If possible, the locations of the soil samples should be shown on Figure 2-11 along with the corresponding radioactivity levels. If soil sample locations are unknown, the ditch should at least be labeled on Figure 2-11.

Response: The locations and radioactivity levels from soils samples collected in 1954 are not available and cannot be accurately placed on Figure 2-11. The assumed location of the ditch has been noted on Figure 2-11.

Reference is made in the second paragraph, page 8, to a uranium machine tool storage area. The location of the storage area should be shown on Figure 2-11. Was this storage area within the soil covered alcove on the west side of Building 444. If not adequately covered by the FSP for IHSS 157.2 additional sampling, i.e. surficial soil sampling, will need to be proposed.

Response The location of the uranium machine tool storage area has been included in Figure 2-11. The area currently is covered in its entirety by Building 460 and will not be investigated under the OU12 RFI/RI as of this date

The May 1960 incident (page 8, bullet 1) by which depleted uranium was deposited to the roof of Building 117 has not been specifically addressed in the Field Sampling Plan. The ability of the HPGe survey to quantify levels of radioactivity atop the roof are suspect. The FSP must be amended to state that the HPGe can properly survey from the ground (doubtful) or be expanded to run HPGe on the roof of Building 447.

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Response Investigation of the uranium potentially deposited on the roof of Building 447 is more appropriately accomplished under D&D and has not been included in this work plan

Regarding the third bullet, page 9, please include a copy of RFP Photograph 13676-10 in the work plan. This photo is of interest relative to the extent of IHSS 136.2.

Response RFP Photograph 13676-10 is included as Figure 2-12 Another photo of interest regarding the pond is RFP Photograph 13677-08, included as Figure 2-10

Regarding the second bullet, page 10, a further effort beyond the HRR is warranted to locate the vent pipe, gutter and the general area of release of process liquids to the ground or paved surfaces. Once determined, the FSP relative to IHSS 157.2 must be reviewed to determine its adequacy. The statement that paint may have been used to contain radioactive materials may help focus the search for the area of release. Moreover, the paint should be sampled given the potential for erosion or blistering of the paint to allow escape of radioactive materials. Soil sampling should be proposed at potential hot spots even if it is to confirm HPGe results.

Response The area of a potential release of process liquids to the ground or paved surfaces could not be determined after a review of pertinent documents The text has been modified, however, to include information obtained from historical document review In addition, the IHSS 157.2 FSP currently covers all areas of IHSS 157.2 (not including buildings), with respect to the initial screening tasks. Any anomalies detected at ground or paved surfaces, including any resulting from a vent pipe overflow, will be detected by the FSP presented in the work plan Paint sampling will be included in the D&D process

CDH S-7 Section 2.1.5. Discussion of the Fiberglassing Areas should be subdivided to provide clarity.

Response Text has been revised in similar manner as described for Comment No CDH S-4

CDH S-8 Section 2.1.7. Please remove all unnecessary references to IHSS 147.1 from the document except to note its transfer to OU9.

Response Document has been revised accordingly A short description of IHSS 147.1 has been retained in Section 2.1.10 in order to explain the transfer of this IHSS to OU9

CDH S-9 Section 2.1.8. The chromic acid release reported under UBC 444 in the first paragraph, page 21, appears to be a significant event that should be investigated within this RFI/RI. The Division believes that its passage into the sewage treatment plant, via the footing drains, warrants its investigation at this time despite its designation as an UBC. Please propose an acceptable FSP for this site. (Footing drains have been discussed in the work plan as possible routes of contaminant migration; however, for this incident, and all other IHSSs in this OU, the FSP does not specifically target investigations to or below footing drains. Why?)

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Response As mentioned in the response to CDH Comment S-3, UBCs and PACs are not included in this work plan because they have not been formally added to OU12 using the procedures outlined in the IAG. If appropriate, this work plan will be amended when a formal decision regarding UBCs and PACs is made. Currently, it is intended that under building contamination will be addressed during D&D activities (see Comment No. CDH-G4). Footing drains and sumps will be located and data reviewed during the initial data review portion of the RFI/RI. If additional data are required, sampling will be proposed in a TM.

CDH S-10 **Section 2.2.1.2.** Please revise this section to reflect the current status of the HRR.

Response: Entire document has been revised accordingly.

CDH S-11 **Section 2.3.1.** Regarding the third paragraph, page 29, EPA has determined that well 15889 is incorrectly located. Please revise all text and maps affected by this discrepancy.

Response Well 15889 is no longer included in the OU12 work plan. The location of 15889 is west of the OU12 boundary. Figures and text dealing with 15889 have been revised accordingly.

CDH S-12 **Section 2.3.2.** Regarding the first paragraph of this section, discharges from Pond C-2 are currently directed to the Broomfield Diversion Ditch such that neither Woman Creek nor Standley Lake receive water from Pond C-2.

Response Text has been revised accordingly.

Regarding the second paragraph, page 35, it is stated that "Available analytical data collected during sitewide monitoring of these and other footing drains and sumps will be obtained during the RFI/RI and evaluated." What specific sitewide monitoring includes footing drains and sumps? Which drains and sumps specific to this OU are of value? Monitoring locations of footing drains and sumps should be shown in the work plan to allow the Division to determine the adequacy of the FSP.

Response. Monitoring locations and available data from footing drains and building sumps within OU12 are presented in Appendix C. Data will be reviewed during initial tasks of the RFI/RI. If additional data collection is determined to be necessary, sampling programs for the drains and sumps will be proposed in a TM.

CDH S-13 **Section 2.4.2.2.** In the first paragraph, page 49, the comparison of PU-239 with the isotopic mixture of PU 239/240 should be avoided. DOE may need to find or determine the background data expressed in terms of the same isotopes as the measured OU data.

Response Text has been revised accordingly.

Near the end of the first paragraph, page 49, tritium concentrations for soils are compared to the upper tolerance limit of 410 pCi/l. Should this be pCi/gram?

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Response Text has been revised to pCi/g

CDH S-14 **Section 2.5.1.** The statement is made that "it is unknown if ground water has been historically impacted." Without wells specific to OU12, it is difficult to "know" that OU12 IHSSs impacted the groundwater; nevertheless, the analytical data from nearby wells suggest a possible, if not probable, impact. It is reasonable to assume that an impact has occurred such that implementation of the FSP can provide a specific knowledge, pro or con. It is therefore inappropriate to exclude ground water from the conceptual model (i.e., Figure 2-39).

Response Figure 2-39 has been revised to include ground water in the conceptual model as a potential historically impacted media

CDH S-15 **Section 2.5.4.** Gathering data to support a BRA is a primary goal of the RFI/RI, but not the only primary goal. An RFI/RI must also be designed to determine nature of extent of contamination. If the BRA is based on an incomplete assessment of nature and extent, the subsequent comprehensive BRA may be flawed if based on understated contamination levels.

Response: Text has been revised to reflect the goal of determining the nature and extent of contamination in order to perform the BRA.

CDH S-16 **Figure 2-3.** An additional drain was found during a June, 1992 visit to the site in the vicinity of the photo vantage point. Please add this to the figure and also to Figure 2-7. The two footing drains currently shown on Figures 2-3 and 2-7 were also found to be further east than depicted. They are located in the soil areas on each side of the loading dock driveway. Please revise.

Response: The drain locations have been revised on figures based on the June 1992 site visit. Drain grates for two older storm water drains were observed on the edges of the exposed soil area near the driveway. The drains were filled with soil and debris. They are thought to be old storm drains, not footing drains as suggested in the comment.

CDH S-17 **Figure 2-5.** The concrete abutment is approximately one foot wide, three feet high and is immediately adjacent to the west side of the dock with a short southward extension beyond the dock.

Response. Figure 2-5 has been revised accordingly

CDH S-18 **Figure 2-9.** The eastward extension of Building 444 is designated Building 445 as observed during the June site visit.

Response: Figure 2-9 has been revised accordingly

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CDH S-19 **Figure 2-13.** The June site visit has confirmed that the photo vantage point for Figure 2-17 is incorrect. The correct vantage point is northeast of Building 452 looking due south.

Response Figure 2-13 has been revised accordingly

CDH S-20 **Figure 2-39.** The exclusion of groundwater from the Site Conceptual Model is unacceptable. A primary goal of this RFI/RI is to determine if ground water has been impacted. Given the potential for impact, the pathways must be set forth in the flow chart. Attached to these comments is a revised version of Figure 2-39 showing the Division's thoughts on an acceptable flow chart. Please contact the Division with any questions or comments on this issue prior to submittal of the Final Work Plan.

Response Figure 2-39 has been revised accordingly

CDH S-21 **Section 3.0.** This section must be revised to fully reflect the change from ARARs to Benchmarks. Currently, the discussion of benchmarks does not begin until page 4 of the section. Prior to revision, please refer to the Division's letter of June 12, 1992 on Chemical-Specific Benchmarks Tables (re: Gary Baughman, CDH to Martin Hestmark, EPA with copy to Rich Schassburger, DOE). Attachment A of the letter provides our guidance on the key points of benchmarks to establish detection limits and ARARs to establish cleanup standards

Attached to our June 12, 1992 letter are comments to DOE's Chemical-Specific Benchmark Tables. Please revise, as appropriate, Tables 3.1, 3.2, and 3.3 of this work plan.

Response: Section 3.0, including tables, has been revised accordingly

CDH S-22 **Section 3.1.2.3.** The last sentence of page 6 should refer to PRGs in Section 3.2 not 3.2.5.

Response Text has been revised accordingly

CDH S-23 **Section 4.1.3.** In the second paragraph of this section, pumpage and irrigation should be added to the text and also to the flow chart, Figure 2-39, as revised and attached.

Response Text and Figure 2-39 have been revised accordingly

CDH S-24 **Section 4.1.4.** An RFI/RI is intended as a data gathering step toward a decision on whether remediation is necessary and, if so, the appropriate remedial alternatives. The text should be revised to reflect that Corrective Measures/Studies/Feasibility Studies (CMS/FS) and Corrective Action Decisions/Record of Decisions (CAD/ROD) are steps toward the final decisions.

Response Text has been revised accordingly

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The next to last bulleted item of page 7 supports the Division's call for the inclusion of ground water into the site conceptual model, Figure 2-39

Response Figure 2-39 has been revised accordingly

Regarding the last paragraph of page 15, the Division notes that the FSP for IHSS 157.2 is based on a square versus triangular grid. Please explain why the triangular grid is not proposed for this IHSS.

Response The surficial soil sampling grid is effectively proposed on a triangular grid at IHSS 157.2 because it is established on alternating nodes of a rectangular grid. Soil gas sampling locations are proposed on a 50 ft rectangular grid, although the screening methodology described in the plan includes additional points to be sampled midway between established grid locations where evidence of contamination is found. This provision would also effectively create a triangular grid.

CDH S-25 Section 5.3.2. Regarding the third paragraph, page 6, minor changes in implementation of the work plan need only be reported in the RFI/RI report. This would include minor adjustments to screening and sampling locations warranted by site conditions. As conceptually agreed in the scoping meeting of April 6, 1992, DOE will submit screening data to the Division along with a rationale for proposed locations of soil borings and monitoring wells, etc. in lieu of a Technical Memorandum (TM). This will enable DOE to proceed on a fast-track, yet provide for Division input and concurrence. Once this stage of the work plan has been completed, revisions and additions needed to define nature and extent of contamination will necessitate a TM as correctly stated in the third paragraph.

Response. Text has been revised to state that minor changes in implementation of the work plan will be reported in the RFI/RI report, not in a TM, as originally stated.

CDH S-26 Section 6.0. DOE needs to clarify, in this section, that sampling will continued to the edge of any possible contamination anomaly, even if this is past the edge of an IHSS. This is necessary to establish the extent of any contamination as a stated objective of Section 4.0.

Response Text has been revised to allow for sampling to the edge of contamination or to the point where another IHSS is encountered.

CDH S-27 Section 6.1. Regarding the second paragraph, page 2, one primary goal of an RFI/RI is to determine the nature and extent of contamination. Given the limited scope of the FSP, clearly one or more Technical Memoranda may need to be proposed, approved and implemented prior to DOE's issuance of the RFI/RI report. The subject paragraph should be revised to reflect such a commitment.

Response Text has been revised to include the possibility for one or more technical memoranda

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CDH S-28 Section 6.2.1.1. Regarding the first paragraph of this section, the Division is concerned about a 195-foot field of view for each HPGe sample. This method may be appropriate for an area with uniformly distributed contamination but is likely to lead to erroneous data in an area like OU12 in which radionuclide contamination is more likely to be found in distinct hot spots resulting from historical spills or other discrete human activities. The assumption that "... radionuclide distribution is relatively homogeneous over the field of view, and that the distribution varies only with depth" is not likely to be the norm for this OU and is of major concern. DOE must demonstrate the ability of HPGe to both detect and locate hot spots with the proposed large grid spacing (100-foot centers - IHSS 157.2) or revert to a much smaller grid. (The Division notes that the proposed OU8 work plan HPGe stations are laid out on approximate 30-foot centers.)

Response In order to define hot spots within the field of view of the HPGe detector, NaI probe locations have been added, tripod-mounted locations have been included, and the height of the vehicle-mounted HPGe can be varied to decrease the field of view. All of these items are presented in the text and on appropriate Figures in Section 6.0

The proposed method will provide one data point, expressed in terms of pCi/g units for each survey point covering a 195-foot circle. This result will purport to represent the average radionuclide concentration over the area. The detector has no capability to determine the distance of a gamma source within the viewed area. Therefore, a hot spot immediately below the detector will result in a larger reported concentration than a hot spot at the edge of the field of view of the detector. Although the method may be valid for predicting radionuclide concentrations in soils in the upper soil layer for areas with uniformly distributed contamination, the use of such wide grid spacings in this type of OU is likely to provide results which are not consistent with actual soil concentrations.

Response The field HPGe survey is used as a screening tool only. NaI probe locations have been included to provide more information over the field of view, thereby, identifying anomalous areas. The HPGe detector, when used as a screening tool, has the advantage of being able to identify specific isotopes. Additional technical information has been presented in Appendix G

Regarding the development of a SOP for the HPGe, DOE needs to accelerate its efforts to prepare this SOP as indicated previously in the General Comments section. It is difficult to provide comments on procedures without the detailed procedures having been submitted. Furthermore, a SOP for the laboratory HPGe, assuming it will become available and approved for the work plan, must be developed.

Response Both requested SOPs are under development by EG&G

Regarding the last paragraph, page 5, surficial soil samples and depth profile samples must be randomly located to confirm both HPGe negatives and positives. Collecting samples at the HPGe stations does not provide a suitable level of confidence that HPGe results are accurate.

Response Text has been revised to state that surficial soil samples, in addition to those established on a grid, and depth profile samples will be collected at random and discrete locations determined after the HPGe readings. Depth profile samples are shown at HPGe locations on figures with notes that actual locations may differ based on HPGe readings

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Also, the use and reliability of a laboratory HPGe has not been demonstrated to the Division, therefore, it is inappropriate to substitute this technique for the standard radiochemistry lab analysis. At a minimum, lab HPGe results will need to be confirmed by a subset of radiochemistry lab analysis or documentation must be submitted that properly demonstrates lab HPGe accuracy and precision based on test results.

Response Additional confirmatory-type samples have been included in the FSP to verify the HPGe results

Regarding the first paragraph, page 6, it is stated that "... more extensive programs of surficial soil sampling for radionuclides will be conducted in paved areas." Please clarify how the soil below the pavement is being given more extensive treatment than soil covered areas when the grid spacing is generally the same (note especially Figures 6-4 and 6-5). With depth profile samples not to be collected in paved areas, it appears to be even less extensive. Please acknowledge that radionuclides deposited before an area was paved may have moved downward to the same extent as in soil covered areas given the probability that they were attenuated at or near the surface. Sampling of the concrete and asphalt certainly do not constitute soil sampling and thus is not more extensive.

Response Text has been revised to delete any reference to "more extensive sampling" Agree with comment and have revised text accordingly

Regarding the second paragraph, page 6, please clarify the term offsite radionuclides and how they will be distinguished from onsite releases of radioactive materials.

Response The term "offsite" has been deleted.

Regarding the last paragraph, page 6, please provide the status on availability of a lab HPGe in relation to the OU12 RFI/RI Schedule. Approval of the work plan as currently proposed will depend, in part, on the availability of this instrument.

Response It is anticipated that the laboratory HPGe will be available in spring 1993 which is within the OU12 scheduled period to commence field work This information has been added to the discussion

CDH S-29 Section 6.2.3.2. Referring once again to the first paragraph of page 6, a 0-2" grab sample for paved areas is less extensive than a depth profile sample, i.e. 0-2, 2-4, 4-6". Please specify how the paved areas are receiving more extensive sampling.

Response Text has been revised to delete reference to "more extensive sampling"

Also, please clarify whether the plug-type sampler or scoop sampler are equivalent to those described in Sections 6.3 and 6.2, respectively, of SOP GT.8. The Division has previously noted weaknesses in GT.8 and has specified that it be modified (OU11 comments May 8, 1992); consequently, references to soil sampling techniques must be precise by name and procedure number (e.g. Section 6.3) pending revision of GT.8. Also in keeping with the soil sampling procedures of OU11, the sampling of unpaved areas should use the meter square template approach and collect five subsamples at each surficial soil sampling station. This procedure should be applied whether CDH 1/4-inch sampling or RFP grab sampling is being

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employed. Given both the difficulty of access and the decreased potential for disturbance, sampling beneath paved surfaces may be limited to one sample versus five subsamples. (Please note: The Division still expects that SOP GT.8 be updated to reflect the meter grid sampling protocol.)

Response Surficial soil sampling procedure techniques have been clarified in this FSP and include the one square meter template approach. A DCN has been prepared to address procedures for grab sampling below pavement and composite sampling in exposed soil areas.

CDH S-30 Section 6.2.3.3. Regarding the last paragraph, page 11, the Division requests that DOE attempt to prepare SOPs for vadose monitoring and leachability testing prior to the resubmittal date of this work plan.

Response SOPs are currently under development and will be submitted when prepared. Vadose zone monitoring and leachability testing will not occur prior to approval of these SOPs.

CDH S-31 Section 6.3. Consistent with our comments on Section 6.2.1.1, the statement on page 14 that "... where HPGe measurements are representative of radionuclide activities in soil, minimal numbers of confirmatory surficial soil and depth profile samples will be collected." DOE must show that the HPGe measurements are representative before this statement will be accepted. Hot spots must be capable of being identified. Note that Section 6, page 39, admits to "moderate area averaging" when describing the capabilities of the HPGe system.

Response. NaI probe locations have been added to supplement the HPGe survey locations and delineate the location and size of hot spots. Additional depth profile samples have been added to delineate the attenuation of radionuclides in soils.

Regarding the last paragraph, page 16, the Division acknowledges the difficulty of determining the grid required to meet a strict statistical objective. However, the Division expects that the data obtained through implementation of the FSP will allow DOE to determine the level of sampling needed to achieve a 95 percent confidence level. Viewed as a staged approach, the FSP as proposed should support subsequent rounds of sampling within the time frame of the IAG schedules. DOE should prepare a budget which assumes a staged approach. Additionally, the Division requests that DOE revise the work plan to clearly show a staged approach and potential investigation activities comparable to the OU10 RFI/RI Work Plan. To develop greater consistency among work plans of the industrialized area of RFP, DOE should determine the relevant need, based on screening data (Stage 1), for lysimeters and BAT sample collection techniques. Additionally, the applicability of the Sodium Sampling Probe Radiation Survey to this OU should be considered.

Response A multi-task approach has been developed for OU12 in a similar manner as OU10. NaI probe locations have been added to supplement the HPGe survey. The need for lysimeters or other vadose monitoring equipment is determined after evaluation of screening data. Ground water screening samples are proposed in the plan as a screening activity, the conduct of which depends on results of surficial and subsurface soil screening.

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Regarding the second paragraph, page 18, please specify the source of the 90 percent/90 percent protocol for reporting an IHSS to be clean. The Division's policy is that IHSSs where 95 percent of a population falls within two standard deviations of mean background will be considered clean.

Response Text has been revised accordingly

CDH S-32 Section 6.3.1. The surficial soil sampling program planned for IHSSs 116 1 is unclear in more than one respect. Will the CDH, modified RFP or vertical profile sampling approach be used? The CDH approach is specified for a similar surficial soil sampling effort at IHSS 136.2.

Response Clarity has been added to Table 6 1, text, and Figure 6-2. Surficial soils at exposed soil locations will be collected using the jig and scoop at the center and four corners of a square meter area With respect to IHSS 136 2, composite samples of surficial soils will be collected using the method described in this response Depth profile samples will be collected using a plug type sampler

Furthermore, the first paragraph, page 21, states that "To verify results obtained from the HPGe detector, two surficial samples will be split and sent to a laboratory for radionuclide analysis." Contrast this, please, to footnote "b" of Table 6.1 where three surficial soil samples and three depth profile samples will be submitted to the laboratory for radionuclide analysis The Division cannot discern the method of sample collection for the surficial samples (CDH or RFP), whether two or three samples are proposed, and whether the footnote "b" surficial samples are to be split or to be analyzed by the laboratory HPGe instrument versus conventional methods. References to the appropriate SOP, and as necessary to the specific section of the SOP, must be made. Additional SOPs, or further revision of existing SOPs, may be warranted.

Response Text, figures, and Table 6-1 have been clarified Several verification surficial soil samples have been added to IHSSs other than 136 2

It appears that footnote "b" may have been intended for IHSSs 120.2 and then been inadvertently applied to this IHSS (The discussion of IHSS 120.2 sampling and analysis is clearer but could benefit from some modification.) DOE should very carefully consider the apparent discrepancies between Table 6.1 and the narrative, further define the SOP method for surficial sampling, and define the specific laboratory method.

Response Table 6 1 and text has been revised extensively The numbers and types of samples agree on the figures, Table 6 1, and in the text The SOP method for surficial soils is found in SOP GT 8 as stated in the text.

Lastly, DOE should discuss the specific rationale for splitting samples. Are both splits being analyzed, if so, how? Is one simply being retained for possible verification?

Response "Split samples" should have read "duplicate samples" Text has been revised. Both samples in a duplicate will be analyzed for QC reasons

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Regarding the discussion of ground water elevations, third paragraph, page 22, how will seasonal variations in the water table be monitored if the top of the screen is placed two feet above a fluctuating water table?

Response Text has been revised to state that the top of the screen will be placed eight feet above the water table to account for seasonal fluctuations

Is sampling proposed as a one time event or will the wells be turned over to a sitewide program for periodic monitoring and sampling?

Response Monitor wells will be sampled quarterly for one year Only validated data will be reported in the RFI/RI report Subsequent quarters will be reported in TMs or as part of the ongoing monitoring program at the RFP This information has been added to the document

CDH S-33 Section 6.3.2. The comments to Section 6.3.1 on surficial soil sampling are applicable to IHSS 116.2.

Response. The text, figures, and portion of Table 6.1 that deal with IHSS 116.2 have been extensively revised. Surficial soils at this paved IHSS will be collected using the grab sampling method described in SOP GT 8 Composite sampling is not proposed under pavement See response to CDH S-32.

CDH S-34 Section 6.3.3. The comments to Section 6.3.1 on surficial soil sampling are applicable to IHSS 136.1.

Response See response to Comment No CDH S-32 and S-33

Referring back to the Division's comments on Section 2.1.2, DOE must consider process knowledge to establish the potential for volatile organic solvents and the need, if any, for soil gas surveys at IHSS 136.1 (and also IHSS 136.2).

Response Reference material discussing the types of solutions typically used to clean cooling towers has been added to the text and Section 11.0

If possible, please include in the work plan a copy of an aerial photographic mosaic for the West Pond. Regarding the third paragraph, page 25, since Building 447 was in service prior to the West Pond and presumable is depicted in the aerial photo, please amend the West Pond location and, accordingly, the FSP. The Division does not wish to perpetuate an inaccurate location.

Response: IHSS locations have been revised to reflect the final HRR locations Consequently, the appropriate FSPs have been revised An historical photograph showing the West Pond has been included in Section 2 (Figure 2-8)

Regarding the second paragraph, page 26, the use of colorimetric screening methods for hexavalent chromium concentrations is acceptable for targeting contaminant hot spots for further investigation. However, a colorimetric detection level of 0.1 milligram (100 ug/l) does

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not support the Benchmark Values of Table 3.2 and 3.3 at 50 ug/l. If hexavalent chromium is not detected in any sample, DOE must still ensure that levels to 50 ug/l are detected by CLP analytical methods.

Response The use of colorimetric screening methods is proposed to determine presence or absence of chromium in ground water, and to efficiently place soil borings, samples from which are analyzed by CLP analytical methods.

CDH S-35 Section 6.3.4. According to Figure 6-4 and the June site visit, the area west of the security fence is asphalt paved not soil covered. Is there an impact on the FSP?

Response Figure 6-5 (previously Figure 6-4) shows asphalt paving in the area west of the security fence. No impact on the FSP.

Regarding the third paragraph, page 27, it is somewhat difficult to visualize how the drainage ditch could have been identified as a pond from aerial photographs. Was there actually a pond or did Dowell merely allow the cleaning solutions to escape via the ditch? Unless a pond, without a discharge point, can be confirmed, DOE must include hydrologic probe and boring locations within the ditch downgradient from the IHSS.

Response Historical photographs were obtained, and the most representative of 136.2 has been included in Section 2.0. The photographs show a small ponding area without a discharge point.

A nested tensiometer station is shown on Figure 6-4. Please refer to the tensiometer in a manner comparable to that given on page 34 for the Fiberglassing Area (IHSS 120.1).

Response Text has been revised accordingly.

CDH S-36 Section 6.3.5. Regarding the second paragraph, page 30, DOE states that "... a minimum of 38 surficial samples will be collected from alternating nodes on a 50-foot grid..." DOE should verify the radionuclide levels at non-node locations by redistributing a portion of the 38 samples and/or allocating additional samples.

Response The FSP has been revised to include eight more surficial soil sampling points, as well as depth profile, asphalt, and HPGe measurements for radionuclide concentration at non-node locations.

Please show tentative locations of the four concrete and asphalt core samples on Figure 6-5. This should lessen the chance of them being overlooked during plan implementation.

Response Tentative locations have been included on Figure 6-1 for this IHSS.

Also, in the second paragraph, eight surficial soil samples appears to conflict with footnote "b" of Table 6.1 (see comments to Section 6.3.1).

Response Table 6.1 has been extensively revised to accurately reflect the text and figures.

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CDH S-37 **Section 6.3.6.** Reference is made on page 32 to the potential applicability of turbidimetric methods. The applicability of this, or any other method, should be determined before it is proposed in the work plan. If a determination is not possible at this time, an alternate method should be proposed. In either case, the appropriate SOP must be referenced or a SOP addendum proposed.

Response The use of turbidimetric methods has been determined to be applicable to ground water screening and has been retained in the field sampling plan. SOP GW.5 has been referenced in the document as the applicable SOP.

CDH S-38 **Section 6.3.7.** Regarding the third paragraph, page 33, the splitting of one surficial and one depth profile sample is more consistent with Table 6.1 footnote "b" than noted for the preceding IHSSs; however, one surficial and one depth profile sample are inadequate for laboratory analysis. A minimum of two samples each should be proposed for full radionuclide analysis.

Response Nine surficial soil samples are proposed for HPGe analysis and TAL metals analysis. Three depth profile samples are proposed at IHSS 120.1.

CDH S-39 **Section 6.3.8.** Regarding the first paragraph, page 35, this is the clearest discussion of the radionuclide sampling and analysis program; nevertheless, it too is not fully consistent with footnote "b".

Response Table 6.1, including the footnotes, has been extensively revised and matches the text and appropriate figures.

Based on the last sentence, first paragraph, page 34, it appears that the statement at the top of page 36 should read "four samples will be analyzed for TCL volatile organics, and three samples will be analyzed for radionuclides, i.e. volatiles should not be proposed twice for analysis."

Response Text has been revised accordingly.

CDH S-40 **Section 6.3.11.** Any stored hazardous waste or depleted uranium waste, if present, should be removed from this IHSS prior to sampling.

Response Text has been revised accordingly.

CDH S-41 **Section 6.4.2.** Please clarify HPGe's ability to detect plutonium. As an alpha emitter, plutonium is not directly determined by the HPGe method but must be estimated through some sort of equilibrium calculation. In reviewing the document "In situ Surveys of the United States Department of Energy's Rocky Flats Plant", (EG&G-10617-1129, UC-702, May 1991) we note the authors statement: "... it is often assumed that parent and progeny radionuclide of natural decay chains are in secular equilibrium in undisturbed soils. However, in most soils, secular equilibrium has been disturbed." This document made no

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attempt to determine plutonium concentrations in the surveyed areas but only reported Americium-241 concentrations. If equilibrium considerations are to be used to predict plutonium concentrations, the proposed calculation methods and factors must be described. Please add this information to the work plan

Response While plutonium is primarily an alpha emitter, gamma and x-rays are also emitted Plutonium emits gamma rays at very low branchings that can be detected with high sensitivity instruments, such as the vehicle-mounted detector Secular equilibrium, as described in the report referenced in this comment, deals with natural lines for U-238 and its decay chain, not for transuranics

The use of a laboratory HPGe detector is discussed in this section. What DQO Analytical Level does this provide, Level I, Level IV? Is the level adequate for the baseline risk assessment?

Response DQOs obtainable with the HPGe detector have been indicated as Analytical Level II or III Regardless of the DQO level assigned, verification samples collected and analyzed using Analytical Level V methods will allow correlation of the HPGe results and use in the BRA

CDH S-42 Section 6.4.3. The rationale for differentially sampling soils based on presence or absence of pavement must be discussed. Why is the CDH method proposed for non-paved areas while a 0-2 inch sample is proposed for soil beneath paved surfaces? The Division believed that for soil covered areas, a one meter grid template should be used to collect five composite samples for a 0-2 inch depth.

Response Text has been revised in accordance with this comment A composite sample collected with a jig and scoop will be used in exposed soil areas Grab sampling methodology described in SOP GT 8 will be used to collect noncomposited grab samples under pavement

Reference to Technical Memorandum (TM) 5 of OU1 is unacceptable. Sampling crews should not be referred to other work plans or TMs. The procedures described in TM5 must be incorporated into SOP GT.8 or a SOP Addendum.

Response A DCN for SOP GT 8 has been prepared which includes the information from TM5

CDH S-43 Section 6.5.3. Table 6.3 lists the analytical parameters of interest, not Table 6.4.

Response Text has been revised accordingly

CDH S-44 Table 6.1. This table needs to be reorganized. Although the docks, ponds, and fibreglassing areas are physically and historically similar for each grouping, the FSP for each IHSS is not. The number of Samples/Borings need to be differentiated so that the Division can clearly see what DOE intends to do at each IHSS. The maps do provide some clarity, but the compounding of symbols tends to mask the frequency for each sample type. Also:

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IHSS 120.1/120.2: Why is a Concrete/Asphalt sample proposed for IHSS 120.2 where there is less pavement than at IHSS 120 1 where the paved area is greater? Is it related to the radionuclide storage issue in Building 664?

IHSS 147.2: For the activities Surficial Soil and Depth Profile Samples, please show the No. of Samples, i.e. two (2) for each.

Please complete footnote "e" on page 6 of Table 6.1.

- Response Figures, text, and Table 6 1 have been revised extensively IHSSs have been separated in the text and Table 6 1
- CDH S-45 **Figure 6-3.** Please note that four of the soil sampling locations shown are largely redundant to those shown on Figure 6.1 and need not be duplicated.
- Response In general, the sampling locations have been revised Any duplication and overlap has been avoided
- CDH S-46 **Figure 6-5.** The Ingot Open Storage Area is shown on the figure; however, surficial and depth profile soil samples are not specific to this potential area of contamination. Please demonstrate how the proposed IHSS 157.2 FSP is adequate or propose specific sampling activities.
- Response The FSP for IHSS 157 2 has been revised Four surficial soil samples are located in the immediate vicinity of the ingot open storage area In addition, several soil gas and two radiation survey points are near the ingot open storage area.
- CDH S-47 **Figure 6-6.** The Division does not believe that the FSP for the IHSS 187 Sulfuric Acid Spill is adequate. Why are samples not proposed along the ditch and at the site of the spill impoundment to determine the full nature and extent of the release?
- Response The sulfuric acid was neutralized with lime almost immediately after the spill and is not persistent in the environment Therefore, any affects of the spill will not be present at this date Sampling at the source has been included with the provision that if contamination is detected at the source, then additional sampling along the spill pathway will be performed
- CDH S-48 **Figure 6-8.** If the Surficial Soil/Depth Profile sampling locations shown are tentative, please indicate in the legend. If not tentative, please redistribute the sample locations from the southwest corner of the IHSS.
- Response Figure 6-9 (previously Figure 6-8) has been revised to reflect the tentative nature of the soil borings and nested tensiometer Surficial soil locations have been distributed with emphasis on the entire IHSS Depth profile sampling locations are tentative although they are shown at HPGe survey locations on Figure 6-1

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Please show tentative locations for concrete/asphalt samples as specified on page 35, Section 6.0. This should ensure that the sampling will occur.

Response: No concrete/asphalt samples will be collected at IHSS 120.1

CDH S-49: **Figure 6-11.** Please use HPGe at the corners and center of this IHSS for a total of five stations. Randomly distribute four surficial soil sampling stations over the IHSS.

Response: Seven HPGe locations are distributed over the entire IHSS providing complete coverage. Seven surficial soil samples have been at the HPGe survey locations.

CDH S-50: **Section 7.0.** Submittal of this work plan occurred on May 8, 1992, not March 8, 1992.

Response: Comment noted. Text has been revised to reflect the submittal date of the Final Work Plan, October 5, 1992, in accordance with the IAG.

Regarding the last sentence, page 2, schedule revisions must be requested two weeks prior to a due date and be based on valid reasons, they are not automatic.

Response: Text has been revised to state a two week minimum schedule revision request and that solid rationale for the schedule extensions must be provided.

CDH S-51: **Section 8.1.** Parts B and C of the Risk Assessment Guidance for Superfund were released on December 13, 1991 (OSWER Directive 9285.7-01B and -01C) and should be referenced on page 3. These documents should be reviewed and, as appropriate, incorporated into this work plan.

Response: Text has been revised to reference the documents. Parts B and C of RAGS will be addressed in the feasibility study.

CDH S-52: **Section 8.1.2.** The onsite residential use scenario, third paragraph, page 5, cannot be excluded from the risk assessment based on DOE's future land use plans.

Response: Land use scenarios will be presented in the Exposure Assessment TM, within the BRA.

CDH S-53: **Figure 10-1.** Please update the figure to include the current personnel assignments.

Response: Figure 10-1 has been revised accordingly.

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GENERAL COMMENTS

EPA-G1 Section 1.0 describes the OU12 background and physical setting. The text is similar to other work plans and provides an adequate description of the site. Several of the figures used in Section 1.0 have come from work plans for other OUs with little or no modification. Therefore, several minor improvements in the figures would make them appropriate for this work plan. The specific comments sections discusses these improvements.

Response See responses to specific comments

EPA-G2 Section 2.0 (site characterization, previous investigations, geology and hydrology, nature of contamination, and site conceptual model) is largely drawn from existing documents. The site characterization section is based on the historic release report (HRR) and summarizes the history of each individual hazardous substance site (IHSS).

The previous investigations sections summarize several past studies and note that the polychlorinated biphenyl (PCB) contamination at OU12 will be investigated in a separate program. This is important because several potential areas of contamination (PACs) in the HRR are identified as potential PCB spills. Additionally, the sandblasting area, identified as PAC 400-807 in the HRR, will be investigated under the IHSS 157.2 (Radioactive Sites South) activities.

Response It is currently intended for PCB sites to be investigated under TSCA, not under RFI/RI activities. DOE is currently preparing a strategy for PCB site investigations and agencies will be involved in review and decision making related to the proposed strategy. PACs or UBCs identified in the HRR have not formally been added to OU12 according to procedures outlined in the IAG, and are not included in this work plan. If appropriate, this work plan will be amended when a formal decision regarding PACs and UBCs is made. Investigations planned for IHSS 157.2, however, including radiation surveys and surficial soil sampling, encompass the sandblasting area.

The geology and hydrology section summarizes the information found in the *Final Geologic Characterization Report* for 1989 (EG&G, 1990). However, it contains one glaring error: well 15889 has been mislocated on all the figures in this section. This results in some highly improbable hydrologic maps and interpretations. Therefore, this section will require some significant rewriting and changes to all figures which use values from well 15889 for mapping.

Response Well 15889 has been removed from all figures and maps in the work plan because the actual location is off of the maps to the west. Water table and isopach maps have been revised accordingly. Text in Section 2.0 has been revised.

The nature of contamination section is based on the HRR and some new validated data. It accurately summarizes the existing knowledge of OU12 contamination.

Response Text has been revised accordingly

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EPA-G3 Section 4.0 (data requirements and data quality objectives) contains a generic discussion from previous RFP work plans for other OUs. Significantly though, the discussion on sample spacing takes into account the size and type of contaminants in each IHSS. The elements and compounds for analysis includes the complete suite from the target compounds list (TCL), volatile organics, target analyte list (TAL) metals, and radionuclides. This appears to be a reasonable Phase 1 approach because of the variety of contamination, the minimal documentation on what was released at each IHSS, and the proximity of the various IHSSs

Response Comment accepted

EPA-G4 Section 6.0 (in the field sampling plan [FSP]) is organized along the lines suggested by CDH and EPA for the FSP OU10 RFI/RI work plan. The described procedures in general appear adequate to meet the objectives set out in Section 6.1 of the FSP. Nevertheless, the FSP must include some discussion of the detection limits for the high purity germanium (HPGe) and the mobile gas chromatograph (GC) systems. Due to special concerns regarding potential calibration problems with the HPGe, SOPs for the radiation surveys using the HPGe, in both laboratory and field settings, must also be submitted as a part of this work plan. Because much of the following work at OU12 will be based on the results of these studies, the quality of the data they generate must be discussed and documented.

Response Additional discussion regarding the detection limits, operation, and calibration of the HPGe has been included in Appendix G. Detection limits for soil gas and additional information on the mobile GC are in Table 6.4 and Appendix H, respectively.

The individual figures showing sampling locations for each IHSS are certainly useful and necessary. It might also be advantageous to present all of the IHSSs (except 147.2) and associated sampling locations on one figure. By doing this, duplication of sampling efforts resulting from overlapping IHSSs would be avoided and spatial relationship of all sample locations could be easily discerned.

Response Overlapping or duplication of sampling efforts has been avoided by revising sampling plan graphics, placing the radiation survey activities on one figure (Figure 6-1), and by reviewing the placement of locations. Placement of all sampling efforts on one figure was attempted and resulted in a very congested, unreadable figure.

EPA-G5 Section 8 (human health risk assessment) presents a cohesive strategy to carry out the human health risk assessment for OU12. It discusses in sufficient detail the four essential components of the risk assessment process as outlined in the *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (RAGS)* (EPA, 1989). Each section presents enough information to conclude that the correct methodology will be employed. Although additional specific information would be helpful, it is not necessary as long as all pertinent information will be submitted for EPA review prior to conducting the investigation.

Response Comment accepted.

The work plan contains two problem areas to EPA's stated position, and EPA guidance (1989). The first is the intention to use the International Commission on Radiological Protection (ICRP) procedures to estimate risk. The second involves the strategy to be used

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in selecting potential chemicals of concern (COCs) The following sections contain specific comments regarding these deficiencies.

Response See the responses to specific comments EPA-S53 and EPA-S59 on these two issues

EPA-G6 Section 9.0 (environmental evaluation) describes how the OU12 environmental evaluation work plan will be incorporated into the OU9 environmental evaluation. This approach is acceptable as long as the OU9 study covers the entire RFP industrial area.

Response The OU9 EE does cover the entire RFP industrial area as stated in the OU9 EE technical memorandum dated June 1992

SPECIFIC COMMENTS

EPA-S1 Section 1.0, Page 1, second paragraph. Several mistakes are present here and corrections need to be made: third sentence, delete the word program and replace the word six with sixteen; the fourth sentence is incomplete and should be either deleted or completed; fifth sentence, CDH is the lead agency for OU12, not EPA.

Response Text has been revised by deleting "program", correcting the number of OUs at RFP, revising the fourth sentence, and stating that CDH is the lead agency

EPA-S2 Section 1.3.3, page 21. This section describes the lithology of the Arapahoe Formation and discusses the difficulty in distinguishing between it and the Laramie Formation. It is recommended that the discrepancies that arise from the stratigraphic interpretation put forth in the *Phase II Geologic Characterization*, (EG&G 1992), be more clearly explained here so that subsequent references to the Arapahoe and Laramie formations are consistent and not confusing. Specifically, for the central and western areas of the plant, the Phase II GC report correlates the uppermost or No. 1 Arapahoe sandstone to what it calls the Arapahoe marker bed. It goes on to use the base of this interval as the contact between the Arapahoe and Laramie formations, whereas previous reports include five sandstone intervals in the Arapahoe formation. As a result, the thickness of the Arapahoe formation according to the Phase II GC is between 15'-25' as opposed to approximately 150' as stated in this work plan and in most previous reports.

Response Text has been revised by describing contrasting logic behind varying Arapahoe Formation thicknesses and noting that all references to the Arapahoe Formation in this report are referring to the Phase II GC description of the Arapahoe Formation

EPA-S3 Section 1.3.3.8, page 24, second paragraph. The conclusion stated here that the unconfined aquifer at RFP is "... not generally believed to be capable of producing economical amounts of water", must either be quantitatively documented or be deleted. The discussion of hydraulic conductivities of the aquifer in this section is not sufficient to draw such a conclusion.

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- Response The conclusion has been deleted from this paragraph
- EPA-S4 Figure 1-4 The legend for this figure shows RFP as draining to various surface water monitoring sites. These monitoring sites are not discussed in the text or legend. The text or legend should describe these sites or they should be removed from the figure.
- Response Text has been revised to mention surface water monitoring sites, and Figure 1-4 has been revised to indicate with which drainages these surface water monitoring sites are associated
- EPA-S5 Figure 1-8. This figure was first used in the OU8 work plan and still shows the outline of OU8 on the map. This outline should be removed to avoid confusion about its purpose on this figure.
- Response The figure has been revised and the outline of OU8 has been deleted, as requested
- EPA-S6 Figure 1-10. This figure shows a stratigraphic column from LeRoy and Weimer (1971). A more detailed stratigraphic section that also includes a revised interpretation for the contact between the Arapahoe and Laramie Formations must be substituted for the older section. Figure 4-53 from *Phase II Geologic Characterization*, (EG&G, 1992), shows this revision alongside a previous stratigraphic column and would be a much better figure to use in this work plan. It would also conform to the geologic map and cross-section shown in Figures 1-11 and 1-12 that were taken from the same document.
- Response Figure 4-53 from the Phase II Geologic Characterization Report has been reproduced in Figure 1-10 of this work plan, as requested
- EPA-S7 Figure 1-11. This figure is a geologic map of the RFP area. The symbols for the cross section should be added to the explanation portion of this figure.
- Response Symbols for the cross section have been added to the explanation on the figure
- EPA-S8 Figure 1-12. This figure is a geologic cross section, the ends of which should be labeled A and A' to correspond to its location on the previous geologic map.
- Response Cross section A-A' has been labeled on the figure.
- EPA-S9 Section 2.1.3, page 7, second paragraph. The first sentence incorrectly states that the outline of IHSS 157.2 includes the soils surrounding building 440. It actually runs along the north side of building 440 and only includes the paved area north of 440.
- Response Text has been revised accordingly

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EPA-S10 Section 2.1.3, page 8, first paragraph. This paragraph discusses background contaminant levels in a ditch south of Building 444. It is unclear how these background values relate to the site-wide background geochemical report. This must be clarified.

Response It is unlikely any correlation can be made between the 1954 ditch samples with radioactivity levels that were stated to be above background and background levels evaluated in the background geochemical report generated from 1989 data. No quantitative data from 1954 are available to make such comparisons.

EPA-S11 Section 2.1.7, page 16. IHSS 147.1 has been officially transferred to OU9 for investigation and need not be included in the final version of this work plan.

Response Discussion of the transfer of IHSS 147.1 to OU9 has been added to the text. A brief discussion of this IHSS has been retained in Section 2.0 to supplement the discussion of the transfer. It is deleted from discussion after Section 2.0.

EPA-S12 Section 2.2.2, page 26, first paragraph. Since many of the PCB sites fall into the OU12 boundaries, it is appropriate to briefly discuss here the plans for investigation of these sites. The statement that it is assumed that separate programs will handle such activities is insufficient.

Response It is currently intended for PCB sites to be investigated under TSCA, not under RFI/RI activities. DOE is currently preparing a strategy for PCB site investigations under TSCA, and the agencies will be involved in review and decision making related to the proposed strategy. Discussion of the proposed PCB site investigation approach has been added to the text. See response to comment no. EPA-G2.

EPA-S13 Section 2.2.2, page 26, second paragraph. This section discusses previous investigations and the impacts of other OUs on OU12. However, it does not discuss how investigations of IHSSs found within the boundaries of OU12 but assigned to other OUs will be coordinated with the OU12 investigations. This must be clarified in this section.

Response The text has been revised to discuss coordination of overlapping IHSS investigations.

EPA-S14 Section 2.3.2, page 33, second paragraph. The third sentence incorrectly states that alluvial water levels are highest during late summer and fall. Spring to early summer is when recharge is greatest and the water table is highest. The significance and veracity of the last part of the sentence, "... whereas some wells go dry at this time of year.", needs further explanation.

Response Referenced sentence has been deleted.

EPA-S15 Section 2.3, page 28, paragraph 2. This paragraph states that Appendix D contains borehole logs for all well locations used in the work plan. The borelog for Well 15889 could not be

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found in the appendix. This borelog needs to be added, and Appendix D needs to be checked to make sure it contains all the wells shown on Figure 2-30.

Response. Well 15889 is no longer included in the OU12 hydrogeologic discussion (see comment no EPA-G2) The borelog for well 15889 will not be included in Appendix D

EPA-S16 Section 2.3.2, page 35, paragraph 2. The influence of infilled utility trenches and footing drains to the hydrogeology of OU12 is discussed in this paragraph. These potential preferred migration pathways are very important and must be identified as thoroughly as possible prior to any sampling so that sample locations are appropriately located. The statements here indicate that locations of these features will not be determined prior to initiating fieldwork and therefore will not be used in placing sample locations in areas of potentially preferred migration pathways.

Response Engineering drawings of utility lines at OU12 IHSSs will be reviewed in the initial data review task of the RFI/RI, which is conducted prior to any sampling activities The extent to which these features act as preferential flow paths will be assessed during the data review task, and supplemented with data from initial sampling activities Sampling of utility trenches and footing drains will be proposed, if necessary, in a technical memorandum

EPA-S17 Section 2.3.2, page 36, paragraph 2. This entire paragraph must be deleted since the mislocation of well 15889 explains what appeared to be a very anomalous ground water mound.

Response Paragraph has been deleted Figures 2-34 and 2-35 have been changed

EPA-S18 Section 2.4.1, page 37, paragraph 2. This paragraph discusses a release that contaminated the IHSS 116.1 area. However, the time frame of the release is not given. The time of the release should be added to this discussion if available.

Response As stated in the first sentence of Section 2.4.1.1, additional information on the release is not available

EPA-S19 Section 2.4.1.1, page 38, paragraph 2. This paragraph states that normal beryllium concentrations are 0.01 to 2 milligrams per gram (mg/g) of soil. However, no reference for citing this relatively high background value is given. A reference must be added for these values.

Response A reference to the document stating the "normal" beryllium concentrations has been included in the report.

EPA-S20 Section 2.4.2.1, page 43, paragraph 1. This paragraph discusses beryllium concentrations in soils and refers to Figure 2-37. The units of concentration for beryllium on Figure 2-37 are

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explained as micrograms per kilogram ($\mu\text{g}/\text{kg}$) whereas the units are expressed as mg/kg on page 43 and Table 2.4. This discrepancy needs to be corrected.

Response Units on Figure 2-37 have been changed to mg/kg

EPA-S21 Section 2.4.2.1, page 43, paragraph 1. This paragraph states that chromium concentrations ranged from 5.5 to 34 mg/kg . These values include concentrations in the deeper spoils, which are those below 3 feet deep. However, Figure 2-37 shows only the chromium concentrations for shallow soils. The text must be clarified to note that Figure 2-37 depicts data from only the top three feet.

Response Text has been revised accordingly

EPA-S22 Section 2.4.2.1, page 43, paragraph 2. The data presented in Table 2-4 indicate slightly higher concentrations in soils at depths greater than 3 feet as opposed to slightly lower as stated in the text. This must be corrected.

Response Text has been revised accordingly

EPA-S23 Section 2.4.2.1, page 44, last paragraph. This section states that ground water quality data is only available from two wells in the vicinity of OU12, neither of which actually lie in its boundaries. Were none of the dozen or so wells which are actually shown to be in OU12, actually sampled for ground water analysis? If they were sampled, why is the data not available?

Response A search of databases at the RFP indicates that only two wells are sampled. The remaining wells, due to artificial conditions in the industrial area, function as piezometers only or are dry

EPA-S24 Section 2.4.2.2, page 47, paragraph 4. This section discusses the shallow soil and ground water analytical data in relation to background data presented in the *Background Geochemical Characterization Report* (EG&G, 1990). After review by EPA, the geochemical characterization approach has been extensively revised. Therefore, discussion of contamination compared to background must be qualified as related to interim values at this time.

Response Discussion has been added to the text regarding the use of background data from the referenced report.

EPA-S25 Section 2.5.4, page 59. The primary goal of the OU12 RFI/RI is to gather data that can be used to define the nature and extent of contamination, which can also be used to support a Baseline Risk Assessment. This correction must be made to the first sentence of this section

Response Correction has been made to the first sentence

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EPA-S26 Figures 2-29, 30-, 31, 34, 35, 36, 37, and 38. These figures have well 15889 mislocated. The *Geological Characterization Report* (EG&G, 1992) lists the state coordinates for this well as being 749125 North and 2080718 East. This puts well 15889 about 2000' west of the location shown and at the west central edge of these figures. When properly plotted, all anomalous features disappear from these figures. This well must be plotted in the correct location, and the associated figures and text related to this misplacement must also be corrected as needed. Additionally, it is suspected that wells 17889, 11989, and 11589 were abandoned in 1989. The active or abandoned status must be verified for all wells shown in these figures, so that existing active wells might be incorporated into the field sampling plan.

Response Well 15889 is located off of the figures to the west and is not included in the OU12 work plan. The active or abandoned status of all wells shown in the figures has been verified, and abandoned wells indicated as such. The affected figures have been revised accordingly.

EPA-S27 Section 3. The preliminary identification of potential chemical-specific Applicable or Relevant and Appropriate Requirements (ARARs) for surface water and ground water presented in this section is the subject of a separate review process and comments from the EPA and CDH will be submitted in a separate document. The final version of this work plan must be amended to reflect any such comments that are submitted.

Response Comments received in a timely manner before this work plan is due will be included although no comments regarding CSBs have been received to date. Section 3 has been revised to refer to Chemical Specific Benchmarks in a similar manner as the OU8 work plan.

EPA-S28 Section 3.2, page 8, paragraph 3. Preliminary Remediation Goals (PRGs) for those chemicals that do not have ARARs associated with them should be calculated assuming more than industrial land use as is stated here. A future onsite residential land use scenario must also be used in such calculations so that a range of PRGs might be established that can be applied to various future land uses.

Response Land use scenarios will be determined in the Exposure Assessment technical memorandum, within the BRA. PRGs will be established based on those land use scenarios, and presented in the feasibility study.

EPA-S29 Section 4.1.2.2, page 4, paragraph 4. This paragraph states that the mean concentration of chromium in OU12 is less than the background concentration. It is significant that none of the sample locations are within the areas of the former cooling tower ponds that were thought to be contaminated with chromium. Therefore, chromium contamination levels at OU12 are still unknown. This fact must be added to this discussion.

Response The discussion has been revised accordingly.

EPA-S30 Section 4.1.4, page 7, paragraph 2. The first sentence states that select OU12 IHSSs will be characterized for nature and extent of contamination. This must be changed to apply to all OU12 IHSSs.

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Response Sentence has been revised accordingly

EPA-S31 Section 4.1.4, page 7, last paragraph. Collection of OU12 surface water data through the sitewide program is mentioned here. To ensure that the needs of the OU12 RFI/RI are met for this type of data, additional discussion must be included in Section 6, Field Sampling Plan, regarding surface water sampling locations, numbers of samples, types of analysis, etc.

Response Data obtained from sitewide surface water programs will be obtained and evaluated in the initial task of the RFI/RI. Results of the evaluation, in addition to data obtained from IHSS investigations, may indicate the need for additional surface water data collection. A technical memorandum outlining surface water sampling would be prepared, if necessary, and submitted to the agencies.

EPA-S32 Section 4.2.5, page 16, paragraph 3. What is the sixth type of activity to be performed? (Only five are listed here).

Response: There are only five types. The sentence has been revised accordingly.

EPA-S33 Section 5.5.2, page 8, last paragraph. "Site-specific background concentrations" are cited as being the levels above which sample concentrations are considered evidence of contamination. The term, site-specific background concentrations, needs to be further defined so that its applicability may be assessed.

Response Site-specific background will be determined using data collected during the RFI/RI for OU12 and adjacent or overlapping OUs. If additional data are needed to determine site-specific background, additional sampling will be proposed in a TM. Any values used for comparison purposes will be proposed and negotiated with the agencies during the RFI/RI.

EPA-S34 Section 5.5.2, page 9, paragraph 1. This paragraph states that data will also be compared to sitewide background values from the *Final Background Geochemical Characterization Report for 1989* (EG&G, 1990). As previously stated, background values from this report have not been approved as being final values for such uses.

Response: It is recognized that values from the Background Geochemical Characterization Report are not approved for the stated comparisons. The values are used relatively and the document is used for guidance only.

EPA-S35 Section 6.2.1.1, page 4, paragraph 2. The assumption that "... radionuclide distribution is relatively homogeneous over the field of view, and that the distribution varies only with depth" may not be valid for releases that have impacted relatively small areas, as is the case for many in OU12. Field of view for the HPGe is stated as being a circle of either 45' or 195' in diameter, depending on mounting height. Further discussion must be included that will define "relatively homogenous" and clarify this statement.

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- Response The assumption of homogeneity is necessary due to the basic laws of physics under which all radioactive screening probes must operate. In order to compensate for this assumption and the relative heterogeneity expected at the Rocky Flats Plant, the HPGe has been supplemented with NaI probe, surficial soil, and depth profile samples.
- EPA-S36 Section 6.2.1.1, page 5, paragraph 2. The use of tripod vs. vehicle mounted detectors is discussed here. It is also necessary to discuss any differences in sensitivities between the two systems and how results gathered using the different techniques will be correlated.
- Response Differences in sensitivity are discussed in the text. Both pieces of equipment measure a concentration per unit mass, therefore, the quality of the results are the same, it is just the sensitivity that varies.
- EPA-S37 Section 6.2.1.1, page 6, paragraph 1. This paragraph discusses soil sampling for radionuclides in areas now covered with asphalt. It states that depth profiles to use with the HPGe survey will not be taken in these areas. Soil profiles must be taken in these areas for the same reason that it is being done in unpaved areas and also to determine if the original surface soil has been disturbed between the time of contamination and asphalt paving.
- Response As agreed to in the comment resolution meeting, grab samples will be collected beneath concrete or paved areas. Depth profile samples will be taken in exposed soil areas to supplement the HPGe surficial analysis.
- EPA-S38 Section 6.2.1.1, page 6, paragraph 2. This paragraph discusses the use of a laboratory-based HPGe detector. It states that the HPGe detector will detect concentrations of gamma-emitting, off-site radionuclides. It is not clear from this statement what is meant by "off-site radionuclides" or how these will be separated from RFP-generated radionuclides. This point must be clarified.
- Response The term "offsite" has been deleted.
- Depending upon the confidence level for which the laboratory HPGe detector results will be confirmed by offsite laboratory analysis, it might be prudent to preserve all, or a portion of all soil samples, that will be analyzed by the laboratory HPGe for possible submittal to offsite labs. By doing this, if it is found that there are problems with the laboratory HPGe, it would not be necessary to collect an additional set of samples. Further discussion of this matter in the work plan is necessary.
- Response Samples will be retained until the laboratory HPGe results have been evaluated. Text has been revised accordingly.
- EPA-S39 Section 6.2.1.2, page 8, paragraph 1. This paragraph discusses the use of a hydraulic probe rig for soil gas sampling. It states that "at several sites where no historical evidence of volatile organic compound contamination exists, soil and ground water screening samples will be collected in the absence of a prior soil gas survey." The reason for collecting these samples needs to be clarified in the text.

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Response Text has been revised to include soil gas sampling will be performed at all sites suspected of being contaminated with volatile organics and that soil screening and ground water screening will be performed at all sites that is warranted. Reference to a "prior soil gas survey" has been deleted.

EPA-S40 Section 6.3, page 18, paragraph 2. This paragraph discusses how uncontaminated IHSSs will be delineated. Such a discussion is premature and must be eliminated from this section.

Response Discussion of uncontaminated IHSS delineation has been deleted.

EPA-S41 Section 6.3.1, page 22, paragraph 2. The last sentence in this paragraph lists collection and analysis of soil samples from boreholes. It must be clarified that this is the minimum number of samples per borehole. The same comment applies to page 24, paragraph 2.

Response The word "minimum" has been added to the referenced sentences.

EPA-S42 Section 6.3.2, page 23, paragraph 2. This paragraph discusses the HPGe radiological survey. It states that at the site, concrete must be cored to obtain soil samples under the concrete. Neither Figure 6-2 nor 6-5 show sample locations on concrete. The area to be sampled is shown as pavement, presumably asphalt, rather than concrete. This discrepancy between the text and figures should be clarified.

Response Text and figure have been revised to reflect the presence of asphalt and collection of asphalt samples.

EPA-S43 Section 6.3.11, page 38, paragraph 1. This paragraph refers to Figure 6-22, however, Figure 6-11 shows IHSS 147.2 referred to in the text. This needs to be corrected.

Response. Figure number in the text has been revised accordingly.

Although no specific releases have been documented for this IHSS, it seems that complete characterization of this site cannot be accomplished by two surficial soil/depth profile samples and the radiation survey. Due to the fact that little is known about this site, additional sampling must be performed. It is recommended to add a soil gas survey, soil and groundwater screening, temporary well points, and one borehole/monitoring well. Thickness of the alluvium at this site is less than 10 feet, so costs involved with the added sampling would be less than other areas. In addition, data from this isolated IHSS could be quite valuable in mapping efforts.

Response. Sampling efforts at this IHSS are staged in similar manner for all other IHSSs. Seven HPGe survey and surficial soil sample locations, NaI probe locations, and three depth profile samples have been included. If surficial sampling indicates that contamination exists, more sampling at depth and possibly of ground water will be performed. Text has been revised to reflect this staged approach.

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- EPA-S44 Section 6.4.4, pages 41 and 42. The SOPs to be developed for collection of soil and ground water screening samples using the hydraulic probing rig and for measuring water levels and identifying flow direction using a pneumatic water level indicator must be submitted with the final version of this work plan.
- Response Draft SOPs will be submitted or existing SOPs will be modified using a DCN and submitted
- EPA-S45 Section 6.4.6, page 44, third paragraph. The fourth sentence incorrectly references Figure 6-9 the correct figure is 6-12.
- Response The text has been revised to reference the correct figure number
- EPA-S46 Section 6.5.3, page 51. The text references Table 6.4, when it should reference Table 6.3.
- Response The text has been revised to reference the correct table number
- EPA-S47 Section 6.6, pages 51-52. The Data Management and Reporting Plan presented here is vague and somewhat confusing. Although it is understood that RFEDS is still evolving, a more specific and detailed account of data management and reporting procedures and timeframes is an important part of this work plan and needs to be in place prior to work plan approvals. Clarification of the specific field data parameters that will be entered into RFEDS by way of example will demonstrate that this aspect has been designed prior to startup. In addition, sample tracking report formats from RFEDS must be included in this work plan as well as some description of the timeframes involved in generating and distributing these reports.
- Response Additional detail regarding RFEDs has been added in Appendix I, including clarification of the specific field data parameters that will be entered into RFEDs. A sample tracking form (FO 14K) is included in Appendix I. A discussion of timeframes has been added to Section 6.6
- EPA-S48 Section 6, Table 6.1. Overall this table is helpful in presenting a summary of the IAG required vs. proposed sampling activities for OU12, however, in certain aspects it must be clarified and revised. The most confusing portion deals with surficial soil samples and associated footnotes a, b, and c. Specifically, these samples need not be listed twice for IHSS groups 116, 136, 157.2, and 120, but the subsequent analysis activities must agree with the details specified in the text for each IHSS. In addition, footnote 'e' is incomplete and could not be found in the table.
- Response Table 6.1 has been revised, as well as the text and figures. The numbers and types of samples presented on Table 6.1 have been revised to reflect a better understanding of the capabilities of the HPGe detector
- EPA-S49 Section 6, Table 6.5. This table indicates that field blanks are not required for organics. A justification for not using field blanks for organics must be included in either the text or with the table.

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- Response Field blanks for organics have been added to Table 6 5
- EPA-S50 Section 6, Figure 6-5. In this figure, it appears that there are a few areas that may need added coverage for the radiological survey. One additional location needs to be added near the southeast corner of building 444, by the ingot open storage area. The south side of building 447 would be covered better if one of the survey locations were moved north 50 feet. One additional location needs to be added in the unpaved area northwest of IHSS 116.1.
- Response Field radiation survey points have been altered to reflect 150 ft grid spacing. A sample point has been placed approximately 50 ft south of the ingot open storage area and south of Building 447, approximately 10 feet. In addition, additional locations have been added at IHSS 116 1 which are further supplemented by NaI probe locations
- EPA-S51 Section 7, Page 1, first paragraph. Submittal of this work plan to EPA and CDH occurred on May 8, 1992, not March 8, 1992, as stated.
- Response. Comment noted. The text has been revised to reflect the submittal date of the Final Work Plan, October 5, 1992.
- EPA-S52 Section 7, Page 1, second paragraph. This paragraph is suggesting that lengthy lab turn-around times may result in missing deadlines that have been set forth in the IAG. Since this concern is already being presented, it seems appropriate that actions must be planned now that would initiate and accelerate sampling activities in timeframes that would allow for longer lab turn-around. Such actions will also benefit preparation of the BRA and are more advantageous to the project as a whole than merely suggesting that future extensions may be needed. One possibility might be to arrange for necessary permits ahead of time, so that actual field work could begin in November rather than December. It also seems that less time should elapse between the screening/sampling activity and drilling phase of field sampling activities.
- Response: The FSP, as presented, was designed to use screening activities to effectively minimize the quantity of samples sent for laboratory analysis, thereby reducing laboratory turnaround times
- EPA-S53 Section 8.0, Page 2, last paragraph; page 3, first paragraph. The work plan states that "The EPA and DOE require a two-phase evaluation for the radiological portion of the assessment; and, "The implementation of procedures established by the International Commission on Radiological Protection (ICRP) and adopted by the EPA (is) used to estimate the radiation dose equivalent to humans from potential exposure to radionuclides through all pertinent exposure pathways." This statement is not accurate. EPA does not currently require the ICRP method to be used, either alone or in tandem with the methodology presented in RAGS. Indeed, the ICRP method, because it was developed for occupational exposure and based on a "Reference Man," is not entirely appropriate for use at a Superfund site. The reference man is healthy, 20 to 30 years of age, and clearly does not represent the general public that may be exposed to radionuclides. A more complete description of the disparities between ICRP and EPA methodology can be found in *Transuranium Elements, Volume II, EPA Office of*

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Radiation Programs. Since the risk assessment is intended for EPA, it must use EPA-derived procedures. Until the ICRP method is officially adopted by EPA Region 8, it must not be included in the risk assessment, except perhaps as an addendum.

Response Section 10 of RAGs specifies that the two-phase evaluation should be utilized for the radiation risk assessment. In addition, DOE requires the use of the two-phase evaluation. Thus, the OU12 risk assessment will utilize the two-phase approach utilizing the ICRP procedures and the computation of health risk based on age-averaged lifetime excess cancer incidence per unit intake and per unit external exposure for radionuclides.

EPA-S54 Section 8.0, page 5, third paragraph. The text states, "With DOE's future ecological land use plans for the OU12 industrial area, future onsite residents are not likely target populations". DOE's future plans are irrelevant in a human health risk assessment. The risk assessment must address the possibility of residents living in the area. It is plausible that residential development in the area will occur in the next century when most of the radiological contaminants could still be present. In addition, it would be inconsistent with other OUs, since a residential-use scenario has been the conventional assumption. Intentions, regardless of how altruistic, must not be included in the quantitative risk assessment. A residential scenario must be included in the exposure assessment.

Response The word "ecological" has been removed from the sentence. Land use scenarios will be determined in the Exposure Assessment technical memorandum, within the BRA.

EPA-S55 Section 8.0, page 6, second bullet. Dermal exposure to contaminants in soil was omitted and must be included as a possible exposure route from surficial soils.

Response Text has been revised accordingly

EPA-S56 Section 8.1.2, page 7, second paragraph. Again the ground work is being laid for activities that may cause delays in the IAG schedule. If additional ground water investigation activities are anticipated, they must be at least tentatively identified and scheduled so that the likelihood of delays can be reduced.

Response Ground water activities beyond those required by Table 5, Attachment 2 of the IAG, are presented in the FSP, and a TM will be submitted if additional work is necessary.

EPA-S57 Section 8.2.2, page 9, last paragraph. The second sentence delineates TICs that will be excluded from the Human Health Risk Assessment. This statement seems to be premature and must be deleted.

Response Statement has been revised.

EPA-S58 Section 8.2.3, page 10, second paragraph. The word "RFP related" must be removed from the first sentence.

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Response "RFP related" has been deleted

EPA-S59 Section 8.2.4, page 11, second paragraph. The flow chart and description of the strategy to be used in the selection of contaminants of concern (COCs) contains major design flaws. The steps must be rearranged because the order of criteria in the flow chart is as critical to the selection process as is the specific criteria used to select COCs. For example, no class A carcinogen should be eliminated from the risk assessment under any circumstance. However, as presented in the flow chart, known human carcinogens could be eliminated in the first or second step. A decision must be made about class A and B carcinogens in the initial screening step.

Response The flow chart has been revised as indicated on Figure 8-2. In regard to Class A carcinogens, those that are at or below background will be eliminated from the risk assessment. DOE does not intend to evaluate risk from background.

RAGS states that, "In general, comparison with naturally occurring levels is applicable only to inorganic chemicals, because the majority of organic chemicals found at Superfund sites are not naturally occurring." Accordingly, the elimination of background chemicals must be limited to inorganic chemicals. Moreover, background concentrations must be collected from an area minimally impacted by man and must accurately represent the RFP area. Due to natural variation of geographical regions, U.S. Geological Survey data should not be used for this purpose, unless it can clearly be shown that the data were specifically drawn from the area.

Response Text has been revised addressing comparison to background.

RAGS presents the concentration-toxicity screen in great detail. It should be used instead of the screening step which uses one-tenth health environmental criteria for elimination. The one-tenth criteria is not an EPA-endorsed methodology.

Response: The concentration-toxicity screen has been incorporated.

EPA-S60 Section 8.2.4, page 11, paragraph 3. It is stated here that the data will be evaluated according to RAGS section 5.9.3 to determine if the detection frequency is greater than 5 percent. RAGS does not state that 5 percent is the detection frequency limit - its says that "any detection limit to be used (e.g. 5 percent) should be approved by the RPM prior to using the screen".

Response: DOE-RFO has presented the 5 percent detection frequency limit to EPA and CDH on numerous occasions. It has been agreed to in the past by these Agencies and it is also common to Superfund sites.

EPA-S61 Section 8.2.4, page 13, paragraph 2. This section states that chemicals which are essential human elements need not be considered further in the quantitative risk assessment. Prior to eliminating those chemicals, however, they must be shown to be present at levels that are not associated with adverse health effects. Hence, a quantitative risk assessment must be

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performed. In addition to the relatively innocuous constituents described in the plan, be aware that chemicals such as arsenic and selenium are also considered essential elements.

Response The text has been modified to more clearly define the criteria for consideration in the Human Health Risk Assessment.

EPA-S62 Section 8.3.1, page 16, paragraph 2. The definition provided for the Reasonable Maximum Exposure is not exactly correct. Exposure is a function of chemical concentration, contact rate, exposure frequency and duration, body weight, and averaging time. The exposure concentration RME is defined as the 95 percent upper confidence limit on the arithmetic average. The RME for the other components of exposure cannot be based solely on quantitative information, but also requires the use of professional judgement.

Response: The text has been modified to better define RME.

EPA-S63 Section 8.4, page 20, paragraph 3. The discussion of toxicity values focuses on RfDs and cancer slope factors with no mention of Inhalation Reference Concentrations (RfCs). These values will be important when assessing the inhalation pathway or the volatilization of contaminants from ground water or surface water. They must also be discussed in this section.

Response RfCs have been added to the text and will be utilized in the assessment

EPA-S64 Section 8.4, page 21, paragraph 2. This section discusses the information sources of toxicity values which are used by EPA. The authors should be aware that there is an established hierarchy of data sources within EPA. As described in RAGS, the IRIS system is first, followed by the HEAST, and then toxicity values developed in consultation with the ECAO Technical Support Center. This section gives the reader the impression that, other than IRIS, the other sources of information available are equal in quality and preference.

Response The text has been revised accordingly. In addition, as required by the IAG, a technical memorandum will be submitted for review and approval listing the toxicological and epidemiological studies utilized for determining toxicity values when values are unavailable in IRIS.

EPA-S65 Section 8.5, page 24, paragraph 2. The method presented in this paragraph for assessing non-cancer health effects is overly aggressive and may be unnecessary. Hazard Quotients (HQs) are initially the sum of all Hazard Indexes (HIs), regardless of mechanism of action. Then, if the HQ exceeds one, the compounds are segregated based on target organ and mechanism of action. This segregation process can be complex and time consuming, and should not be undertaken unless it is known that the sum of all the HIs clearly exceed one.

Response The text has been revised accordingly to better explain the use of the HQs and HIs Segregation will only take place as necessary

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EPA-S66 Section 9.1, page 1, paragraph 1. If there are no viable ecosystems or natural habitats presently existing in OU12, as stated here, why is this OU being considered for an ecological preserve?

Response OU12 is not being considered as an ecological preserve Text has been revised accordingly.

EPA-S67 Section 9.3, page 3, paragraph 3, bullet 1. The work plan states that the presence of target taxa, which are accumulating or concentrating target analytes, is a criterion for initiating ecotoxicological studies. The method for determining concentration or accumulation of chemicals prior to ecotoxicological studies is not clear. The criterion must be clarified.

Response A list has been prepared of contaminants which are known, based on published laboratory and field studies, to bioaccumulate in plants or animals. During OU12 Phase I investigations, a limited number (<20) of small rodent tissue samples will be collected and analyzed for the presence of the listed contaminants. This study will provide empirical confirmation or denial of contaminant uptake by what is believed to be the dominant mammal species in the Industrial Area

EPA-S68 Section 9.3, page 3. In the section under Ecotoxicological Investigations, a number of conditions were presented which would trigger an investigation. What about the effect of contaminants moving offsite and adversely affecting target taxa?

Response: Contaminant effects on Target Taxa in the non-operable unit areas beyond OU12 and the Industrial Area boundaries would be considered during development of the Biotic Transport Model Impacts, if any, of OU12 contaminants on target taxa in adjacent buffer zone operable units (primarily OU5) would be considered during field work for the environmental evaluation (EE) for the potentially affected OU

EPA-S69 Section 9.0, Table 9.1. The key of status symbols does not include a definition for 9. This definition must be provided.

Response. On Table 9.1, the status of endangered species according to state lists was mistakenly shown in the table as "9". It has been revised to "e", which is shown in the table explanation.

EPA-S70 Section 10, Figure 10-1. This figure should be updated with the names of the personnel who are currently in the positions shown on the chart.

Response: Figure 10-1 has been revised accordingly.