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August 16, 1994
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Mr. Randy Ogg
Environmental Restoration
EG&G Rocky Flats, Inc.
Rocky Flats Plant
P.O. Box 464, Bldg. 080
Golden, CO 80402-0464

Subject: **Responses to Colorado Department of Health (CDH) and US Environmental Protection Agency (EPA) Comments on the OU4 Draft Final Phase II RFI/RI Work Plan**
Operable Unit 4 Phase II RFI/RI Requirements Post Closure Assessment
Task Order MTS 343780GG3 Under Master Task Subcontract MTS 225453RR

Dear Mr. Ogg:

Attached are the responses to the CDH and EPA comments on the OU4 Draft Final Phase II RFI/RI Work Plan submitted to EG&G on May 23, 1994. Parsons/ES is proceeding with development of the Final Phase II RFI/RI Work Plan based on the enclosed comment responses.

As previously discussed, Parsons/ES has modified Section 5.0 (Field Sampling Plan-FSP) to reflect a more progressive, observational approach to the Phase II field investigations. The FSP now specifies the use of additional field screening techniques during the initial phases of the field effort to acquire and analyze data that will guide the optimal placement of the monitoring wells specified in the Draft Final document.

This flexible approach will better achieve the program's overall objectives of determining the nature and extent of contamination; assessing the impact of the OU4 Solar Evaporation Ponds (SEPs) on surface water, groundwater, air, biota, and the environment; and providing data important in the initial screening and evaluation of remedial alternatives under the future Corrective Measures Studies/Feasibility Study (CMS/FS).

If you have any questions, please contact me directly at 764-8883.

Sincerely,

Peter J. Holland
Project Manager, Phase II RFI/RI

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cc:

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EG&G Records (2-c/o C. Horn)
L. Pivonka (Geraghty & Miller)
J. Gordon (Dames & Moore)
J. Bender (Ground Exploration)
P. Breen
R. Schmeirmund
C. Rosé
J.P. O'Brien
R. Henry
P. Nixon (w/out attachments)
J. Evans
A. Putinsky (w/out attachments)
R. Stegen (w/out attachments)
R. Cropper (w/out attachments)
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Attachment 1

RESPONSES TO COMMENTS
PHASE II RFI/RI WORK PLAN
Solar Evaporation Ponds, Operable Unit No. 4

August 16, 1994

Responses To
Colorado Department of Health (CDH) Comments

CDH Comment 1

Section 2.1: There appears to be some confusion as to which geologic units may or may not be included in either the HSU or the LSU at the OU-4 site. This confusion appears to be particularly site-specific in nature. For example, Laramie Formation weathered bedrock may be part of the HSU at other operable unit locations or in the context of the entire site; however, beneath IHSS 101, the Solar Evaporation Ponds (SEPs), the inclusion of the Laramie may not be appropriate. If, however, one brings the entire OU-4 operable unit north (stratigraphically downward) of the SEPs into discussion, weathered Laramie as part of the HSU may be very appropriate. To avoid any bickering over whether a certain formation is or is not part of the HSU or LSU, one needs to focus on lithology. Obviously, contaminates will not migrate differentially based on a geologic name. Therefore, acknowledge that Laramie lithologies may be included in the HSU in the northern portion of the OU, but add a statement that the lithology is more important to an understanding of contaminate migration than geologic nomenclature. Figure 2.1-1 should be retained.

Response To CDH Comment 1

The text, as it currently appears in Section 2.1, indicates that lithology is the primary factor controlling the movement of ground water and contaminants. The work plan states, "In areas where the underlying Arapahoe [or Laramie] Formation is sandstone, weathered and fractured claystone, or siltstone, it is included in the Upper HSU because of the hydraulic connection." The bedrock (whether it is Arapahoe or Laramie) is weathered throughout the greater OU4 area. The weathered bedrock (sandstone, claystone, or siltstone) is considered part of the Upper HSU throughout OU4. Unweathered bedrock formations, whether Arapahoe or Laramie, are considered part of the lower HSU.

CDH Comment 2

Section 5.2.1.4: The Division disagrees with the determination that no additional surface soil investigations is necessary. The Division's comment on Page VI.1-4, Lines 7-11, of the Roundtable Review Document stands. Since DOE has not specifically and clearly presented, in the IM/IRA Decision Document, a plan to pursue soil contamination and removal, the Division requires that the Phase II work plan include provisions for additional surficial soil sampling. Our basis for this requirement is that the Phase II investigations are intended to investigate releases from the SEPs.

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Although, investigation of soils was initiated under the Phase I effort, the results of Phase I indicate that contaminated soils exist beyond the operable unit boundary. The area beyond the operable unit boundary is OU-6; however, releases from OU-4 to OU-6 are the responsibility of OU-4. Additionally, DOE cannot assume that OU-6 will investigate the soils further as the OU-6 field work has been completed and there are no other OUs contemplated that will be tasked to investigate these soils. The work plan will not be approved until this issue is resolved.

Please note the eight objectives indicated to be in Section 4.4 are actually located in Section 4.1.3 and should include additional soil investigations as an objective. Please revise if a reference to the objectives is retained in the discussion.

Response To CDH Comment 2

Additional surface soil sampling will be included in the revised Phase II field sampling plan (FSP) to characterize, as appropriate, surface soil contamination outside of OU4. Prior to conducting additional surface soil investigations, available surface soil chemical data from the surrounding operable units will be reviewed to determine if sufficient information exists to characterize surface soil contamination and to better focus the surface soil sampling effort. Details of the proposed surface soil sampling will be presented in Technical Memorandum #5, as identified in the revised FSP.

The objectives listed in Section 4.1.3 were cited incorrectly and have been correctly cited in the revised work plan. Additional surface soil sampling will be added as a Phase II RFI/RI objective.

CDH Comment 3

Table 5.3-2: Regarding the location and objective of proposed well A-4, it would appear to be more suitable for compliance monitoring than to determine the extension of contamination. As located, A-4 is more immediately down gradient of Pond B-North than it is of Well 05093, per Figures 3.1-1 and 3.1-2. Given its position relative to the ITS, the well should be within the contaminant plume and cannot delineate the extent of contamination.

Regarding surface water sampling station SW-A, please review Draft Technical Memorandum No. 1 to the Operable Unit No. 8 (OU-8) work plan, dated April, 1994 for information on Building 779 footing and storm drains.

Response To CDH Comment 3

Table 5.3-2 does not accurately describe the purpose of Well A-4. Well A-4 is proposed to allow sampling of ground water downgradient of the northeast edge of the SEPs. There is no ground water quality data available for the area of the proposed well. A revised FSP is currently being prepared that describes a phased, flexible, observational approach to the Phase II RFI/RI investigation. As

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a result of this revised approach, the well locations proposed in the Draft Final Phase II RFI/RI Work Plan are subject to change depending on the data developed and analyzed while implementing the FSP.

A copy of the Draft Technical Memorandum No. 1 for Operable Unit No. 8 will be obtained and reviewed for information concerning Building 779 footing and storm drains. If the information obtained from this document impacts our current understanding of Building 779, appropriate adjustments to the FSP will be made and reported in Technical Memorandum #5.

CDH Comment 4

Section 7.0: Resolution of the dispute between the Division and EPA over risk assessment approaches, particularly considering the two phased, closure/corrective action approach for RCRA closure operable units, warrants an evaluation of the impacts specific to OU-4. The Division is unable to provide specific guidance, on this date, owing to the need to adequately inform Division personnel on the compromise approaches. Meetings for affected OUs are to be scheduled and should support the milestones for delivery of a final Phase II work plan.

Response To CDH Comment 4

It is understood that CDH and EPA are attempting to resolve the dispute concerning risk assessment approaches at the Rocky Flats Plant. When specific risk assessment guidance is provided by CDH, it will be reviewed and incorporated in the Phase II RFI/RI Work Plan, as appropriate.

Responses To
U.S. Environmental Protection Agency (EPA) Comments

Overall Comment 1

It is our understanding that DOE is not planning to move forward with the proposed field sampling plan (FSP) until geoprobe studies are conducted at the OU4 area. DOE staff has indicated that the geoprobe studies are necessary to better delineate preferential ground water flows and select adequate well locations. The FSP for the geoprobe studies have not been provided to the regulatory agencies. In order to minimize schedule impacts, EPA suggests that DOE move forward with the implementation of the geoprobe studies as soon as possible. DOE should modify the Phase II FSP and resubmit it to EPA and CDH via Technical Memorandum (TM). The TM should incorporate the results of the geoprobe studies and should include a rationale for the number and location of the new wells.

Response To Overall Comment 1

The FSP presented in the Draft Final Phase II RFI/RI Work Plan submitted to the EPA in May 1994 currently is undergoing revision. The revised FSP will be presented in the Final Phase II RFI/RI Work Plan for agency review and concurrence. The field activities presented in the revised FSP are designed as a phased, flexible, observational program that relies heavily on "real time" analysis for subsequent direction of the proposed tasks. Each subsequent task is dependent on the integrated results of the previous tasks. Conditional decision points occur throughout the FSP to allow direction or redirection of the subsequent tasks. The decisions will be made based on scientific data available at the decision point. At this time, geoprobe studies are proposed as part of the FSP to provide information to site monitoring wells. The results obtained from the precursor field activities and geoprobe activity will be presented, along with the recommended monitoring well configurations, in Technical Memorandum #5 for agency review and approval.

Overall Comment 2

EPA presently feels that the proposed four unweathered bedrock wells are not sufficient to fully characterize the unweathered bedrock at OU4. The revised FSP should reassess the number and location of unweathered bedrock wells.

Response To Overall Comment 2

As discussed in the response to Overall Comment 1, the Draft Final FSP is currently being revised to be a phased, flexible, observational field program. The number and locations of monitoring wells will be based on scientific data available from previous investigations and data generated as part of the Phase II RFI/RI field program. The results of the data analysis and the recommended

unweathered bedrock well configuration will be documented in Technical Memorandum #5 and submitted for CDH and US EPA review and approval.

Overall Comment 3

It is unclear how information on previous groundwater sampling efforts was utilized to design the proposed FSP. The revised FSP should specify the relationship between previous sampling efforts and the proposed groundwater investigation.

Response To Overall Comment 3

As indicated in the response to Overall Comment 1, the FSP presented in the Draft Final Phase II RFI/RI Work Plan currently is being revised to include a phased, flexible, observational investigation approach. The revised FSP will include integration and subsequent evaluation of all currently available and developed data to guide the RFI/RI investigation. The investigation tasks will be focused on obtaining the data necessary to site monitoring wells and to provide the necessary input for future CMS/FS activities. Technical Memorandum #5 will be prepared to summarize the currently available data and any additional data collected during the initial phases of the investigation prior to selecting the proposed monitoring wells locations. The relationship and integration of the previous OU4 investigations and the Phase II investigation will be clearly specified.

Overall Comment 4

The risk assessment section should be revised to evaluate the risks at OU4 considering post-closure conditions. The risk assessment should assess the risks associated with any contamination remaining in the soils outside the cover system (i.e., soils within the seeps area), as well as ground water contamination. This information can be provided via Technical Memorandum (TM).

Response To Overall Comment 4

The Baseline Risk Assessment (BRA) will be modified to include the assumption that the engineered cover and subsurface liner system proposed under the Phase I IM/IRA will eliminate further migration of contaminants and further degradation of groundwater over the long-term. The current design foot print is assumed to cover all of IHSS 101. It is also assumed that surface soils outside the foot print will not be remediated as part of the Phase I IM/IRA.

Overall Comment 5

The data quality objectives and field sampling plan will need to be modified or revised based on the geoprobe studies results.

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Response To Overall Comment 5

The DQOs and FSP will be revised, as appropriate, to include the potential geoprobe studies and evaluation of results.

Overall Comment 6

The analytical list should be revised to incorporate analysis for FO39 waste. An explanation or rationale for deleting or adding analytes from the list should be presented in the work plan.

Response To Overall Comment 6

The analytes comprising FO39 waste will be reviewed and compared with the analyte list presented in the Draft Final Work Plan. These analytes (FO39) will be compared with the chemical constituents previously detected in the historical OU4 ground water quality data to determine if any additional analytes should be considered for inclusion in the Phase II RFI/RI target analyte list (TAL). FO39 constituents that can not be eliminated based on historical quality data, will be further screened during the initial phases of the revised FSP and determinations made whether to include them in the final Phase II RFI/RI TAL. The specifics and rationale for the screening program will be presented in Technical Memorandum #5 and submitted to CDH and EPA for review and approval.

General Comment 1

The proposed alluvial (Figure 5.1-1) and unweathered bedrock (Figure 5.3-2) wells do not appear to be located in the areas determined to have preferential flow (Figure 3.3-3) of groundwater. In addition, no new wells are located in the areas where the ITS is not keyed into bedrock and its effectiveness is questioned (Figure A-5). It is apparent from the figures that the preferential flow areas and areas where the ITS is not keyed into bedrock coincide. Since there is a question as to what groundwater might be bypassing the ITS, it seems important to locate additional monitoring wells in the preferential flow areas.

Response To General Comment 1

Table 5.3-2 indicates that the final location of wells W-5 W-6 W-7, and A-11 will be determined based on the results of geophysical surveys and that the wells will be sited in bedrock channels if possible.

Well A-11 is clearly sited within an area of the ITS that is not keyed into bedrock. Note that the unconsolidated materials are largely unsaturated in the area of the ITS which limits the number of locations for viable unconsolidated materials wells.

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The use of the observational method will allow additional wells to be placed in preferential pathways or areas of the ITS that are not keyed into bedrock, if appropriate.

General Comment 2

Pages 3-53 and 3-54 (Figures 3.3-17 and 3.3-18) were missing from the EPA copy of the OU4 Phase II RFI/RI Work Plan. These missing pages made it difficult to conduct a complete and coherent review of this section of the work plan.

Response To General Comment 2

Figures 3.3-17 and 3.3-18 were inadvertently omitted from the Draft Final Work Plan during reproduction. The figures are attached and will be provided in the Final Phase II RFI/RI Work Plan.

General Comment 3

In general, information presented in Section 3.3.2 is not clearly or completely presented, and should be carefully reconsidered and rewritten to provide a simple and clearly conceived presentation of general inorganic geochemistry at OU4.

Response To General Comment 3

Section 3.3.2 of the Final Work Plan will be reviewed and rewritten to clarify confusing information, as appropriate.

General Comment 4

The text of the IM/IRA risk analysis discussion states that no environmental evaluation (EE) will be provided until the IM/IRA is installed and the Phase II RFI/RI is in process. This agrees with discussions involving EPA, DOE, and the State of Colorado. The EE will be highly reduced from the standard for the less developed area of RFETS, which is acceptable.

Response To General Comment 4

Comment is noted and requires no response.

General Comment 5

Section 7 provides a comprehensive outline of how the baseline risk assessment (BRA) will be performed. In general, the outline is complete; however, more specific information should be provided on certain steps of the risk assessment.

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Response To General Comment 5

More specific information will be added to the BRA section, as specified in response to specific comments below.

General Comment 6

Groundwater exposure pathways are not described in the BRA and do not appear to have been included in any exposure scenario. Groundwater exposure pathways are potentially complete and may pose significant health risks. They should be included in the BRA; conservative exposure parameters should be used to assess complete exposure pathways.

Response To General Comment 6

Ground water exposure pathways will be added to the exposure scenario discussion, as discussed in the specific comment responses below.

Specific Comment 1

Section 3.3.2.3. Although upgradient (local background) water sample analytical results were compared with analytical results for samples collected from the solar evaporation ponds and with analytical results for groundwater samples collected from wells downgradient of the solar evaporation ponds, no direct comparison was made using trilinear diagrams. It would be reasonable to plot inorganic data for actual solar evaporation pond water samples on the same trilinear diagram as upgradient groundwater samples and downgradient groundwater samples. A graphical illustration of this type would help support the conclusion that mixing is occurring, and would provide the reader with a clearer understanding of the rationale behind the conclusion.

Response To Specific Comment 1

Analytical results for actual SEP waters (including scattered data from 1958 through 1992) will be presented on a trilinear diagram (Fig. 3.3-20) and included in the Final Work Plan. The data for SEPs 207A and 207B (North, Center and South) plot in a reasonably consistent (considering the history of the ponds) area along the top right of the quadrilateral. This area serves as an end-member for mixing scenarios involving pond waters and up-gradient background water P307289 (constrains a theoretical mixing envelope). Most SEP-area ground waters plot between these end-members and within the mixing envelope, and thus may be explained by the mixing scenario. Limited chemical data for SEP 207C water reveals a unique composition (relative to the other ponds) and can be shown to be a plausible mixing endmember for groundwater from wells P210189 and 2286.

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Specific Comment 2

Page 3-55, First Paragraph. The conclusion is made that the change over time in chemistry of samples collected from well 3086 is due to decrease in or cessation of solar evaporation pond leakage over time and to dilution by relatively uncontaminated groundwater. Without endpoints of upgradient groundwater and solar evaporation pond sample chemistry, the rationale for this conclusion is not clear. The trilinear diagram should include data points for end points of solar evaporation pond water data presented.

Response To Specific Comment 2

As stated in the previous comment response, SEP waters will be included in the trilinear diagrams contained in the Final Work Plan and theoretical endmembers will be fully illustrated and discussed. From Figure 3.3-25 it is obvious that the relative major-ion composition of 3086 is changing and becoming more dilute over time. Figure 3.3-23 illustrates the theoretical mixing ratios and compositions of intermediate mixtures. As discussed in the text and illustrated on Fig. 3.3-24, early (ca. 1987) 3086 waters are not fully explained by mixing with any known SEP waters and may be, in part, a result of water-rock interactions.

Specific Comment 3

Section 3.3.2.4, Page 3-55, First Paragraph. If process wastewater samples are available over time, it would be reasonable to provide the data and plot trilinear diagrams for these analytical results to display the changes in water type within the ponds over time. Potentially, the water types of groundwater in wells near to the solar evaporation ponds may be responding to changes in solar evaporation pond water rather than to cessation of pond leakage or dilution from local groundwater.

Response To Specific Comment 3

This point has been addressed (see Response To Specific Comments 1 and 2). Chemical data for SEP waters is very sporadic over time precluding detailed correlation with ground water chemistry. Additionally only one set of complete analyses exist for the thirty four year period (1962 - 1994) and ground water analyses generally do not exist prior to 1986. An analysis does reveal, however, that analyzed (modern) ground waters could not have originated solely from modern (1991) SEP waters - i.e., historic pond waters continue to influence ground waters.

Specific Comment 4

Page 3-55, Last Paragraph. This paragraph states that Figure 3.3-20 suggests that groundwater from monitoring well 2996 could be the result of mixing solar evaporation pond water and groundwaters. The data presented on this trilinear diagram do not suggest this. It would have been appropriate to reach such a conclusion if the mixing scenario had included data for solar evaporation pond water and for water from an upgradient well. Well 2886 water was used in Figure 3.3-20 as one of the

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end members; therefore, it is not reasonable to suggest that mixing water from this well with solar evaporation pond water will produce the chemistry exhibited by the water from this well.

Response To Specific Comment 4

The topic of mixing SEP waters with up-gradient ground water has been reexamined and will be presented in Section 3.3.2.4. of the Final Work Plan.

Specific Comment 5

Page 3-55, Last Paragraph. The second sentence of this paragraph refers to a more detailed scenario not discussed in this document. This scenario should be explained or referenced to provide the reader with complete information to support conclusions made within the document.

Response To Specific Comment 5

The "detailed scenario" referred to was a numerical modeling program (SOLMINEQ) and its description should have been included. In the rewritten sections all references to such models (also including NETPATH) are explained.

Specific Comment 6

Figures 3.3-19, 3.3-20, and 3.3-21. Figures presented in this section are difficult to interpret because of overlapping symbols and letters. Different symbols and a clearer explanation of what each figure illustrates would provide the reader with a clear understanding of the discussion and conclusions presented.

Response To Specific Comment 6

The quality of the figures represents a limitation of the software HC-GRAM. To correct this, HC-GRAM will still be used to locate the points and determine other plotting parameters, but appropriate means (e.g. CADD, hand-contoured, etc.) will be used to display the data on the final figures for clarity. Also, all wells discussed in this section will be represented by single or double letters. These letters will be included on all trilinear diagrams and a separate index map.

Specific Comment 7

Page 5-58, First Full Paragraph. This paragraph suggests that solar evaporation pond water moving through weathered bedrock materials was depleted of sodium and enriched in calcium. The explanation presented was that sodium-rich, pond-derived water moving through the vadose zone or alluvial or weathered bedrock materials was enriched in calcium and depleted in sodium due to cation exchange. It is unlikely that sodium in solution would be replaced by calcium present in alluvial or weathered bedrock material. Sodium is likely to remain in solution unless the solution

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has a high sodium concentration. Several other explanations for the change in water type are possible and should be presented in this section. In particular, it is more likely that the wells completed in the weathered bedrock on the hillside north of the solar evaporation ponds are simply in a different portion of the aquifer and have had little or no contact with solar evaporation pond water.

Response To Specific Comment 7

Observed ground water data still suggests a shift in the cation compositions toward relatively higher calcium and/or magnesium at the expense of sodium. A cation exchange mechanism may not be the actual mechanism but it is conceptually feasible since cation exchange is a stoichiometric process. Pond waters contain high sodium concentrations relative to calcium and magnesium (up to 8:1 on an equivalent basis). This caveat was acknowledged by the commentor. Regarding other possible explanations suggested by the commentor, there do not appear to be any ground waters or process waters which could serve as an endmember for a mixing scenario which would explain the observed compositions. This section will be rewritten and expanded.

Specific Comment 8

Section 3.3.2, Pages 3-49 through 3-60. Discussions of the groundwater quality and geochemistry should also include a reference to a map or maps to portray where the wells being discussed. This would allow the reader to understand the geochemistry and water quality spatially as well as chemically. References to maps showing the locations of the wells discussed should be added to the text.

Response To Specific Comment 8

A map will be included as a new figure (Fig. 3.3-17) in the Final Work Plan on which the referenced wells are identified by single or double letters for simplicity and ease of interpretation.

Specific Comment 9

Section 7, Page 7-2, Second Paragraph. IRIS is listed at the end of the reference. IRIS is an independent source of information; it is not part of the cited document. The IRIS reference should be listed separately.

Response To Specific Comment 9

The reference to IRIS in this paragraph will be corrected and the proper IRIS citation included in the list of references.

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Specific Comment 10

Section 7, Page 7-5, Section 7.1.3.1. This section identifies criteria that will be used to evaluate analytical data. This section should describe how the data will be evaluated with respect to blank samples. If a chemical is a common laboratory contaminant, Risk Assessment Guidance for Superfund (RAGS; EPA 1989a) recommends that it is retained in the risk assessment only if it is 10 times greater than the concentration of that chemical in the blank. If it is not a common laboratory contaminant, the chemical is retained as a COC if it is five times greater than the chemical concentration in the blank. This section should also list evaluation of tentatively identified compounds as part of the data evaluation.

Response To Specific Comment 10

Section 7.1.3.1 of the Final Work Plan will describe how the data will be evaluated with respect to blank samples. If a chemical is a common laboratory contaminant, it will be retained in the risk assessment only if it is 10 times greater than the concentration of that chemical in the blank. If it is not a common laboratory contaminant, the chemical is retained as a COC if it five times greater than the chemical concentration in the blank (Risk Assessment Guidance for Superfund Section 5.5, EPA, 1989a). This section will also list evaluation of tentatively identified compounds (TICs) as part of the data evaluation.

Specific Comment 11

Section 7, Page 7-6, Last Paragraph, Second Sentence. The text states that guidelines for evaluation of data validation as described in RAGS will be used in assessing data usability. A description of how this evaluation will be performed is necessary. Level III and IV data are required by EPA for use in risk assessment.

Response To Specific Comment 11

The following is a description of the guidelines used for evaluation of data validation which will be used in assessing data usability. According to RAGS, Chapter 5, there are nine steps that should be followed:

I. Gather all data available from the site investigation and sort by medium.

II. Evaluate the analytical methods used.

III. Evaluate the quality of data with respect to sample quantitation limits.

IV. Evaluate the quality of data with respect to qualifiers and codes.

V. Evaluate the quality of the data with respect to blanks.

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VI. Evaluate tentatively identified compounds.

VII. Compare potential site-related contamination with background.

VIII. Develop a set of data for use in the risk assessment.

IX. Further limit the number of chemicals to be carried through the risk assessment (according to CDH/EPA Region VII approved data screening and aggregate techniques).

During the conduct of these steps, CDH and the EPA remedial project manger (RPM) will be consulted to account for site-specific conditions (RAGS, Chapter 5, EPA, 1989a).

Specific Comment 12

Section 7, Page 7-6, Second Set of Bullets. This section describes comparison of site contaminants to background levels. The description is incomplete. It should also describe how hot spots will be identified in the data evaluation analysis.

Response To Specific Comment 12

The attached flow chart elaborates on the discussion of comparison of site contaminants to background, which is mentioned at the end of Section 7.1.3.1. This flow chart explains the COC selection process. A description of the identification of hotspots, or areas of high contamination relative to other areas of the site, will be added to this data evaluation section.

Specific Comment 13

Section 7, Page 7-7, Third Bullet. The text states that chemicals detected at levels significantly above their naturally occurring concentrations will be retained as contaminants of concern. A complete description of where background samples will be collected, how many samples will be collected, and the type of statistical tests that will be applied to determine significant differences should be provided. Adequate information should be provided to allow the reader to determine if the background analysis has been carried out correctly. Background analyses are extremely important to the risk assessment process, as they assist with determination of achievable cleanup levels and selection of site-related contaminants of concern.

Response To Specific Comment 13

Sampling methodology and statistical tests used to determine background contamination of COCs will be in accordance with those mentioned in Sections 5 and 6 of the Background Geochemical Characterization Report for the Rocky Flats Plant (EG&G, 1993).

Specific Comment 14

Section 7, Page 7-10, First Bullet. The text reads, "maintenance workers could have incidental contact via dermal absorption for direct soil ingestion, inhalation of vapor phase contaminants,..." This statement is not clear. The text should indicate if both direct contact with soils and soil ingestion will be evaluated or if only soil ingestion will be assessed.

Response To Specific Comment 14

The bullet should read "Current populations of site remedial investigators, and construction or maintenance workers, could have incidental contact via dermal absorption from soil, direct soil ingestion, inhalation of vapor phase contaminants...". The text will be revised accordingly.

Specific Comment 15

Section 7, Page 7-10, Second Bullet. If a residential scenario is possible, ingestion of fruits and vegetables should be evaluated. Ingestion of groundwater should also be evaluated or an explanation of why this pathway is not considered complete should be provided. The risk assessment should consider all potential exposure pathways.

Response To Specific Comment 15

The Exposure Assessment Technical Memorandum (EATM) will address the complete and incomplete pathways for both current and future exposure scenarios. The EATM will also include the evaluation of the ingestion of fruits and vegetables pathway as well as the groundwater ingestion pathway for a residential scenario.

Specific Comment 16

Section 7, Page 7-11, Development of Exposure Concentrations, First Paragraph. The first sentence states that exposure point concentrations of COCs in soil, air, and water will be estimated using spreadsheet calculations and computer models. The text should describe in more detail the computer models that will be used. In addition, water is listed in this paragraph. The section describing exposure scenarios did not indicate that there are exposure pathways associated with groundwater or surface water. The text should be modified to clarify this discrepancy.

Response To Specific Comment 16

The text will be modified to include a discussion of models to estimate exposure point concentrations of COCs in soil, air, and groundwater. The text will also be modified to include groundwater pathways. Model selection and application will be addressed in the Final Work Plan.

Specific Comment 17

Section 7, Page 7-11, Development of Exposure Concentrations, Second Paragraph. The text states that "Depending on the spatial variability of contamination, different averaging may apply to each contaminant." This statement should be clarified. It is not clear what is meant by the term "spatial variability." The text should state whether it is referring to the distribution of data or the variability of the samples on-site. Typically, if a given contaminant exhibits a log-normal distribution, the upper 95 percent confidence limit of the geometric mean is used as the exposure point concentration. If the data for a contaminant are normally distributed, then the upper 95 percent confidence limit on the arithmetic mean is used as the exposure point concentration. It is not clear if this is what the statement in the text is describing.

Response To Specific Comment 17

The statement will be clarified in the revised text. The term "spatial variability" refers to the variability of the samples on-site as opposed to the distribution of the data.

Specific Comment 18

Section 7, Page 7-14, Third Paragraph, Last Sentence. The text states that if health-based toxicity criteria are not available for a chemical, a health-protective number will be derived using established procedures listed in RAGS (EPA 1989a). This statement should be clarified. RAGS states that a toxicity value may be derived using EPA methodology. This derivation should be done in conjunction with the regional risk assessment contact, who will submit the derivation to Environmental Criteria and Assessment Office (ECAO) for approval. The text should provide more information regarding how toxicity values will be derived.

Response To Specific Comment 18

The text will be expanded to provide more information on how toxicity values will be derived in conjunction with the Environmental Criteria and Assessment Office (ECAO).

Specific Comment 19

Section 7, Page 7-18, Second Paragraph, Second Sentence. The text states that slope factors will be used to estimate radiological risks from exposure for up to four pathways: inhalation, ingestion, air immersion, and external irradiation. It is not clear what is meant by air immersion. HEAST 1993 does not present a toxicity value for air immersion. This discrepancy should be clarified.

Response To Specific Comment 19

The term "air immersion" was inadvertently added to the text. The words will be removed from the revised text.

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Specific Comment 20

Section 7, Page 7-24, Paragraph 4. The text states that the exposure assessment related to groundwater for the EE would examine groundwater contaminants "reaching vegetation around seeps and impacting biota." The rationale behind this approach is not clear. The statement appears to limit concern to plant uptake of contaminants and not consider that fauna of the area may drink contaminated water directly. This statement should be clarified.

Response To Specific Comment 20

The statement will be clarified in the revised text and will consider the fact that fauna of the area may drink contaminated water directly.

Specific Comment 21

Section 8, Subsection 1.0, Page 4, Paragraph 2. This section presents the organization of EG&G Rocky Flats and the Environmental Management (EM) Department. However, not included is a list of contractors. As stated in the EPA guidance document on quality assurance project plans (QAPP), the QAPP is requested to describe and provide a table illustrating project responsibilities including subcontractors. This section should include a list of each organizational project and its subcontractor.

Response To Specific Comment 21

EPA guidance on QAPPs will be reviewed to determine the level of detail regarding subcontractors necessary in the description of organization and responsibilities. As appropriate, changes will be made to Section 8, Subsection 1.0 and to Figure 8.0-1.

Specific Comment 22

Table C-1. The maximum contaminant levels (MCLs) for radium-226 and radium-228 are incorrect according to the Drinking Water Regulations and Health Advisories recommended by the Office of Water, May 1993 (EPA 1993b). The MCLs recommended by the EPA Office of Drinking Water are 20 picocuries per liter (pCi/L).

Table C-1 does not list the MCL or the maximum contaminant level goal (MCLG) for butyl benzyl phthalate. The EPA Office of Drinking Water recommends an MCL of 0.1 micrograms per liter (ug/L) and an MCLG of 0 ug/L. The table should be corrected.

Response To Specific Comment 22

Table C-1 will be corrected to include the recently established MCLs for radium-226 and radium-228. The MCL for butyl benzyl phthalate will be added to Table C-1.

4/22

Specific Comment 23

Table C-2. It is not clear why several of the columns carry identical headings but list different numbers. For example, there are two columns with the heading "SDWA Maximum Contaminant Level," and there are two columns with the heading "SDWA Maximum Contaminant Level Goal." There should be a footnote indicating the differences between the columns of numbers.

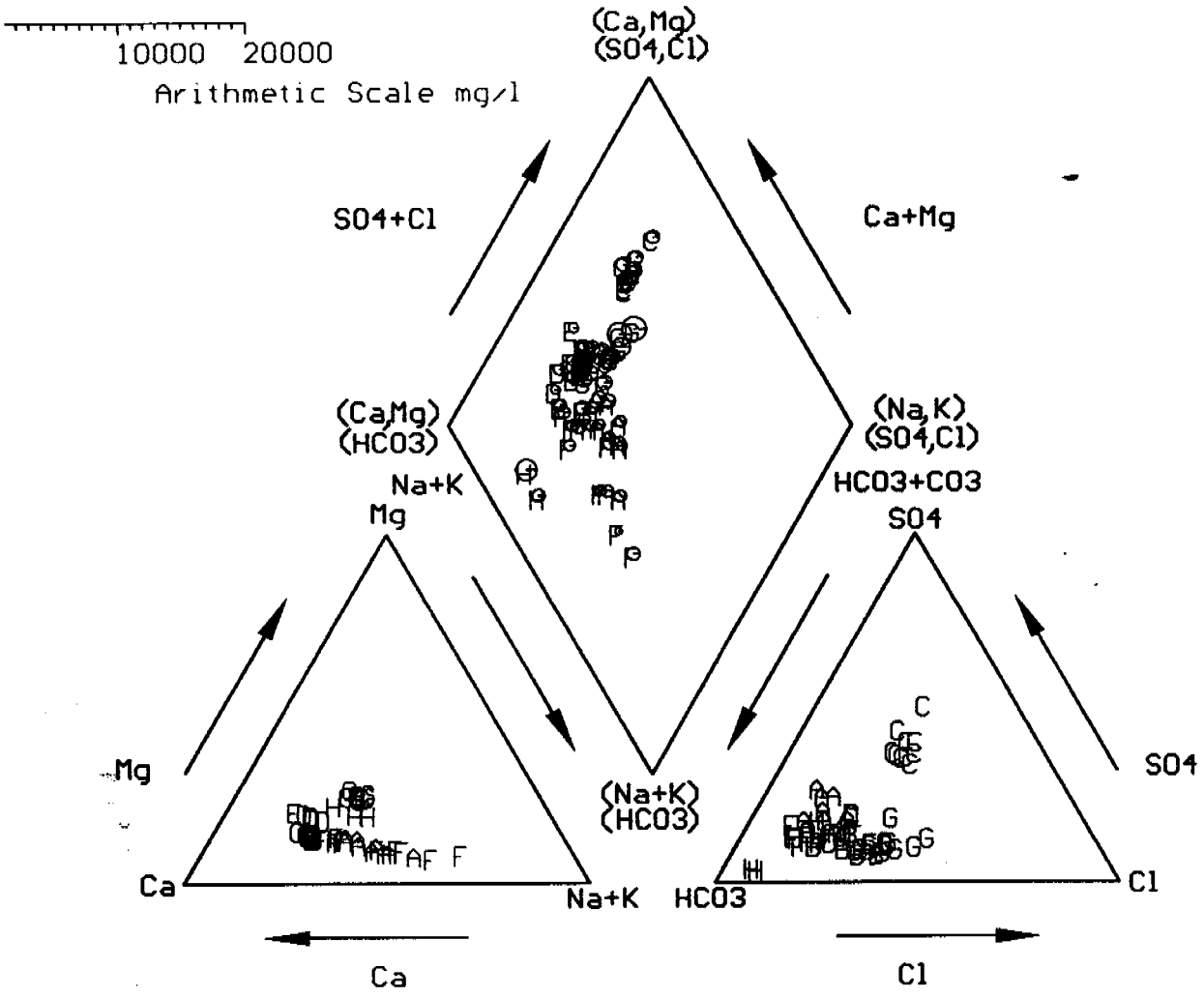
The MCL for endrin is incorrect. The number should be 0.1 ug/L (EPA, 1993b). The number presented is 2.0 ug/L. The table should be corrected.

The MCL for lead is incorrect. The value listed is 15 ug/L. The Office of Water (EPA, 1993b) recommends a value of 0 ug/l.

Response To Specific Comment 23

The column headings in Table C-2 will be clarified to avoid confusion. The MCL for endrin and lead presented in Table C-2 will also be corrected to reflect the recent MCL values for these constituents, as appropriate.

19/27



LEGEND

PLOT SYMBOLS AND
WELL NUMBERS:

A = P209189
B = P210189
C = P209389
D = 02691
E = 76292
F = 2286
G = P209789
H = B208089

SIZE OF CIRCLES INDICATES TDS

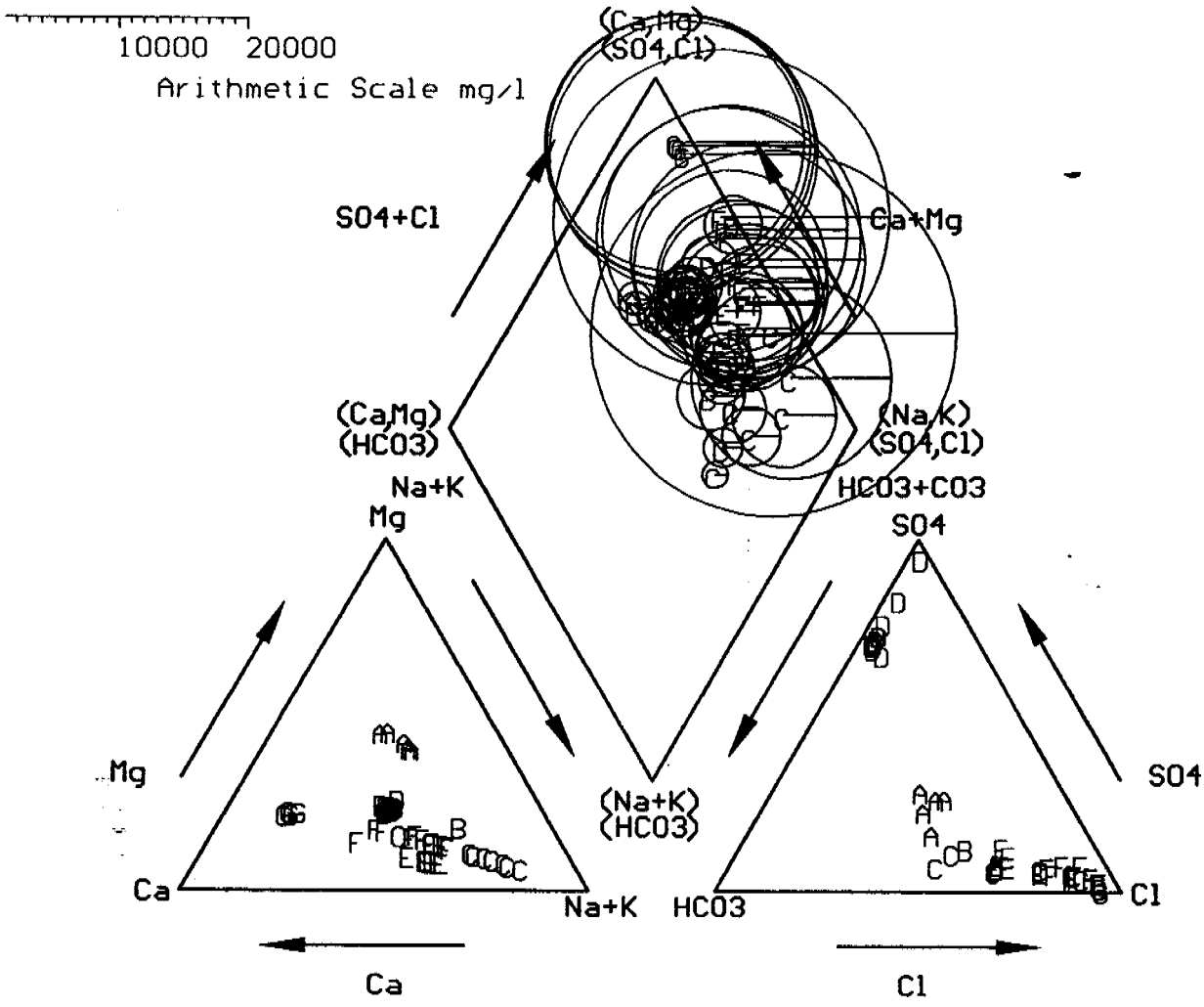
PREPARED FOR
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GOLDEN, COLORADO

Figure 3.3-17

OU4 Phase II Work Plan
Trilinear Diagram Including Low TDS
Samples from UHSU

20/22

Attachment 2
00e 1093



LEGEND

PLOT SYMBOLS AND
WELL NUMBERS:

A = P207689
B = 05193
C = 2886
D = 2586
E = P209489
F = 3987
G = P208989

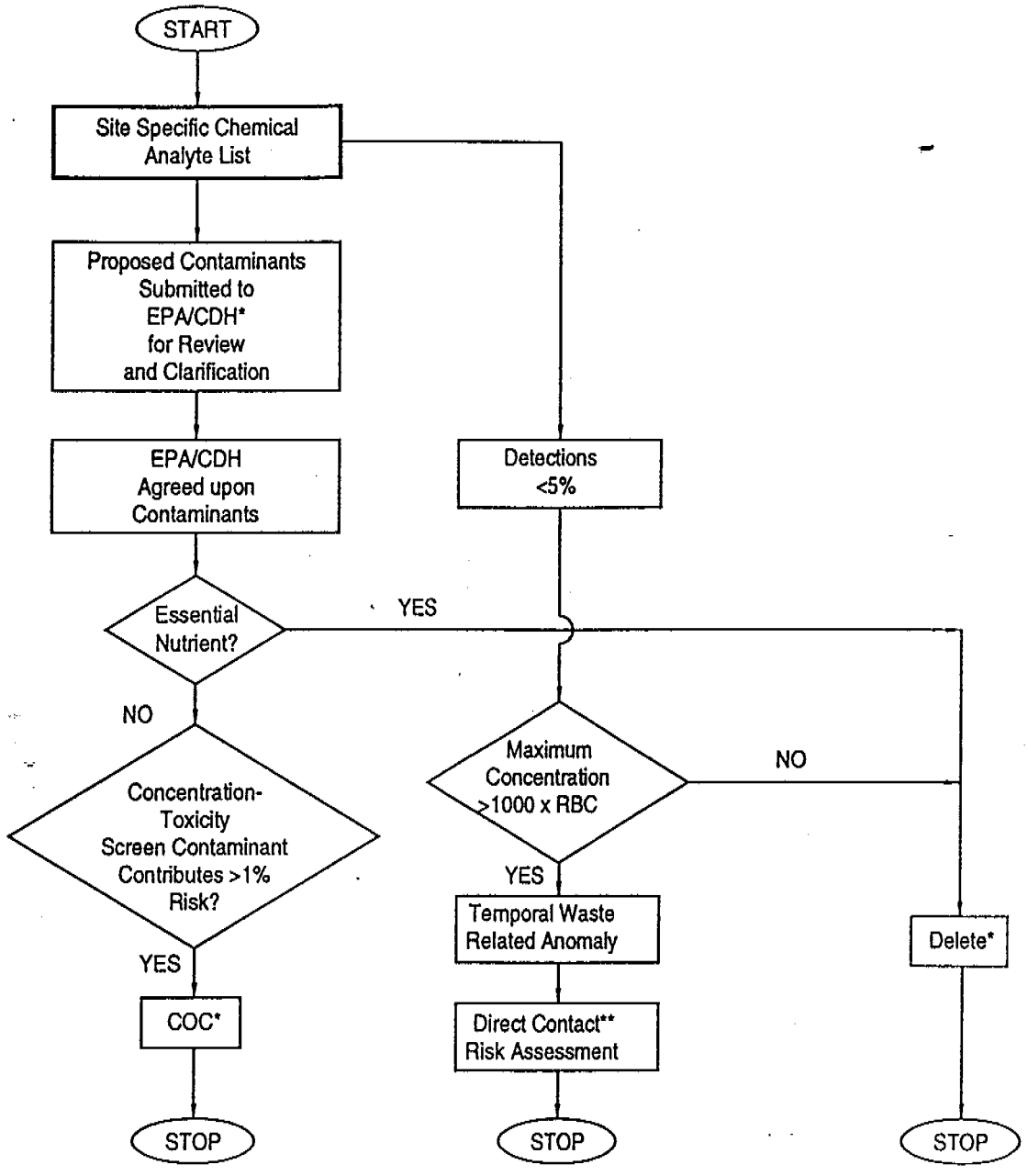
SIZE OF CIRCLES INDICATES TDS

PREPARED FOR
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GOLDEN, COLORADO

Figure 3.3-18

OU4 Phase II Work Plan
Trilinear Diagram Including High TDS Samples from UHSU

Attachment
Page 2 of 3



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

* PROFESSIONAL JUDGEMENT MAY BE USED TO RETAIN OR DELETE A CHEMICAL.

** DIRECT EXPOSURE THROUGH INGESTION, INHALATION OR DERMAL EXPOSURE AS APPLICABLE.

UTL = Upper Tolerance Limit
ANOVA = Analysis of Variance
RBC = Risk Based Concentration

R74266.PJMBPJ-051794

22/22

Attachment 2
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