

RESPONSES TO EPA AND COMMENTS

FINAL PHASE II RFI/RI WORK PLAN (Alluvial)
Dated April 12, 1990

ROCKY FLATS PLANT
GOLDEN, COLORADO

903 PAD, MOUND AND
EAST TRENCHES AREAS

(OPERABLE UNIT NO. 2)

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

ENVIRONMENTAL RESTORATION PROGRAM

29 July 1991

ADMIN RECORD

REVIEWED FOR CLASSIFICATION/DCM

By [Signature]

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EPA AND CDH COMMENTS**

**PHASE II RFI/RI WORK PLAN (Alluvial)
903 Pad, Mound, and East Trenches Areas**

This document presents the disposition of review comments on the Final Phase II RFI/RI Work Plan (Alluvial) made by the U.S. Environmental Protection Agency (EPA) and the Colorado Department of Health (CDH) on the 12 April 1990 submittal. It accompanies the Final Phase II RFI/RI Work Plan (Alluvial) Technical Memorandum 1 to satisfy requirements of the Interagency Agreement (IAG). Sections 1.0 and 2.0 present responses to EPA comments, and responses to the CDH comments are provided in Section 3.0. Borehole numbers have not changed during this revision. Monitor well numbers have been changed due to the deletion of some proposed drill sites. In the event that a CDH or EPA comment references a particular well, the response references both the new well number and the original well number for clarity. [For example, Well 27-91 (previously 35-90)....] Page numbers provided in a response to a regulatory comment reference the page in the Final Phase II Work Plan (Alluvial) July submittal where the edit or citation can be found.

TABLE OF CONTENTS

| <u>Section</u> | <u>Page</u> |
|---|-------------|
| 1.0 RESPONSES TO EPA COMMENTS ON THE FINAL PHASE II RFI/RI WORK PLAN (Alluvial) OPERABLE UNIT NO. 2 (DATED 14 MAY 1990) | 1-1 |
| 2.0 RESPONSES TO EPA COMMENTS ON THE DRAFT PHASE II RFI/RI WORK PLAN (Alluvial) OPERABLE UNIT NO. 2 (DATED 15 MARCH 1990) | 2-1 |
| 3.0 RESPONSES TO CDH COMMENTS ON THE FINAL PHASE II RFI/RI WORK PLAN (Alluvial) OPERABLE UNIT NO. 2 (DATED 15 MAY 1990) | 3-1 |
| 4.0 REFERENCES | 4-1 |

Attachment

- 1 EPA AND CDH LETTERS TO ROBERT M. NELSON, JR., DOE, COMMENTS ON THE FINAL PHASE II RFI/RI WORK PLAN (ALLUVIAL) DATED APRIL 12, 1990

LIST OF ACRONYMS

| | |
|---------------------|---|
| AEC | U.S. Atomic Energy Commission |
| ARARs | Applicable or Relevant and Appropriate Requirements |
| CDH | Colorado Department of Health |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act of 1980 |
| CFR | Code of Federal Regulations |
| Ci | Curies |
| CLP | Contract Laboratory Program |
| CMS/FS | Corrective Measure Study/Feasibility Study |
| CWA | Clean Water Act |
| DOE | U.S. Department of Energy |
| EPA | U.S. Environmental Protection Agency |
| ERHSP | Environmental Restoration Health and Safety Project Plan |
| FS | Feasibility Study |
| g/l | grams per liter |
| GRRASP | General Radiochemistry and Routine Analytical Services Protocol |
| HASL | Health and Safety Laboratory |
| IAG | Inter-Agency Agreement |
| IHSS | Individual Hazardous Substance Site |
| IRIS | Integrated Risk Information System |
| LDRs | Land Disposal Restrictions |
| MCLGs | Maximum Contaminant Level Goals |
| MCLs | Maximum Contaminant Levels |
| mCi/km ² | milliCuries per square kilometer |
| NCP | National Contingency Plan |
| OU | Operable Unit |
| pCi/g | picoCuries per gram |

LIST OF ACRONYMS (Continued)

| | |
|--------------------|--|
| pCi/ℓ | picoCuries per liter |
| ppb | parts per billion |
| PPCD | Prevention of Contaminant Dispersion |
| PQLs | Practical Quantitation Limits |
| QAA | Quality Assurance Addendum |
| QAPjP | Quality Assurance Project Plan |
| RAAMP | Radioactive Ambient Air Monitoring Program |
| RAS | Routine Analytical Services |
| RCRA | Resource Conservation and Recovery Act of 1976 |
| RfDs | Risk Reference Doses |
| RFI/RI | RCRA Facility Investigation/Remedial Investigation |
| RI/FS | Remedial Investigation/Feasibility Study |
| SAP | Sampling and Analysis Plan |
| SAS | Special Analytical Services |
| SDWA | Safe Drinking Water Act |
| SID | South Interception Ditch |
| SOP | Standard Operating Procedure |
| SSHSP | Site-Specific Health and Safety Plan |
| SWMU | Solid Waste Management Unit |
| TBC | To Be Considered |
| TSP | Total Suspended Particulate |
| VOC | Volatile Organic Carbon |
| μCi/ℓ | microCuries per liter |
| μCi/m ² | microCuries per square meter |
| μg/kg | micrograms per kilogram |

RESPONSES TO EPA COMMENTS DATED 14 MAY 1990

EPA1-1 COMMENT:

Executive Summary

The bedrock RI/FS work plan for Operable Unit Number 2 (OU 2) will be titled Phase II RFI/RI Work Plan (bedrock), not Phase III.

Plutonium and americium are also observed in seeps downgradient of the 903 Pad and in the upper reaches of South Walnut Creek. This must be evaluated and discussed within the draft Phase II RFI/RI Report.

RESPONSE:

The bedrock Remedial Investigation/Feasibility Study (RI/FS) work plan for Operable Unit Number 2 (OU No. 2) will be titled the Phase II RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan (Bedrock) (EG&G, 1991) and is referenced as such in the Technical Memorandum I of the Final Phase II Work Plan (Alluvial) (see p. i).

Reference to the presence of plutonium and americium in two seeps (SW-50 and SW-53) downgradient of the pad has been added in the Executive Summary. Their presence may be attributed to the water from the seeps coming in contact with surface soils exhibiting elevated concentrations of these radionuclides. This theory will be evaluated and discussed within the draft Phase II RFI/RI Report (see p. ii).

EPA1-2 COMMENT:

Section 1.0

The Bedrock Work Plan is also a Phase II Work Plan. It is not a Phase III Work Plan.

RESPONSE:

See previous response.

EPA1-3 COMMENT:

Section 1.4.1.1

The location of the burial grounds for the drums containing plutonium contaminated sludge is important to determine as a part of this RFI/RI. 4.54×10^{-3} gm/l plutonium does not correlate to 280 pico Ci/l plutonium.

RESPONSE:

Available historical references were reviewed in an attempt to determine the location of the burial grounds for the drums containing plutonium contaminated sludge. The information is not provided. The location will be further investigated during the RFI/RI (see p. 1-21).

The amount 4.54×10^{-3} grams per liter (g/l) of plutonium correlates to 280 microCuries per liter ($\mu\text{Ci}/\ell$), not 280 picoCuries per liter (pCi/l). The error has been corrected in the text (see p. 1-25).

EPA1-4 COMMENT:

Section 1.4.1.2

The off-site disposal location of the plutonium contaminated soils removed from the 903 Lip Site must be determined as part of this RFI/RI.

RESPONSE:

This information is not provided in the available references. The disposal location will be further researched during the RFI/RI (see p. 1-26).

EPA1-5 COMMENT:

Section 1.4.1.4

It is important to know what is meant by destruction of lithium, calcium, magnesium and solvents at site 140 so that the RFI/RI can incorporate this information in characterizing the site. Implementation of the work plan must address this issue.

RESPONSE:

The references do not provide any information more descriptive concerning the method of destruction of lithium, calcium, magnesium, and solvents at site 140. It is presumed, however, that the method of destruction for metals was burning (oxidation) of the elemental form. It is possible that additional information will be discovered during preparation of the Historical Release Report.

EPA1-6 COMMENT:

Section 1.4.2.1

It is important to ascertain the condition of the drums when the drums were removed from the Mound Site. The RFI/RI must determine if the surficial radionuclide contamination of soil is the result of wind dispersion of contaminants from the 903 Pad Site.

RESPONSE:

The condition of the drums when removed from the Mound Site is not provided in the available references. An attempt will be made to acquire this information for the draft Phase II RFI/RI Report.

The hypothesis that surficial radionuclide soil contamination is the result of wind dispersion of contaminants from the 903 Drum Storage Site will be evaluated during the RFI/RI.

EPA1-7 COMMENT:

Section 1.4.2.2

It is important to determine the off-site disposal location of the two drums unearthed in 1968 from this site. This information must be presented within the draft Phase II RFI/RI for OU 2.

RESPONSE:

The off-site disposal location of the two drums unearthed in 1968 from Individual Hazardous Substance Site (IHSS) No. 108 cannot be determined from the currently available references. Additional research will be conducted in an attempt to gather this information for the RFI/RI.

EPA1-8 COMMENT:

Section 2.2.2.2

Implementation of the final work plan must reflect information gathered as a result of the seismic study ongoing.

RESPONSE:

Section 2.2.1.2 (formerly Section 2.2.2.2) has been modified to discuss the current understanding of bedrock geology based on the results of the seismic reflection study, a comprehensive literature search, reprocessing and describing previously collected core samples, and collecting and analyzing selected samples for grain size analyses (see pp. 2-5 through 2-10).

EPA1-9 COMMENT:

Section 2.3.1.

Table 2-4 within this section should have been revised to reflect the actual number of samples utilized to calculate tolerance intervals. This information must be updated in the draft Phase II RFI/RI Report for OU 2.

RESPONSE:

Table 2-3 (previously Table 2-4) does reflect the actual number of samples used to calculate tolerance intervals for each geologic material (see p. 2-19).

EPA1-10 COMMENT:

Section 2.3.2.1.

The draft Phase II RFI/RI Report must be based on use of appropriate analytical procedures. Procedures should have been identified within the work plan which would allow information derived from the Phase I investigation to be verified or refuted. The Phase I investigation seems to have relied upon medium level CLP procedures utilizing inappropriate detection limits for volatile organic compounds. The final work plan should have referenced the data validation of the Phase I data. The draft Phase II RFI/RI Report must reference this information and the RFI/RI work must incorporate and utilize appropriate analytical procedures.

The final Phase II RFI/RI Work Plan for OU 2 should have identified that acetone, 2-butanone, chloroform, 4-methyl-2-pentanone, toluene, ethyl benzene, and xylenes appear to be present at Trench T-2. The final work plan should not have excluded the possibility of the presence of methylene chloride, trans-1, 2-dichloroethene, chloroform, trichloroethene, phthalates, and cis-1, 3-dichloropropene from the 903 Pad Area. This information cannot be excluded from the draft Phase II RFI/RI Report.

RESPONSE:

The analytical procedures to be used during Phase II are identified in the Quality Assurance Addendum (QAA) presented in Section 9.0 of the Phase II Work Plan. Organic and metal analyses will be performed using Contract Laboratory Program (CLP) routine analytical services, and radionuclide and inorganic analyses will be performed in accordance with the methods specified in the General Radiochemistry and Routine Analytical Services Protocol (GRRASP) (EG&G, 1990a). Analytical methods with detection limits below or near chemical-specific ARARs will be used to facilitate comparison of resulting data to Applicable or Relevant and Appropriate Requirements (ARARs).

Validation codes will be presented in the draft Phase II RFI/RI Report.

The presence of acetone [micrograms per kilogram (1,100 $\mu\text{g}/\text{kg}$)], ethyl benzene (780 $\mu\text{g}/\text{kg}$), and total xylenes (3,300 $\mu\text{g}/\text{kg}$) in the soils just south of Trench T-2 is acknowledged in the text. Toluene (640 $\mu\text{g}/\text{kg}$) was added to the list of volatile organics detected at Trench T-2 as was a reference to the presence of chloroform and 2-butanone at concentrations estimated below the detection limit. Toluene, chloroform, and 2-butanone were not originally identified as possible contaminants at Trench T-2 since toluene was detected in only one sample, and both chloroform and 2-butanone were estimated at concentrations below the detection limit. The lack of acknowledgement of these compounds in Phase I boreholes at Trench T-2 does not change the proposed work plan. No 4-methyl-2-pentanone was detected in any soil samples from boreholes BH25-87, BH26-87, BH27-87, or BH28-87 (see p. 2-37).

The work plan does not exclude the possibility of the presence of volatile organics at the 903 Pad Area. It does indeed state that, based on soil boring analytical results from Phase I, volatile organics are present in the soil and adjacent to the pad. Additional boreholes drilled during Phase II will verify this conclusion. All soils data will be presented in the draft Phase II RFI/RI Report.

EPA1-11 COMMENT:

Section 2.3.2.2

The Oil Burn Pit No. 2 is SWMU No. 153, not SWMU No. 158.

The final Phase II RFI/RI Work Plan for OU 2 should have clarified which existing and proposed boreholes will be used to characterize each SWMU, and the numbers and types of soil samples to be collected at each borehole. This information must be included within the draft Phase II RFI/RI Report for OU 2.

Conclusions regarding the presence of plutonium and americium as a result of the wind dispersion of material from the 903 Pad are not acceptable and cannot be substantiated with the present information. The draft RFI/RI Report must substantiate or refute this theory.

RESPONSE:

The Oil Burn Pit No. 2 is IHSS No. 153, not IHSS No. 158. The correction has been made in the text (see p. 2-37).

The boreholes from the Phase I investigation used to characterize each IHSS are presented in Sections 2.3.2.1 (903 Pad Area), 2.3.2.2 (Mound Area), and 2.3.2.3 (East Trenches Area). The proposed boreholes for the Phase II field investigation are discussed in Section 5.3 along with an explanation of the sampling methodology.

The hypothesis that surficial radionuclide soil contamination is the result of wind dispersion of contaminants from the 903 Pad will be evaluated during the RFI/RI.

EPA1-12 COMMENT:

Section 2.3.2.3.

The draft Phase II RFI/RI Report must be based on use of appropriate analytical procedures. Procedures should have been identified within the work plan which would allow information derived from the Phase I investigation to be verified or refuted. The Phase I investigation seems to have relied upon medium level CLP procedures utilizing inappropriate detection limits for volatile organic compounds. The final work plan should have referenced the data validation of the Phase I data. The draft Phase II RFI/RI Report must reference this information and the RFI/RI work must incorporate and utilize appropriate analytical procedures.

In order to verify that the plutonium and americium contamination of the soil is limited to the surface, the subsurface soils must also be sampled and analyzed for radionuclides (see comment on Section 5.2.3 below).

The final work plan should have indicated that phthalates and 2-butanone were above detection limit within samples from boreholes at trenches T-3, T-4, T-10 and T-11. The final work plan should have indicated that 1, 1, 1-trichloroethane, toluene, and xylenes appear to be present within boreholes drilled within trenches T-5 through T-9. The draft Phase II RFI/RI Report must reflect this.

RESPONSE:

The analytical procedures to be used during Phase II are identified in Section 9.0 of the Phase II Work Plan. Organic and metal analyses will be performed using CLP routine analytical services, and radionuclide and inorganic analyses will be performed in accordance with the GRRASP-specified methods (EG&G, 1990a). Analytical methods with detection limits below or near chemical-specific ARARs will be used to facilitate comparison of resulting data to ARARs.

Validation codes will be presented in the draft Phase II RFI/RI Report.

The parameter list for the source characterization boreholes is presented in Table 5-3. The radionuclide analytes include gross alpha, gross beta, uranium-233 + 234, 235, and 238, americium-241, plutonium-239 + 240, tritium, strontium-90, 89, and cesium-137. A discussion of the sampling protocol is provided in Section 5.3.

The work plan has been revised to acknowledge the presence of di-n-butyl phthalate at concentrations estimated below the detection limits in four samples from boreholes at trenches T-3, T-4, T-10, and T-11. The presence of bis (2-ethylhexyl) phthalate at a maximum concentration of 880 $\mu\text{g}/\text{kg}$ in BH45-87 (0-9.5 foot interval) was also added to this discussion. In addition, the detection of 2-butanone in samples from this area is also acknowledged in the modified text. The detection of toluene, 1,1,1-TCA, and xylenes at concentrations estimated below the detection limit in samples from Trenches T-5 through T-9 has been added to the text. The majority of these compounds were estimated at concentrations below the detection limits and therefore were not identified as potential contaminants in the original plan. The acknowledgement of these compounds in the final work plan does not change the proposed activities (see p. 2-40).

EPA1-13 COMMENT:

Section 2.3.3

This section should have clarified how first quarter 1989 site specific well data is compared to second quarter background information. Also, this section should have explained why maximum detected values were utilized instead of upper tolerance limit values, when available. The draft Phase II RFI/RI Report for OU 2 must provide this explanation.

This section should have discussed the designations of the flagged analytical results as they pertain to results estimated above/below detection limits so as to clarify the interpretation of results. The draft Phase II RFI/RI Report must include this explanation. Table 2-9 must be updated in the draft RFI/RI Report to reflect excluded ground water data referenced within EPA comments on the draft Phase II RFI/RI Work Plan, Section 2.3.3.1.

RESPONSE:

The text has been modified to clarify that all data (with the exception of radionuclide data) discussed in Section 2.3.3 were collected during the second quarter of 1989. However, site-specific radionuclide data relies on first quarter results because complete second quarter site-specific data are unavailable (see p. 2-41).

Errors were found in Table 2-12A through C (previously Table 2-10) and Tables 2-13A through F, 2-14A through F, and 2-15A through F (previously Table 2-11) listing some background values as maximum detected values when they are indeed the upper limit of the tolerance intervals and vice versa. The errors have been corrected and, therefore, data are only compared to maximum detected values when tolerance intervals are unavailable (see p. 2-41).

A brief discussion has been added to Section 2.3.3 on data value qualifiers "J" and "E" as reflecting concentrations estimated below and above the detection limit, respectively. This explanation is also presented on the data printouts in the appendices (see p. 2-41).

The "J" qualifier signifies that the analytical result for a parameter was outside the standard curve range for both the undiluted (high end) and diluted (low end) sample and, therefore, the result is considered approximate. It is important to retain this record of limited accuracy while still reporting that some contamination may be present.

Table 2-11 (previously Table 2-9) was revised and corrected in Technical Memorandum 1 of the Final Phase II RFI/RI Work Plan (Alluvial) for OU No. 2, as appropriate.

EPA1-14 COMMENT:

Section 2.3.3.2

Why are second quarter 1989 well analytical results compared to maximum detected values instead of calculated tolerance intervals for ground water radionuclide data in Table 2-10? Table 2-11 should have been clarified to note that the background figures presented for comparison to all previously collected data may not represent background for quarters other than the second quarter of 1989. Thus, this serves as a qualitative comparison only. The data presented within Table 2-11 for radionuclides in ground water should be compared to the 1989 second quarter tolerance interval, not the maximum detected level for the second quarter of 1989, even though this tolerance interval is not directly applicable to all data previously collected and is only a qualitative indicator for data collected previous to the second quarter 1989. These explanations must be presented within the draft RFI/RI Report for OU 2.

The work implemented to support the draft Phase II RFI/RI for OU 2 must substantiate or refute the evaporative concentration theory and substantiate or refute the transport of contaminants by the south interceptor ditch.

RESPONSE:

Tables 2-12A through C (previously Table 2-10) and Tables 2-13A through F, 2-14A through F, and 2-15A through F (previously Table 2-11) have been corrected to reflect upper limits of the tolerance intervals where available. Maximum detected concentrations are only used for comparison where tolerance intervals are unavailable (see p. 2-41).

A statement has been added to Section 2.3.3.2 to explain that the background figures presented for comparison in Tables 2-12A through C (previously Table 2-10) and Tables 2-13A through F, 2-14A through F, and 2-15A through F (previously Table 2-11) are for qualitative comparison, and may not represent background for other quarters in 1989 (see p. 2-51).

The conceptual model that local concentrations of certain contaminants are due to evaporation of shallow ground water will be further investigated during the Phase II activities, and the results will be presented in the draft Phase II RFI/RI report. This investigation will determine the role of the South Interceptor Ditch (SID) in contributing to the elevated major ion concentrations in well 29-87.

EPA1-15 COMMENT:

Section 2.3.5.2

Data and sampling locations for samples taken in October, 1989 must be presented within the draft Phase II RFI/RI Report for OU 2.

RESPONSE:

The analytical results for the samples collected in October 1989 will be presented in the draft Phase II RFI/RI Report.

EPA1-16 COMMENT:

Section 2.4.

This section should have been titled Chemical Specific Applicable or Relevant and Appropriate Requirements. The following comments on the ARAR analysis are intended, in part, to conform the ARAR analysis to specific requirements of the revised NCP and will require the reformulation of Table 2-12, potential chemical specific ARAR concentrations when presented within the draft Phase II RFI/RI Report for OU 2.

- *The ARAR screening process should not be performed serially. Rather, relevant and appropriate requirements are considered in the same manner as applicable requirements. When more than one ARAR is identified, the most stringent ARAR is to be used.*
- *Pursuant to the NCP [40 CFR 300.430 (e)(2)(i)(B)], MCLGs must be attained for remedial actions for ground or surface waters that are current or potential sources of drinking water. Where the MCLG is set at level of zero, the MCL must be attained.*
- *Pursuant to the NCP (40 CFR 300.430 (e)(2)(i)(E)), Water Quality Criteria must be attained where relevant and appropriate.*
- *Pursuant to the NCP (40 CFR 300.430 (e)(2)(i)(A)(2)), the 10E-6 risk level is to be used for carcinogens which do not have an ARAR. In particular, this should be evaluated for strontium. In addition, in evaluating the potential alternatives, all ARARs taken together should not present a cumulative risk in excess of 10E-4. If such risk would be exceeded for a particular alternative, the ARARs may need to be scaled back accordingly (see also 40 CFR 300.430 (e)(2)(i)(D)).*
- *RCRA LDR is an action specific ARAR, triggered by the placement of a restricted waste. For the purposes of identifying chemical specific ARARs prior to screening remedies, the RCRA LDR standards in Subpart D or 40 CFR part 268 should be classified as "items to be considered".*

The newly promulgated applicable CDH surface water standard for trihalomethanes is 190 ppb. The newly promulgated applicable CDH surface water standard for 1, 1, 2, 2-tetrachloroethane is 170 parts per trillion. Although contaminant concentrations in ground water were estimated below detection limits, ARARs analyses must be presented for methylene chloride, acetone, carbon disulfide, 1, 2-dichloroethene and toluene. Potential ARARs for phthalates and PCBs must also be presented. This information must be revised within the draft RFI/RI Report for OU 2.

RESPONSE:

The discussion of ARARs has been substantially revised and broken out as a separate section, Section 7.0. Proposed chemical-specific ARARs for OU No. 2 ground water are now summarized as Table 7-1.

Potential ARARs considered for ground water and soils/sediments are discussed in Section 7.4 and 7.5, respectively, and determined to either be ARAR or not. The most stringent standard available was selected for each constituent and presented in Table 7-1.

ARARs discussions have been revised to incorporate the following National Contingency Plan (NCP) [FR Vol 55, No. 46, 8848; 40 CFR 300.430 (e)] considerations in development of remediation goals:

1. Proposed ARARs.
2. For systematic contaminants, concentration levels that will not cause adverse effects to the human population and sensitive subgroups over a lifetime of exposure.
3. For carcinogens, concentration levels that represent an excess lifetime individual cancer risk less than 10^{-4} considering multiple contaminants and multiple pathways of exposure.
4. Factors related to detection limits.
5. Attainment of Maximum Contaminant Level Goals (MCLGs) [or Maximum Contaminant Levels (MCLs) if MCLGs are zero] if water is a current or potential source of drinking water.
6. Attainment of Clean Water Act (CWA) water quality criteria where relevant and appropriate.

Identification of action-specific ARARs, including RCRA Land Disposal Restrictions (LDRs), and remediation goals is a part of the Feasibility Study (FS) process and will be addressed in the Corrective Measure Study/Feasibility Study (CMS/FS) Report. Modification and/or establishment of remediation goals based on risk consideration will also be a part of the CMS/FS Report. The Colorado Department of Health (CDH) surface water trihalomethane standard is 190 parts per billion (ppb), and ARARs [(or To Be Considereds (TBCs)] are shown for all volatiles detected in ground water (1,1,2,2-tetrachloroethane was not detected and has been removed from the table). Phthalates and PCBs have only been detected in soils. Chemical-specific ARARs for organic contaminants in soils do not exist and must be determined through a risk assessment.

EP1-17 COMMENT:

Section 3.1

Concerning the Table 3-1 objective of characterizing the nature and extent of contamination, DOE must also include evaluation of the horizontal and vertical extent of inorganic and organic contamination in soils external to SWMUs. This addition must be carried forward through Sections 4.0 and 5.0 of the work plan and must be implemented and the resulting information presented within the draft Phase II RFI/RI Report for OU 2. The characterization of sources must be completed regardless of the past removal of wastes from some of the sites. This information must be provided within the draft Phase II RFI/RI Report for OU 2.

RESPONSE:

Contamination beyond IHSS boundaries would have occurred through migration, primarily by ground-water transport and wind dispersion (e.g., plutonium). Accordingly, contamination beyond the IHSS boundaries is being investigated by use of monitoring wells for determination of ground-water quality and soil profiles for plutonium contamination.

EPA1-18 COMMENT:

Section 3.2

Table 3-2 must be modified to reflect the new NCP modification of the ARARs analysis presented in Section 2.4 and the update of the CDH standards for trihalomethanes and 1, 1, 2, 2-tetrachloroethane as indicated in comments pertaining to Section 2.4 above.

The final work plan should have identified work plan items designed to provide information not present in the Phase I RI. These shortcomings must be identified, corrected and presented within the draft Phase II RFI/RI Report for OU 2.

RESPONSE:

Table 3-2 has been removed because it provided redundant information relative to Table 7-1 (formerly Table 2-13).

Section 3.2 summarizes the conclusions of the previous investigations conducted at OU No. 2. Along with the general conclusions, this section identifies issues that were not resolved during these investigations. For example: further characterization of potential contaminant sources is needed, the nature and extent of contamination has not been fully determined, and additional characterization of the unconfined ground-water flow system is necessary.

Table 3-1 cites the objectives of the Phase II RFI/RI work plan. These objectives and the associated proposed planned activities target the shortcomings identified in Section 3.2.

EPA1-19 COMMENT:

Section 4.1.3

The brief description of the activities required for the remedial investigation do not correlate to the objectives presented within Section 3.2 of the work plan. For example, not just the surface soils will be sampled and analyzed for radionuclide contamination.

RESPONSE:

Revisions have been made to Section 4.1.3 of the work plan to ensure that the activities required for the remedial investigation correlate to the objectives of the Phase II RFI/RI (see p. 4-2).

EPA1-20 COMMENT:

Section 4.1.6

For clarity, this section should have further stated that the risk assessment will assume no institutional controls. The risk assessment to be presented within the draft Phase II RFI/RI Report for OU 2 must reflect this requirement.

RESPONSE:

The text has been modified to state that the risk assessment will assume no institutional controls (see p. 4-5).

EPA1-21 COMMENT:

Section 4.1.6.2

This section describes work which may be required to evaluate environmental impact associated with the disposal practices at OU 2. Data needs and actual work plan objectives are not described or defined within Section 3.0 of the work plan. The draft RFI/RI must present this information and a detailed description of the methods utilized to realize these data needs.

RESPONSE:

Table 3-1 in Section 3.0 has been revised to provide objectives and data needs for assessing environmental impacts related to disposal practices at OU No. 2 (see p. 3-4). The Environmental Evaluation Work Plan for OU No. 2 is now presented in Section 6.0 of this work plan.

EPA1-22 COMMENT:

Section 4.2.2.1

The compliance with ARARs section should have been reworded to state "The analysis will address compliance with chemical specific, location specific and action specific ARARs in accordance with the NCP. If an alternative will not comply with an ARAR, the FS report will propose a basis for justifying a waiver, if appropriate." The draft Phase II RFI/RI Report must be prepared to reflect this change.

RESPONSE:

The text has been modified as directed in this comment (see p. 4-19).

EPA1-23 COMMENT:

Section 4.2.3

The progression of Feasibility Study documents is draft to final. Under the proposed IAG, there is no provision for the Feasibility Study to go to public comment. The Proposed Plan goes to public comment.

RESPONSE:

The discussion in Section 4.2.3 describing the progression of the Feasibility Study Report has been modified to explain that the final FS report will incorporate EPA and CDH comments. No reference to public comments are made (see p. 4-22).

EPA1-24 COMMENT:

Section 5.0

DOE must present rationale for not analyzing both filtered and unfiltered samples for metal constituents.

RESPONSE:

In general, wells at OU No. 2 do not yield sufficient quantities of water to perform both filtered and unfiltered analysis. Dissolved metals analysis provides the best representation of the metals within ground water capable of migrating in this medium. Total metals analysis would reflect dissolved metals and those leached from sediments within the well and is less amenable to interpretation.

EPA1-25 COMMENT:

Section 5.1.1

It is unclear how Table 5-1 correlates with statements made in this section concerning well screened interval. The well screened interval tables should have followed the procedures outlined within this section.

An alluvial monitoring well must be located approximately 150 feet south southeast of newly proposed well 85-90. New well 35-90 must be relocated approximately 50 feet west of proposed location.

RESPONSE:

Table 5-1 (see p. 5-5) presents the anticipated screened interval for each proposed monitoring well based on historical water level information. The table and associated text now state that if the saturated thickness at a location is greater than 10 feet, multiple wells will be installed. It is not prudent at this time to base well numbers on estimated saturated thicknesses.

An alluvial well (59-91) has been added approximately 300 feet south-southeast of well 0171 to investigate ground-water quality downgradient of the 903 Pad Area. (Proposed Well 85-90 has been deleted from the plan.) Well 27-91 (previously 35-90) has been relocated approximately 50 feet west of the original proposed location to provide a better location for defining the plume north of Trench T-3 (see Plate 1).

EPA1-26 COMMENT:

Section 5.1.1.3

DOE must not reduce the parameter list for analysis of ground water samples prior to receiving approval from the regulatory agencies.

RESPONSE:

DOE will consult with EPA and CDH prior to reducing the analyte list (see p. 5-38).

EPA1-27 COMMENT:

Section 5.2.1.2

Boreholes must be located immediately downgradient of sites 153 and 154. These boreholes must be located as close to the source sites as is allowed. Boreholes must be located on both sides of site 108 in addition to the proposed monitoring wells. The draft RFI/RI Report for OU 2 must include this requirement. A borehole must be placed to characterize the potential for a source to be located within site 183.

RESPONSE:

As discussed in Section 5.3.2, the western area of the Pallet Burn Site is inaccessible and therefore additional borings are not proposed. An additional borehole (BH2891) will be drilled in the eastern area to aid in verifying the IHSS location (see p. 5-21).

Additional boreholes suggested by EPA for site 108 will not be drilled due to the presence of the barrels throughout the site. As explained in response to EPA comment on Section 3.1, contamination beyond IHSS boundaries will be investigated through the use of monitoring wells and soil profile samples. Boreholes will only be drilled for source characterization.

A borehole (BH4691) has been added to characterize the potential source within the gas detoxification site (see p. 5-19).

EPA1-28 COMMENT:

Section 5.2.1.3

Boreholes must be placed external to, and downgradient from sites within the East Trenches Areas. This is necessary in order to verify the results of the Phase I investigation. These boreholes must be sampled for all constituents listed within Table 5-5. If Trench T-10 is filled with barrels, boreholes must be drilled adjacent to this site and Figure 1-5 should have been modified to reflect this information. Boreholes and wells must be completed and sampled in surface water drainages downgradient of the east spray fields to evaluate the effect they have had on these drainages. The draft phase II RFI/RI Report must include information derived from inclusion of these boreholes.

RESPONSE:

Boreholes are drilled to investigate potential source areas. Boreholes will not be drilled outside of IHSS boundaries since contaminate migration via ground water will be investigated by installing and sampling monitor wells. As described in Section 5.2.1.3, alluvial monitor wells 30-91 and 31-91 will be installed between Trenches T-3/T-4 and T-11/T-10 in an attempt to differentiate the two group of trenches as contaminant sources. Well 32-91 will be located southeast of Trench T-10 to further characterize the extent of volatile organics in alluvial ground water.

EPA1-29 COMMENT:

Section 5.2.3

Given that stored and buried drums contained plutonium and uranium, the soils must be sampled for plutonium 239 and 240, americium 241 and uranium 233/234, 235 and 238. Also, if the one meter depth proposed for the vertical profile indicates that radionuclides are found at depth, further characterization may be warranted. It would be prudent to sample small discrete intervals within proposed boreholes drilled into and adjacent to sites known to have contained radionuclides to verify the premise that 903 Pad is responsible for the radionuclides present in the soils affected by OU 2. This is necessary as some borehole samples taken at depth do indicate the presence of plutonium and americium.

RESPONSE:

Table 5-3 (previously Table 5-5) lists the source sampling parameters for the borehole soils. The radionuclides include: gross alpha, gross beta, uranium-233+234, 235, and 238, americium-241, plutonium-239, 240, tritium, strontium-90, 89, and cesium-137. Boreholes to be drilled into IHSSs will extend from the ground surface to 6 feet into claystone bedrock. Continuous samples will be collected for geologic descriptions for the entire borehole depth. From this core, discrete and composite samples will be submitted for laboratory chemical analysis (Section 5.3, p. 5-15). In addition, a discrete sample will be collected for chemical analysis at the water table. Core from saturated surficial materials will not be submitted to the laboratory, as the presence of water in this zone will affect interpretation of chemical results. In order to prevent alluvial ground water from affecting weathered bedrock samples, surface casing will be grouted into the borehole through surficial materials. Subsequent to grout hardening, the borehole will then be advanced through weathered bedrock with continuous sampling. With regard to the plutonium/americium profiles at the surface, a 1 meter depth sample is almost assuredly not going to show elevated plutonium/americium unless the sampling location is at, or adjacent to, an IHSS where these radionuclides were disposed and have been released to the environment. In this case, the boreholes will provide the needed data for greater depths.

RESPONSES TO EPA COMMENTS DATED 15 MARCH 1990

[These EPA comments correspond to the draft work plan submitted in December 1989. They were received by DOE in late March 1990, which did not provide sufficient time for incorporation into the Final Work Plan (12 April 1990). Accordingly, responses to these comments are provided below, and Technical Memorandum 1 of the Final Work Plan includes modifications that address these comments.]

GENERAL COMMENTS

EPA2-1 COMMENT:

In general, the draft work plan for the baseline risk assessment conforms to EPA guidance for risk assessments. However, you should be aware that the region is now in the process of developing a "generic" work plan for risk assessments. Once completed, EPA will forward this information to you. This work plan will, in general, conform to plans now in existence and those under development in other regional offices. Included in the work plan will be a set of regionally specific exposure parameters to be used in the exposure assessment portion of the baseline risk assessment. Deviation from these exposure parameters will require adequate documentation, and the approval of EPA.

RESPONSE:

Region-specific exposure parameters determined by EPA will be used where available. Any proposed deviation from the parameters will be documented and submitted to the EPA for approval prior to preparation of the risk assessment (see p. 4-10).

SPECIFIC COMMENTS

EPA2-2 COMMENT:

Page 4-6: Paragraph 3: Objectives

Objective 2 includes fate and transport analysis within environmental media. It is also essential that the baseline risk assessment address cross media fate and transport. For instance, such analysis must include contamination of ground water from soil sources, contamination of air from soils or water, etc.

RESPONSE:

Cross-media fate and transport will be considered.

EPA2-3 COMMENT:

Page 4-7: Paragraph 1: Documents to be used

In addition to the documents listed in Table 4-1, EPA will be using documents included on the attached list for development and review of the baseline risk assessment.

RESPONSE:

Table 4-1 of the work plan has been revised to include the documents EPA listed for use in risk assessment preparation and evaluation.

EPA2-4 COMMENT:

Page 4-9: Paragraph 1: Contaminants to be considered

The following criteria must be used in identifying chemicals to be addressed in the baseline risk assessment:

- a.) *Those chemicals positively detected in at least one CLP sample [Routine Analytical Services (RAS) or Special Analytical Services (SAS)] in a given medium, including chemicals with qualifiers attached indicating known identities, but unknown concentrations.*
- b.) *Chemicals detected at levels elevated above background.*
- c.) *Chemicals which have been tentatively identified and may be associated with the site based on historical information, or have been confirmed by SAS.*
- d.) *Transformation products of site associated chemicals.*

It is unclear what is meant in the draft work plan by "risk based detection limits". Analytical detection limits based upon the best available technology must be used.

Chemicals must not be eliminated based upon environmental fate predictions until the exposure assessment phase of the baseline risk assessment is completed.

RESPONSE:

Criteria a, b, and c as listed in the comment above will be used in selecting site contaminants. It is not clear what level of detail is expected in the evaluation of potential transformation products. The prediction of the transformation products is dependent on the availability of transformation information in the scientific literature and on information regarding chemical, physical, and microbial site conditions. Quantitative estimates of transformation products would also be complicated, and depend on site-specific conditions as well as information regarding the approach to evaluating transformation products (see p. 4-9).

Analytical detection limits are based upon the best available technology (see Section 9.0).

Chemicals will not be eliminated based on fate predictions until the exposure assessment is completed (see p. 4-9).

EPA2-5 COMMENT:

Page 4-10: Bullet 2: Exposure scenarios

Scenario selection should proceed regardless of the ability to quantify exposure. This may require exposure to be addressed qualitatively under circumstances where quantitative evaluation is not possible.

RESPONSE:

All plausible exposure scenarios will be identified, regardless of the ability to quantify exposure.

EPA2-6 COMMENT:

Page 4-10: Paragraph 2: Factors examined in pathway identification

In addition to the factors listed, detailed local meteorological data must be considered.

It may be advantageous to consider receptor characteristics rather than "exposure scenarios" for the purpose of the baseline risk assessment. Each of the scenarios listed include several of the same receptor subpopulations. To avoid a duplication of effort, it may be more efficient to directly assess exposure and potential toxicity to subpopulations.

RESPONSE:

Detailed local meteorological data will be considered (see p. 4-10).

To avoid duplication, the scenarios will be based on discrete subpopulations (e.g., residents and workers) (see p. 4-9).

EPA2-7 COMMENT:

Page 4-11: Paragraph 1: Cancer risk

It is not clear what is meant by the statement "Doses or the dose might result in an excess cancer risk for non-carcinogenic health". Please explain.

RESPONSE:

The statement "doses or the dose might result in an excess cancer risk for non-carcinogenic health" has been rewritten to state, "doses might exceed risk reference doses (RfDs) and or might result in an excess cancer risk greater than the acceptable target risk as defined by EPA (i.e., to 10^{-6} to 10^{-4}) (see p. 4-11).

EPA2-8 COMMENT:

Page 4-11: Paragraph 2: Critical toxicity values

Reference values for systemic or carcinogenic risk derived from SPHEM or PHRED will not be acceptable for use in the baseline risk assessments. Both of the above sources are now obsolete and have been replaced.

RESPONSE:

Toxicity reference values from EPA's Integrated Risk Information System (IRIS) will be used in preference to other EPA reference values (see p. 4-11).

EPA2-9 COMMENT:

Page 4-12: Paragraph 2: Types of toxicity values

It will be unnecessary to generate toxicity values for subchronic exposure. Chronic exposure will provide a more conservative assessment and will drive the rationale for any cleanup activity which may be indicated.

The preferred terminology for acceptable intake for chronic exposure (AIC) is now "risk reference dose" (RFD). To avoid confusion, this terminology should be used throughout the baseline risk assessment and the AIC terminology should be discontinued.

RESPONSE:

Toxicity values will be generated for chronic exposure only.

The term (risk) reference dose (RfD) will be used in the risk assessment to describe the toxicity value for acceptable chronic daily intake (see p. 4-11).

EPA2-10 COMMENT:

Page 4-12: Paragraph 3: Risk characterization

The reasonable maximum estimate of exposure (RME), based upon the 95% upper confidence limit of the exposure data, must be used throughout the baseline risk assessment process. Details must be provided regarding the rationale and methodology for development of subchronic exposure estimates.

RESPONSE:

In accordance with EPA guidance, the upper 95 percent confidence limit of the exposure data will be used to calculate the exposure concentrations. Based on the previous comment that there is no need to generate toxicity values, it is assumed that there will also be no need to develop subchronic exposure estimates.

EPA2-11 COMMENT:

Page 4-12: Paragraph 2: Aquatic toxicity

Where applicable, assessment of sediment toxicity must be included in the environmental portion of the risk assessment.

RESPONSE:

The text does not rule out an assessment of sediment toxicity, and such an assessment will be included in the environmental evaluation where applicable.

RESPONSES TO CDH COMMENTS DATED 15 MAY 1991

CDH-1 COMMENT:

General Comments

This and other similar documents submitted for review by DOE do an excellent job of covering geology, demographics, physical location, ecology, and both underground and surface water, but they all lack good coverage of meteorological and fugitive emissions information. In this document wind dispersion is referred to once in Section 1.4.2.1 Mound Site (SWMU Ref. No. 113) but with little explanation. Particulates are a major method of transport for contaminants through reentrainment. Any leakage or spills of solids such as those from deteriorating pondcrete and construction activities of other soil disturbances will also add to fugitive particulates in the air which are a pollutant by themselves and may also carry other contaminants.

A second area of fugitive emissions which did not receive adequate consideration are fugitive VOC emissions. These may occur from drum leakage, spills, seeps, etc. While these emissions may be of minor levels they add to the total plant emissions and are never controlled. Both the VOC and particulate emissions can have impacts on both human health and the environment.

RESPONSE:

Extensive meteorologic and air monitoring data exist for the Rocky Flats Plant. These data are reported in monthly and annual monitoring reports produced by Rockwell International and now EG&G. In addition, total long lived alpha and Volatile Organic Carbon (VOC) fugitive emissions were monitored during the Phase I RI. A discussion of this monitoring program was added to Section 2.3.6 of the work plan (pp. 2-80 through 2-85). Monitoring of radioactive and VOC fugitive emissions will also be needed at OU No. 2 during Phase II RFI/RI field activities. The Health and Safety Plan currently being prepared for OU No. 2 will include plans for this monitoring.

CDH-2 COMMENT:

Section 1.0Figure 1-5

The location of the 903 Area "Lip" is inconsistent with the historical definition of the "Lip", particularly with regard to what was removed and the material shipped to NTS as low level radiological waste. The historical "Lip" is SE of the 903 Pad, over the brow of the hill (a depositional area of windblown contamination). The narrative does mention the removal in relation to the metals destruction area that occurred there also. Considerable covering and recontouring of the 903 Area has occurred which will complicate cleanup/removal.

RESPONSE:

The 903 Pad "Lip" Area illustrated in Figure 1-8 is consistent with the area portrayed on the original Solid Waste Management Unit (SWMU) map found in the Comprehensive Environmental Assessment and Response Program Phase I document (Rockwell International, 1987a).

CDH-3 COMMENT:

Section 1.3.1.2.

Previous investigations, item 8 makes minor reference to meteorological studies but does not detail. This should have included a study of fugitive particulates.

RESPONSE:

The annual environmental monitoring reports produced by Rockwell International and now EG&G cover ambient air quality monitoring for radioactive particulates (See Section 2.3.6, pp. 2-80 through 2-85). There are several meteorological studies which will be reviewed during the Phase II RFI/RI if additional meteorological information is required. Some deal with contaminant transport and resuspension of particulates. (Langer, G. "Fugitive Dust Measurements and Modeling," Langer G., 1989, "Resuspension of Rocky Flats Soil Particles Containing Plutonium.")

The routine monitoring that has been done for Total Suspended Particulate (TSP) is included in both the monthly and annual Environmental Reports for Rocky Flats. Data are available for TSP since 1981 at one location near the east entrance to the Plant.

CDH-4 COMMENT:

Section 1.4.1.1 Page 1-19

There is no reference to HASL-235 information which indicated that the loss of control of materials was greater than 86 grams. It may be that other documents referenced do include discussion of HASL-235 et seq documentation. Also recognize that statements made about inventory lost from control are time related, in that the plant boundary has changed over the years.

RESPONSE:

The investigative results presented in U.S. Atomic Energy Commission (AEC) Health and Safety Laboratory (HASL) Report HASL-235 reveal that an estimated 4.5 Curies (Ci) of Rocky Flats plutonium-239 are found in the soil bounded by the 3 milliCuries per square kilometer (mCi/km²) concentration contour around Rocky Flats as mapped in the document (Krey and Hardy, 1970). An additional 3.2 Ci could have been released from the Plant to remote areas beyond the 3 mCi/km² contour. This release by wind dispersal would equal a total of 125 grams of plutonium-239. A reference to these findings has been added to Section 1.4.1.1 (see pp. 1-21 through 1-25).

CDH-5 COMMENT:

Section 1.4.1.2 Page 1-23

The off-site disposal location of the first two soil cleanups is unknown. Is the off-site disposal location of the 214 tri-wall pallets of contaminated soil removed during the 1984 third soil cleanup unknown as well?

RESPONSE:

The available references do not provide any information concerning the off-site disposal location of contaminated soil from the 1984 third soil cleanup.

CDH-6 COMMENT:

Section 1.4.2.2 Page 1-26

Ground penetrating radar or some other kind of noninvasive geophysical investigation should be done to define the location of the 125 buried drums in Trench T-1, SWMU Ref. No. 108.

RESPONSE:

A magnetometer survey was conducted during the Phase I RI. Drum locations as determined by this investigation and by visual inspection are shown in Figure 1-9.

CDH-7 COMMENT:

Section 1.4.3.1 Page 1-27

Again, some kind of noninvasive geophysical investigation should be done to define the location of the 300 buried drums.

RESPONSE:

Figure 1-9 exhibits the location of the barrels as determined by visual inspection and magnetometer survey.

CDH-8 COMMENT:

Section 2.0

Phase I Site Evaluation item nine, air monitoring for total long lived, alpha, plutonium, and volatile organics during field activities is listed, however, the collection and analytical methods should also be referenced for evaluation.

RESPONSE:

A discussion has been added to Section 2.3.6 (see pp. 2-80 through 2-85) describing the field air monitoring conducted during the Phase I site evaluation including the sampling protocols and results.

CDH-9 COMMENT:

Table 2-3

Regarding radiological parameters, the results for sediments should be in pCi/gram, not pCi/liter.

RESPONSE:

Table 2-5 (previously Table 2-3) has been corrected to show picoCuries per gram (pCi/g) as the unit for sediment radiological parameter results.

CDH-10 COMMENT:

Table 2-4

Are the radiological parameter results to be in pCi/l or pCi/g?

RESPONSE:

Table 2-6 (previously Table 2-4) has also been corrected to show pCi/g as the unit for radiological parameter results.

CDH-11 COMMENT:

Section 2.3.1 Page 2-14

It is not an acceptable practice to use background concentrations derived from maximum detectable values i.e. sample size less than seven and in some cases as few as two samples, to identify contaminated sites. It is acceptable to use maximum background values for borehole and monitoring well placement. All background concentrations used to identify contaminated sites must be within 95% upper tolerance interval limits, or 95% or higher upper confidence interval limits.

RESPONSE:

Maximum detected background values are used for comparison with site-specific data when tolerance intervals are not available. The text in Section 2.3.1 (see p. 2-18) has been modified to state that tolerance intervals will be used to assess the presence of contamination, whereas site-specific chemical concentrations above the maximum detected background values will be considered a preliminary indication of contamination.

CDH-12 COMMENT:

Section 2.3.2.1 Page 2-28

No reference to HASL-235 et seq documentation. There is no mention of the work done by Michels (RI) who did work on the depth of soil contamination penetration in the 903 Area. Michels also published information regarding background Pu in the midwest for comparison with the Rocky Flats Plant environs.

RESPONSE:

HASL-235 is a document prepared by P.W. Krey and E.P. Hardy of the AEC HASL on August 1, 1970 (Krey and Hardy, 1970). The report references the work of Dr. Martell. Following a serious fire at Rocky Flats on May 11, 1969, Dr. Martell demonstrated the presence of plutonium-239 in soil around the Plant. Subsequent to this discovery, HASL was invited to perform a study of the plutonium-239 distribution in soil around the Plant. The HASL study was also designed to determine the source, quantity, and extent of Rocky Flats plutonium off AEC property.

The investigation findings indicated that leaking barrels of plutonium-laden cutting oil stored in the southeast corner of the Plant (903 Drum Storage Area) were the likely source of the off-site plutonium. This conclusion was made based on historical wind behavior patterns, release estimates, and concentration contour configurations.

The HASL-235 does not mention any work conducted by Michels nor does it present any information on soil sampling beneath the 903 Pad or background plutonium concentrations in the midwest.

CDH-13 COMMENT:

Section 2.3.2.1 Page 2-31

The reduction of Pu/Am contamination by wet screening is suspect. While Pu attaches to clay particles and particle size separation (a soils classification methodology used by USGS and Dr. Johnson) is feasible, there are complications. The wet process takes considerable water and total destruction of the particle conglomerates. The treatment and disposal of such waste water would present additional complications. Dry separation is also problematic due to the dust generated even with closed systems. Cleveland (RI now USGS) tried the process using clean soil unsuccessfully at the Sweeny Mining and Milling facility on Sugarloaf above Boulder.

RESPONSE:

The reference in Section 2.3.2.1 (see p. 2-31) to the use of wet screening for the reduction of plutonium and americium soil contamination below the 903 Pad is cited as a conclusion drawn from a study conducted by Navratil (1979). Wet and dry separation methods will be thoroughly evaluated during the CMS/FS.

CDH-14 COMMENT:

Section 2.3.2.2 Page 2-37

The 903 Drum Storage area has been identified as the wind dispersal source of ground surface plutonium and americium contamination at the Mound, Oil Burn Pit and Trench Sites. There should be a meteorological analysis of the direction of prevailing winds over the site with respect to topography. Were there topographical features where winds could have deposited significant amounts of radionuclide contaminated soil before the pad was placed on 903?

How many additional soil samples will be collected from borings at both possible Pallet Burn Sites? Will the soil sampling tests and data needed to evaluate depth and extent of plutonium in soils at both Pallet Burn sites be completed and presented in the Draft phase RI Plan?

RESPONSE:

A meteorological analysis along with the plutonium/americium profile data will be used in substantiating or refuting the theory that the 903 Drum Storage Area is the source of surficial soil plutonium and americium contamination. The results of the investigation will be presented in the draft Phase II RFI/RI Report.

The proposed boreholes for the Phase II field investigation are discussed in Section 5.3.2 of the work plan along with an explanation of the sampling methodology. As discussed in Section 5.3.2, the possible western location for the Pallet Burn Site is inaccessible, and therefore, additional borings are not proposed. An additional borehole (BH2891) will be drilled in the possible eastern location to aid in evaluating the site boundary. All soil analytical results will be provided in the draft Phase II RFI/RI Report.

CDH-15 COMMENT:

Section 2.3.2 Soils

What radionuclides, other than americium and plutonium will be tested for in evaluation of elevated Pu and Am concentration in surface soils?

RESPONSE:

Surficial soil samples and vertical profile samples will be analyzed for plutonium-239+240 and americium-241, as discussed in Section 5.4. Boreholes drilled to characterize IHSSs will be sampled for the full suite of radionuclides presented in Table 5-3.

CDH-16 COMMENT:

Section 2.3.2.1

903 Pad & Lip Sites Ph I RI Soil Investigation Results. How many and where, will the additional boreholes, through and immediately adjacent to the pad during Phase II RI validation of VOC soil contamination be placed?

Page 2-35. Specify what additional surficial soil and soil profiling is going to characterize the radionuclide distribution on the 903 Pad and Lip Sites.

RESPONSE:

The proposed boreholes for further investigation of the 903 Pad Area are presented in Section 5.3.1 Thirteen borings are proposed within and adjacent to the pad to characterize the vertical and horizontal extent of radionuclide and solvent contamination.

Section 5.4 provides a discussion of the surficial soil sampling and profile sampling program to be conducted for the Phase II investigation. Soil samples for plutonium and americium will be collected from 124 grids (surface scrapes). Also, vertical profiles of these radionuclides to a depth of 1 meter will be determined at 26 locations. The sampling locations are near the 903 Pad, Mound, and East Trenches Areas and in the buffer zone to Indiana Street.

CDH-17 COMMENT:

Section 2.3.2.3 Page 2-38

Page 2-39. What was the depth of the uppermost soil sample taken at Borehole BH 52-87, where the most contaminated soil was found?

RESPONSE:

The uppermost soil sample taken at borehole BH52-87 was composited from 0 to 9.5 feet below ground surface (see p. 2-41).

CDH-18 COMMENT:

Section 2.3.3.1 Page 2-42

Will the CCl₄ plume at 903 Pad be sufficiently delineated by information gained from the additional boreholes placed immediately adjacent to the pad, referred to in Section 2.3.2.1 for VOC soil contamination Ph II RI Validation?

Page 2-48. How many and where will the additional monitoring wells to delineate the extent of PCE contamination, (southeast downgradient of the 903 Pad and Trench T-2), be placed?

Page 2-49. How will the additional data required to assess the significance of chloroform in wells 28-87 and 30-87 be gathered?

Page 2-50. What further sampling and analysis will be done to resolve methylene chloride and acetone contamination at well 36-87BR?

RESPONSE:

Fourteen new alluvial monitoring wells are proposed to further define the extent of volatile organics in the shallow ground-water system east and southeast of the 903 Pad Area. Thirteen boreholes are proposed within and immediately adjacent to the 903 Pad to characterize the vertical and horizontal extent of both solvent and radionuclide contamination beneath the pad. Samples from the proposed

monitoring wells and boreholes for the Phase II investigation should provide sufficient information to delineate the carbon tetrachloride plume in the 903 Pad Area as well as determining the extent of solvent contamination in the soils beneath the pad.

Section 5.2.1.1 provides a discussion of the number and location of proposed alluvial monitoring wells for the 903 Pad Area. A total of fourteen new wells will be installed during Phase II to aid in defining the extent of volatile organic in ground water in the 903 Pad Area.

In order to assess the significance of the isolated reports of chloroform in wells 28-87 and 30-87, additional monitoring of these wells will be conducted and additional monitoring wells will be installed in unweathered sandstones in the area. This work will be conducted during the Phase II bedrock investigation as outlined in the Phase II RFI/RI Work Plan (Bedrock).

Well 36-87 will continue to be sampled during the quarterly sampling program. The additional methylene chloride and acetone data will provide the necessary information to determine if the previous reports of these analytes in well 36-87 represent actual contamination or are laboratory artifact.

CDH-19 COMMENT:

Section 2.3.6 Page 2-81

The ambient air data is not provided by individual station, which is important, as the individual station data of significance is washed out in averaging. The resultant summary talks in generalities only. There is a need to require historical air sampling data as current concentrations are lower, due to surficial burial of the contamination.

RESPONSE:

Site specific air monitoring results are now presented in Section 2.3.6 of the revised work plan (see pp. 2-80 through 2-85). All data collected as part of the Radioactive Ambient Air Monitoring Program (RAAMP) are reported monthly by individual site. These data are available in the Rocky Flats Plant Monthly Environmental Monitoring Reports (Rockwell International, 1975 through 1986, 1987b, and 1989; EG&G, 1990b).

CDH-20 COMMENT:

Page 2-84

The last sentence refers to airborne plutonium contamination as being in compliance with Clean Air Act regulations (40 CFR 61). Subpart H of 40 CFR 61 is the National Emission Standard for Radionuclide Emissions from Department of Energy (DOE) facilities. This covers radionuclide emissions as a whole and not specifically for plutonium as implied in the document. There are no specific standards for plutonium in the CFR or State Regulations.

RESPONSE:

The text has been modified to remove the implication that there are specific standards for plutonium in the Code of Federal Regulations (CFR) or state regulations (see p. 2-85).

CDH-21 COMMENT:

Section 2.3.8 Page 2-85

The summary of contamination only addresses ground water. There are no statements regarding soil contamination.

RESPONSE:

This section has been modified to cite the principal contaminants in each environmental media (see p. 2-86).

CDH-22 COMMENT:

Section 2.4

Applicable or Relevant and Appropriate Requirements should also include a reference to the Colorado Clean Air Act and the Air Quality Control Commission's (AQCC) Regulations. The AQCC regulations are especially important for considerations of complete or partial removal and treatment of wastes and contaminated soils, which are again referred to in Section 2.5. The regulations also apply for in-situ treatment.

RESPONSE:

ARARs addressing contaminants in air will be addressed in the CMS/FS Report. In general, federal and state standards for air exist only as source- or activity-specific requirements and, accordingly, will be addressed in detail in the FS process.

CDH-23 COMMENT:

Section 2.4 Page 2-87 to 2-95 Table 2-12

Table 2-12 and Section 2.4 on ARARs addresses water only. No mention of ARARs for soil and sediment contamination for radiological and hazardous substances.

Table 2-12 starting on Page 2-89 lists ARARs which I understand were based on ground water standard or surface water drinking standards or other appropriate standards but did not specifically list as potential standards the site specific surface water standards based on aquatic life uses -- I assume because there would be no aquatic life use of "ground water." However, I believe both sets of standards should be listed because:

- a) *pages 2-87 of the document states there is "significant interaction of alluvial ground water and surface water in the drainages of the Rocky Flats Plant"; and*
- b) *any discharge to the surface waters, e.g., during remediation, must meet the surface water standards, and these surface water standards could be more stringent than the presently identified ARARs (i.e., aquatic life standards for metals can be significantly more restrictive than drinking water standards).*

Many of the standards for surface water metals are listed as Table Value Standards (TVS) referring to formulas in the Basic Standards which are based on hardness as CaCO_3 .

Page 2-89. The effective site specific surface water standard for chloroform is 1.0 micrograms per liter (based on detectable levels).

The detection level specified by CDH for tetrachloroethene and 1, 1, 2, 2-tetrachloroethane is 1.0 microgram per liter, not 5.

Page 2-93. Typo. It should state: "Analytical results are total nitrate plus nitrite nitrogen."

Page 2-94. The units should be pCi/liter for rads, rather than mg/liter, and the gross alpha ARAR is CDH surface water standard (not ground water).

RESPONSE:

The discussion of ARARs has been substantially revised and may now be found in Section 7.0. Included in the revisions was the development of an ARAR table addressing ground water only. Standards considered in the development of ARARs for ground water included those found in the Safe Drinking Water Act (SDWA), RCRA 40 CFR Part 264 Subpart F and Colorado WQCC Ground-Water Quality Standards. Other references were reviewed for the ground-water medium as items TBC.

There are no chemical specific ARARs for soils. Acceptable concentrations will be determined through a risk assessment, which the ARARs section now discusses (Section 7.5, p. 7-18).

Surface water stations have been determined to be outside the boundaries of OU No. 2, with the exception of ground-water seeps. For this work plan, seeps are regarded as points at which ground-water quality may be characterized. Surface water investigations, including investigating the influence of seeps on surface water quality, are the subject of other Operable Unit remedial investigations (OU Nos. 5 and 6). Accordingly, no discussion of ARARs for surface water has been presented in this work plan.

Detection limits used in this work plan were established based on the GRRASP, EG&G Rocky Flats, February 15, 1990.

The correct units for radionuclides is picoCuries per liter (pCi/ℓ). The revised table (Table 7-1) reflects this correction. Proposed ARAR standards presented in the revised text are for ground water, as discussed above.

CDH-24 COMMENT:

Table 2-13 Page 2-96

Response actions and remedial technologies should include controls of air emissions for study and review.

RESPONSE:

Table 2-17 (previously Table 2-13) provides an overview of general response actions and applicable technologies and is not intended to provide details of secondary waste generation or air emission controls. The need for and effectiveness of air emission controls will be evaluated for all technologies that generate air pollutant emissions.

CDH-25 COMMENT:

Page 3-7 Table 3-2

Are the units in mg/liter or pCi/l for radiological parameters? The table does not address soil or sediments.

RESPONSE:

Table 3-2 in the April 12, 1990, submittal provided redundant information relative to Table 2-13 and therefore has been deleted.

CDH-26 COMMENT:

Section 4.0

The author of this section has provided a well written concise outline of the work ahead.

RESPONSE:

No response required.

CDH-27 COMMENT:

Section 4.1.7 Page 4-14

The four methods proposed for treatability study sound interesting and promising.

RESPONSE:

Please note this section has been modified to address all on-going treatability study programs applicable to contamination at OU No. 2 (see p. 4-14).

CDH-28 COMMENT:

Section 5.0

The Division realizes that the site wide Health and Safety Analysis, Quality Assurance, Prevention of Contaminant Dispersion and Sampling and Analysis documents have not been submitted for review at this time. Inclusion of the relevant parts of these documents is appropriate.

It appears that some of the earlier comments on additional sampling were premature.

RESPONSE:

The Inter-Agency Agreement (IAG) specifies that the Sampling and Analysis Plan (SAP) is to include a Quality Assurance Project Plan (QAPjP) and Standard Operating Procedure (SOP) for all field activities. The Final QAPjP for site-wide RCRA and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) activities was submitted to the regulatory agencies on 5 May 1991. A GRRASP has already been prepared which is the scope of work for analytical services. The current Rocky Flats Plant SOPs were submitted to EPA and CDH in August 1990. The Environmental Restoration Health and Safety Project Plan (ERHSP) is in final form. On August 1990 a draft of the document was submitted to the regulatory agencies for review. The Department of Energy (DOE) revised the plan based on regulatory agency comments and resubmitted a final document to the agencies for final review. A site-specific Health and Safety Plan (SSHSP) defining the protocol for protection of field workers during Phase II operations will be submitted as well. After finalization and approval of the work plan, the ERHSP and OU No. 2 SSHSP will not undergo formal public review, but will be available to the public. A draft Prevention of Contaminant Dispersion (PPCD) was completed in September 1990 and was reviewed by EPA and CDH. Agency comments were received in December 1990 and these comments are being incorporated into the final document scheduled for submittal in July 1991. The PPCD will be available for public review and comment in August 1991 and the Final Responsiveness Summary is due on 22 November 1991.

CDH-29 COMMENT:

Page 5-30

Don Michels in the 1970s identified that the plutonium contamination had penetrated to at least 8 cm. There is not enough detail presented to concur in the sampling approach. The proposal is not definitive. Pu contamination identified at BH30-87 is at depths greater than 20 feet. Inventory sampling procedures will yield much greater than 2 dpm/gram all the way to Indiana Street. Depth profile (inventory) soil sampling data needs to be presented in $\mu\text{Ci}/\text{m}^2$ or mCi/km^2 for comparisons with historical information and materials balance (there has been no mass wasting or erosion and removal from these large areas).

RESPONSE:

Surficial soil radionuclide contamination at OU No. 2 will be investigated by collecting 124 surficial soil scrapes (1/8 inch depth) and sampling from 26 vertical soil profiles (see p. 5-23 through 5-26). The vertical profile samples will extend below the depth of 8 cm. Profile soil sampling analytical results will be presented in microCuries per square meter ($\mu\text{Ci}/\text{m}^2$) or mCi/km^2 in the draft Phase II RFI/RI Reports for comparison with historical information.

CDH-30 COMMENT:

Figure 5-5

Needs a profile sample due east at Indiana Street due to the windstrewn field in that area.

RESPONSE:

A sampling location for an additional profile sample has been added in the area of the intersection of the Rocky Flats Plant east access road with Indiana Street (Figure 5-6).

CDH-31 COMMENT:

Section 5.2.3 Page 5-43

This section needs uranium analysis data included. Regarding the East Trenches data, all BH 53-87 2-3.5 feet deep analyses 0.98 pCi/gram, which is in excess of the State soil standard.

RESPONSE:

Uranium 233+234, 235, and 230 do not appear to be contaminants of surficial soils unlike plutonium and americium. Uranium contamination at specific IHSSs will be assessed from borehole soils data where the full suite of radionuclides will be analyzed (Table 5-2). Boreholes to be drilled into IHSSs will extend from the ground surface to 6 feet in claystone bedrock. Continuous samples will be collected for geologic descriptions for the entire borehole depth (Section 5.3). From this core, discrete and composite samples will be submitted for laboratory chemical analyses. In addition, a discrete sample will be collected for chemical analysis at the water table. Core from saturated surficial materials will not be submitted to the laboratory, as the presence of water in this zone will affect interpretation of chemical results. In order to prevent alluvial ground water from affecting weathered bedrock samples, surface casing will be grouted into the borehole through surficial materials. Subsequent to grout hardening, the borehole will then be advanced through weathered bedrock with continuous sampling. Section 5.2.3 has been deleted because the information concerning surficial sampling is provided in Section 5.4.

CDH-32 COMMENT:

Appendix D

The appendix does not include soil or sediment ARARs.

RESPONSE:

The appendices provide analytical results only. The discussion of ARARs is presented in Section 7.0.

SECTION 4.0
REFERENCES

-
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- Krey, P.W. and E.P. Hardy, 1970, Plutonium in Soil Around Rocky Flats Plant: U.S. Atomic Energy Commission Health and Safety Laboratory (HASL-235); New York, New York, August 1, 1970.
- Navratil, J.D., G.H. Thompson, and R.L. Kochem, 1979, Waste Management of Actinide Contaminated Soil; Rockwell International Report (RD 79-016), January 15, 1979.
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- Rockwell International, 1979, Annual Environmental Monitoring Report: January-December 1978; Rockwell International, Rocky Flats Plant, Golden, Colorado, report RFP-ENV-78.
- Rockwell International, 1980, Annual Environmental Monitoring Report: January-December 1979; Rockwell International, Rocky Flats Plant, Golden, Colorado, report RFP-ENV-79.
- Rockwell International, 1981, Annual Environmental Monitoring Report: January-December 1980; Rockwell International, Rocky Flats Plant, Golden, Colorado, report RFP-ENV-80.
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- Rockwell International, 1983, Annual Environmental Monitoring Report: January-December 1982; Rockwell International, Rocky Flats Plant, Golden, Colorado, report RFP-ENV-82.
- Rockwell International, 1984, Annual Environmental Monitoring Report: January-December 1983; Rockwell International, Rocky Flats Plant, Golden, Colorado, report RFP-ENV-83.
- Rockwell International, 1985, Annual Environmental Monitoring Report: January-December 1984; Rockwell International, Rocky Flats Plant, Golden, Colorado, report RFP-ENV-84.

Rockwell International, 1986, Annual Environmental Monitoring Report: January-December 1985; Rockwell International, Rocky Flats Plant, Golden, Colorado, report RFP-ENV-85.

Rockwell International, 1987, Annual Environmental Monitoring Report: January-December 1986; Rockwell International, Rocky Flats Plant, Golden, Colorado, report RFP-ENV-86.

Rockwell International, 1987a, Resource Conservation and Recovery Act Part B - Operating Permit Application for U.S. DOE Rocky Flats Plant, Hazardous and Radioactive Mixed Wastes, Revision 1; U.S. Department of Energy, unnumbered report.

Rockwell International, 1989, Rocky Flats Plant Site Environmental Report for 1988: January-December 1988; Rockwell International, Rocky Flats Plant, Golden, Colorado, report RFP-ENV-88.

ATTACHMENT 1



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII

999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405
MAY 14 1990

Ref: 8HWM-FF

Mr. Robert M. Nelson, Jr., Manager
Department of Energy
Rocky Flats Office
P.O. Box 928
Golden, CO 80402-0928

RE: Final Phase II RFI/RIFS
Workplan (alluvial) for OU 2

Dear Mr. Nelson:

This letter serves as notice from EPA of conditional approval of the final Phase II RFI/RIFS Workplan for Operable Unit 2 (OU2). This approval is required, prior to initiation of work, in accordance with the proposed Interagency Agreement (IAG) between EPA, the State of Colorado and DOE.

This approval is conditional upon DOE incorporating the enclosed comments into the work to be performed to characterize OU 2 and addressing the enclosed comments in the draft Phase II RFI/RI Report for OU 2 to the satisfaction of EPA. This conditional approval is also contingent upon EPA review and comment on the site-wide Health and Safety Plan and review and approval of the Sampling and Analysis Plan required under the IAG.

It is important to note that although most of these comments concern editorial issues, substantive requirements are also presented within the enclosed comments. Of significant importance within the comments are concerns regarding the new National Contingency Plan's (NCP) affect on the proposed ARAR analysis presented within the final Phase II RFI/RIFS Workplan for OU 2. This concern impacts all RFI/RI work at all OUs for Rocky Flats and should be taken into consideration while developing workplans and performing the work.

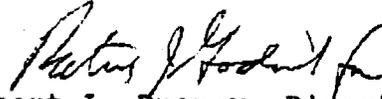
Also of importance are concerns regarding approval of a workplan which references the Sampling and Analysis Plan, required under the IAG, which has not yet been submitted for review and approval. This concern is addressed by the conditions raised in the second paragraph above.

As a specific matter, EPA is very concerned that the Workplan for OU 2 does not address minimization of contaminant migration due to field activities. Since the site-wide Health and Safety Plan and the Plan for Prevention of Contaminant Dispersion, required by the proposed IAG, are not yet submitted for review and comment, activities related to the Workplan for OU

2, all related field activity, and activity related to other OU investigations must take this concern into consideration. RFI/RI reports must describe how this concern was addressed. This concern is also addressed by the conditions raised in the second paragraph above.

If EPA can be of further assistance in clarifying these matters, please contact Nat Miullo or Martin Hestmark of my staff at (303) 294-1134 and (303) 294-1132, respectively.

Sincerely,



Robert L. Duprey, Director
Hazardous Waste Management Division

Enclosure

cc (w/enclosure):

David C. Shelton, CDH
Joan Sowinski, CDH
Gary Baughman, CDH
Nat Miullo, SHWM-FF
Peter Ornstein, 8ORC
~~Tom Greengard, EG&G~~
Scott Grace, DOE
Tom Olsen, DOE
Terri Ruitter, PRC

Comments on 903 Pad, Mound and East Trenches Areas
Final Phase II RI/FS Workplan

Executive Summary. The bedrock RI/FS workplan for OU 2 will be titled Phase II RFI/RI Workplan (bedrock), not Phase III.

Plutonium and americium are also observed in seeps downgradient of the 903 Pad and in the upper reaches of South Walnut Creek. This must be evaluated and discussed within the draft Phase II RFI/RI Report.

Section 1.0. The bedrock workplan is also a Phase II Workplan. It is not a Phase III Workplan.

Section 1.4.1.1. The location of the burial grounds for the drums containing plutonium contaminated sludge is important to determine as a part of this RFI/RI. 4.54×10^{-3} gm/l plutonium does not correlate to 280 pico Ci/l plutonium.

Section 1.4.1.2. The off-site disposal location of the plutonium contaminated soils removed from the 903 Lip Site must be determined as part of this RFI/RI.

Section 1.4.1.4. It is important to know what is meant by destruction of lithium, calcium, magnesium and solvents at site 140 so that the RFI/RI can incorporate this information in characterizing the site. Implementation of the workplan must address this issue.

Section 1.4.2.1. It is important to ascertain the condition of the drums when the drums were removed from the Mound Site. The RFI/RI must determine if the surficial radionuclide contamination of soil is the result of wind dispersion of contaminants from the 903 Pad Site.

Section 1.4.2.2. It is important to determine the offsite disposal location of the two drums unearthed in 1968 from this site. This information must be presented within the draft Phase II RFI/RI for OU 2.

Section 2.2.2.2. Implementation of the final workplan must reflect information gathered as a result of the seismic study ongoing.

Section 2.3.1. Table 2-4 within this section should have been revised to reflect the actual number of samples utilized to calculate tolerance intervals. This information must be updated in the draft Phase II RFI/RI Report for OU 2.

Section 2.3.2.1. The draft Phase II RFI/RI Report must be based on use of appropriate analytical procedures. Procedures should have been identified within the workplan which would

allow information derived from the phase I investigation to be verified or refuted. The phase I investigation seems to have relied upon medium level CLP procedures utilizing inappropriate detection limits for volatile organic compounds. The final workplan should have referenced the data validation of the phase I data. The draft Phase II RFI/RI Report must reference this information and the RFI/RI work must incorporate and utilize appropriate analytical procedures.

The final Phase II RFI/RI Workplan for OU 2 should have identified that acetone, 2-butanone, chloroform, 4-methyl-2-pentanone, toluene, ethylbenzene and xylenes appear to be present at trench T-2. The final workplan should not have excluded the possibility of the presence of methylene chloride, trans-1,2-dichloroethene, chloroform, trichloroethene, phthalates, and cis-1,3-dichloropropene from the 903 Pad area. This information cannot be excluded from the draft Phase II RFI/RI Report.

Section 2.3.2.2. The Oil Burn Pit No. 2 is SWMU No. 153, not SWMU No. 158.

The final Phase II RFI/RI Workplan for OU 2 should have clarified which existing and proposed boreholes will be used to characterize each SWMU, and the numbers and types of soil samples to be collected at each borehole. This information must be included within the draft Phase II RFI/RI Report for OU 2.

Conclusions regarding the presence of plutonium and americium as a result of the wind dispersion of material from the 903 Pad are not acceptable and cannot be substantiated with the present information. The draft RFI/RI Report must substantiate or refute this theory.

Section 2.3.2.3. The draft Phase II RFI/RI Report must be based on use of appropriate analytical procedures. Procedures should have been identified within the workplan which would allow information derived from the phase I investigation to be verified or refuted. The phase I investigation seems to have relied upon medium level CLP procedures utilizing inappropriate detection limits for volatile organic compounds. The final workplan should have referenced the data validation of the phase I data. The draft Phase II RFI/RI Report must reference this information and the RFI/RI work must incorporate and utilize appropriate analytical procedures.

In order to verify that the plutonium and americium contamination of the soil is limited to the surface, the subsurface soils must also be sampled and analyzed for

radionuclides (see comment on section 5.2.3. below).

The final workplan should have indicated that phthalates and 2-butanone were above detection limit within samples from boreholes at trenches T-3, T-4, T-10 and T-11. The final workplan should have indicated that 1,1,1-trichloroethane, toluene, and xylenes appear to be present within boreholes drilled within trenches T-5 through T-9. The draft Phase II RFI/RI Report must reflect this.

Section 2.3.3. This section should have clarified how first quarter 1989 site specific well data is compared to second quarter background information. Also, this section should have explained why maximum detected values were utilized in stead of upper tolerance limit values, when available. The draft Phase II RFI/RI Report for OU 2 must provide this explanation.

This section should have discussed the designations of the flagged analytical results as they pertain to results estimated above/below detection limits so as to clarify the interpretation of results. The draft Phase II RFI/RI Report must include this explanation. Table 2-9 must be updated in the draft RFI/RI Report to reflect excluded ground water data referenced within EPA comments on the draft phase II RFI/RI Workplan, section 2.3.3.1.

Section 2.3.3.2. Why are second quarter 1989 well analytical results compared to maximum detected values instead of calculated tolerance intervals for ground water radionuclide data in table 2-10? Table 2-11 should have been clarified to note that the background figures presented for comparison to all previously collected data may not represent background for quarters other than the second quarter of 1989. Thus this serves as a qualitative comparison only. The data presented within table 2-11 for radionuclides in ground water should be compared to the 1989 second quarter tolerance interval, not the maximum detected level for the second quarter of 1989, even though this tolerance interval is not directly applicable to all data previously collected and is only a qualitative indicator for data collected previous to the second quarter 1989. These explanations must be presented within the draft RFI/RI Report for OU 2.

The work implemented to support the draft Phase II RFI/RI for OU 2 must substantiate or refute the evaporative concentration theory substantiate or refute the transport of contaminants by the south interceptor ditch.

Section 2.3.5.2. Data and sampling locations for samples taken in October, 1989 must be presented within the draft Phase II RFI/RI Report for OU 2.

Section 2.4. This section should have been titled Chemical Specific Applicable or Relevant and Appropriate Requirements. The following comments on the ARAR analysis are intended, in part, to conform the ARAR analysis to specific requirements of the revised NCP and will require the reformulation of table 2-12, potential chemical specific ARAR concentrations when presented within the draft Phase II RFI/RI Report for OU 2.

- The ARAR screening process should not be performed serially. Rather, relevant and appropriate requirements are considered in the same manner as applicable requirements. When more than one ARAR is identified, the most stringent ARAR is to be used.

- Pursuant to the NCP (40 CFR 300.430(e)(2)(i)(B)), MCLGs must be attained for remedial actions for ground or surface waters that are current or potential sources of drinking water. Where the MCLG is set at a level of zero, the MCL must be attained.

- Pursuant to the NCP (40 CFR 300.430(e)(2)(i)(E)), Water Quality Criteria must be attained where relevant and appropriate.

- Pursuant to the NCP (40 CFR 300.430(e)(2)(i)(A)(2)), the 10E-6 risk level is to be used for carcinogens which do not have an ARAR. In particular, this should be evaluated for strontium. In addition, in evaluating the potential alternatives, all ARARs taken together should not present a cumulative risk in excess of 10E-4. If such risk would be exceeded for a particular alternative, the ARARs may need to be scaled back accordingly (see also 40 CFR 300.430(e)(2)(i)(D)).

- RCRA LDR is an action specific ARAR, triggered by the placement of a restricted waste. For the purposes of identifying chemical specific ARARs prior to screening remedies, the RCRA LDR standards in Subpart D of 40 CFR part 268 should be classified as "items to be considered".

The newly promulgated applicable CDH surface water standard for trihalomethanes is 190 ppb. The newly promulgated applicable CDH surface water standard for 1,1,2,2-tetrachloroethane is 170 parts per trillion. Although contaminant concentrations in ground water were estimated below detection limits, ARARs analyses must be presented for methylene chloride, acetone, carbon disulfide, 1,2-dichloroethane and toluene. Potential ARARs for phthalates and PCBs must also be presented. This information must be revised within the draft RFI/RI Report for OU 2.

Section 3.1. Concerning the table 3-1 objective of characterizing the nature and extent of contamination, DOE must also include evaluation of the horizontal and vertical extent of inorganic and organic contamination in soils external to SWMUs. This addition must be carried forward through sections 4.0. and 5.0. of the workplan and must be implemented and the resulting information presented within the draft Phase II RFI/RI Report for OU 2. The characterization of sources must be completed regardless of the past removal of wastes from some of the sites. This information must be provided within the draft Phase II RFI/RI Report for OU 2.

Section 3.2. Table 3-2 must be modified to reflect the new NCP modification of the ARARs analysis presented in section 2.4 and the update of the CDH standards for trihalomethanes and 1,1,2,2-tetrachloroethane as indicated in comments pertaining to section 2.4. above.

The final workplan should have identified workplan items designed to provide information not present in the Phase I RI. These shortcomings must be identified, corrected and presented within the draft Phase II RFI/RI Report for OU 2.

Section 4.1.3. The brief description of the activities required for the remedial investigation do not correlate to the objectives presented within section 3.2. of the workplan. For example, not just the surface soils will be sampled and analyzed for radionuclide contamination.

Section 4.1.6. For clarity, this section should have further stated that the risk assessment will assume no institutional controls. The risk assessment to be presented within the draft Phase II RFI/RI Report for OU 2 must reflect this requirement.

Section 4.1.6.2. This section describes work which may be required to evaluate environmental impact associated with the disposal practices at OU 2. Data needs and actual workplan objectives are not described or defined within section 3.0 of the workplan. The draft RFI/RI must present this information and a detailed description of the methods utilized to realize these data needs.

Section 4.2.2.1. The compliance with ARARs section should have been reworded to state "The analysis will address compliance with chemical specific, location specific and action specific ARARs in accordance with the NCP. If an alternative will not comply with an ARAR, the FS report will propose a basis for justifying a waiver, if appropriate." The draft Phase II RFI/RI Report must be prepared to reflect

this change.

Section 4.2.3. The progression of Feasibility Study documents is draft to final. Under the proposed IAG, there is no provision for the Feasibility Study to go to public comment. The Proposed Plan goes to public comment.

Section 5.0. DOE must present rationale for not analyzing both filtered and unfiltered samples for metal constituents.

Section 5.1.1. It is unclear how table 5-1 correlates with statements made in this section concerning well screened interval. The well screened interval tables should have followed the procedures outlined within this section.

An alluvial monitoring well must be located approximately 150 feet south southeast of newly proposed well 85-90. New well 35-90 must be relocated approximately 50 feet west of proposed location.

Section 5.1.1.3. DOE must not reduce the parameter list for analysis of ground water samples prior to receiving approval from the regulatory agencies.

Section 5.2.1.2. Boreholes must be located immediately downgradient of sites 153 and 154. These boreholes must be located as close to the source sites as is allowed. Boreholes must be located on both sides of site 108 in addition to the proposed monitoring wells. The draft RFI/RI Report for OU 2 must include this requirement. A borehole must be placed to characterize the potential for a source to be located within site 183.

Section 5.2.1.3. Boreholes must be placed external to, and downgradient from sites within the East Trenches Areas. This is necessary in order to verify the results of the phase I investigation. These boreholes must be sampled for all constituents listed within table 5-5. If trench T-10 is filled with barrels, boreholes must be drilled adjacent to this site and figure 1-5 should have been modified to reflect this information. Boreholes and wells must be completed and sampled in surface water drainages downgradient of the east spray fields to evaluate the effect the east spray fields have had on these drainages. The draft Phase II RFI/RI Report must include information derived from inclusion of these boreholes.

Section 5.2.3. Given that stored and buried drums contained plutonium and uranium, the soils must be sampled for plutonium 239 and 240, americium 241 and uranium 233/234, 235 and 238. Also, if the one meter depth proposed for the vertical profile indicates that radionuclides are found at

depth, further characterization may be warranted. It would be prudent to sample small discreet intervals within proposed boreholes drilled into and adjacent to sites known to have contained radionuclides to verify the premise that 903 Pad is responsible for the radionuclides present in the soils affected by OU 2. This is necessary as some borehole samples taken at depth do indicate the presence of plutonium and americium.

STATE OF COLORADO

COLORADO DEPARTMENT OF HEALTH

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Roy Rome
Governor

Thomas M. Ventron, M.D.
Executive Director

May 15, 1990

MAY 18 1990

Mr. Robert N. Nelson, Jr.
Manager
Rocky Flats Area Office
U.S. Department of Energy
P.O. Box 928
Golden, CO 80402-0928

Mr. Phillip Warner
Manager
EG&G, Rocky Flats Inc.
Rocky Flats Area Office
P.O. Box 928
Golden, CO 80402-0928

Re: Comments on the April 12, 1990 Final Phase II RFI/RIFS Workplan
(Alluvial) for OU2.

Dear Messrs. Nelson and Warner,

The Colorado Department of Health, Division of Hazardous Materials and Waste Management (the Division) has reviewed the April 12, 1990 final Phase II RI/RIFS Workplan (Alluvial) for Operable Unit 2 (OU 2).

The Division gives conditional approval of the Final Phase II RFI/RIFS Alluvial Workplan for Operable Unit 2. Conditional approval is required, prior to initiation of work, in accordance with the proposed Interagency Agreement (IAG) between DOE, the State of Colorado and EPA. Approval remains conditional until DOE incorporates the enclosed comments in the Draft Phase II RFI/RI Report for OU 2 to the satisfaction of CDH.

The authors of the Final Phase II RFI/RIFS Alluvial Workplan for OU 2 should be applauded for their efforts in producing a well written, technically sound document. The Division anticipates this summer 1990, six forthcoming site wide activity documents will be of the same comprehensive technical quality. The relevant sections of the The Health and Safety Plan, Plan for Prevention of Contaminant Dispersion, QA Program, Discharge Limits for Radionuclides (Workplan), Sampling and Analysis Plan, and Treatability Study should be submitted to the agencies as soon as possible, and included in the Draft RI Report for OU 2.

EPA is submitting comments on the final RFI/RIFS workplan for OU 2 under separate cover. If you or any of the members of your staff should have any questions or concerns that you would like to discuss, feel free to contact Noreen Matsuura at (303) 331-4920.

Sincerely,



Gary W. Baughman,
Unit Leader
Hazardous Waste Facilities
Hazardous Materials and Waste Management Division

Encl.

cc: Joan Sowinski, CDH
Fred Dowsett, CDH
John Haggard, RFPD
Teresa Hampton, AGO
Robert Duprey, EPA
Martin Hestmark, EPA
Patty Corbetta, EPA
Rich Schassburger, DOE
Tom Greengard, - EG&G

GWB/NM/nm

CDH Comments on the Rocky Flats Plant
FINAL PHASE II RFI/RIFS WORKPLAN
(Alluvial)
Operable Unit No. 2
April 12, 1990

General Comments

This and other similar documents submitted for review by DOE do an excellent job of covering geology, demographics, physical location, ecology, and both underground and surface water but they all lack good coverage of meteorological and fugitive emissions information. In this document wind dispersion is referred to once in section 1.4.2.1 Mound Site (SWMU Ref. No. 113) but with little explanation. Particulates are a major method of transport for contaminants through reentrainment. Any leakage or spills of solids such as those from deteriorating pondcrete and construction activities of other soil disturbances will also add to fugitive particulates in the air which are a pollutant by themselves and may also carry other contaminants.

A second area of fugitive emissions which did not receive adequate consideration are fugitive VOC emissions. These may occur from drum leakage, spills, seeps, etc. While these emissions may be of minor levels they add to the total plant emissions and are never controlled. Both the VOC and particulate emissions can have impacts on both human health and the environment.

SECTION 1.0

Figure 1-5.

The location of the 903 area "Lip" is inconsistent with the historical definition of the "Lip", particularly with regard to what was removed and the material shipped to NTS as low level radiological waste. The historical "Lip" is SE of the 903 pad, over the brow of the hill (a depositional area of windblown contamination). The narrative does mention the removal in relation to the metals destruction area that occurred there also. Considerable covering and recontouring of the 903 area has occurred which will complicate cleanup/removal.

Section 1.3.1.2.

Previous investigations, item 8 makes minor reference to meteorological studies but does not detail. This should have included a study of fugitive particulates.

Section 1.4.1.1 Page 1-19.

There is no reference to HASL-235 information which indicated that the loss of control of materials was greater than 86 grams. It may be that other documents referenced do include discussion of HASL-235 et seq documentation. Also recognize that statements made about inventory lost from control are time related, in that the plant boundary has changed over the years.

Section 1.4.1.2 Page 1-23.

The off-site disposal location of the first two soil cleanups is unknown. Is the off-site disposal location of the 214 tri-wall pallets of contaminated soil removed during the 1984 third soil clean up unknown as well?

Section 1.4.2.2 Page 1-26.

Ground penetrating radar or some other kind of noninvasive geophysical investigation should be done to define the location of the 125 buried drums in Trench T-1, SWMU Ref. No. 108.

Section 1.4.3.1 Page 1-27.

Again some kind of noninvasive geophysical investigation should be done to define the location of the 300 buried drums.

SECTION 2.0

Phase I Site Evaluation item nine, air monitoring for total long lived, alpha, plutonium, and volatile organics during field activities is listed, however the collection and analytical methods should also be referenced for evaluation.

Table 2-3.

Regarding radiological parameters, the results for sediments should be in pCi/gram, not pCi/liter.

Table 2-4.

Are the radiological parameter results to be in pCi/L or pCi/gram?

Section 2.3.1 Page 2-14.

It is not an acceptable practice to use background concentrations derived from maximum detectable values i.e. sample size less than seven and in some cases as few as two samples, to identify contaminated sites. It is acceptable to use maximum background values for borehole and monitoring well placement. All background concentrations used to identify contaminated sites must be either 95% upper tolerance interval limits, or 95% or higher upper confidence interval limits.

Section 2.3.2.1 Page 2-28.

No reference to HASL-235 at seq documentation. There is no mention of the work done by Michels (RI) who did work on the depth of soil contamination penetration in the 903 area. Michels also published information regarding background Pu in the midwest for comparison with the RFP environs.

Section 2.3.2.1 Page 2-31.

The reduction of Pu/Am contamination by wet screening is suspect. While Pu attaches to clay particles and particle size separation (a soils classification methodology used by USGS and Dr. Johnson) is feasible, there are complications. The wet process takes considerable water and total destruction of the particle conglomerates. The treatment and disposal of such waste water would present additional complications. Dry separation is also problematic due to the dust generated even with closed systems. Cleveland (RI now USGS) tried the process using clean soil unsuccessfully at the Sweeny Mining and Milling facility on Sugarloaf above Boulder.

Section 2.3.2.2 Page 2-37.

The 903 Drum Storage area has been identified as the wind dispersal source of ground surface Plutonium and Americium contamination at the Mound, Oil Burn pit and Trench Sites. There should be a meteorological analysis of the direction of prevailing winds over the site with respect to topography. Were there topographical features where winds could have deposited significant amounts of radionuclide contaminated soil before the pad was placed on 903?

How many additional soil samples will be collected from borings at both possible Pallet Burn Sites? Will the soil sampling tests and data needed to evaluate depth and extent of plutonium in soils at both Pallet Burn sites be completed and presented in the Draft Phase RI Plan.

Section 2.3.2 Soils.

What radionuclides, other than americium and plutonium will be tested for in evaluation of elevated Pu and Am concentrations in surface soils?

Section 2.3.2.1. 903 Pad & Lip Sites Ph I RI Soil Investigation Results.

How many and where, will the additional boreholes, through and immediately adjacent to the pad during Ph II RI validation of VOC soil contamination be placed?

Page 2-35. Specify what additional surficial soil and soil profiling is going to characterize the radionuclide distribution on the 903 Pad and Lip Sites.

Section 2.3.2.3 Page 2-38.

Page 2-39. What was the depth of the uppermost soil sample taken at Borehole BH 52-87, where the most contaminated soil was found?

Section 2.3.3.1 Page 2-42.

Will the CCl₄ plume at 903 Pad be sufficiently delineated by information gained from the additional boreholes placed immediately adjacent to the pad, referred to in Section 2.3.2.1 for VOC soil contamination Ph II RI Validation?

Page 2-48. How many and where will the additional monitoring wells to delineate the extent of PCE contamination, (southeast downgradient of Pad 903 Pad and Trench T-2), be placed?

Page 2-49. How will the additional data required to assess the significance of chloroform in wells 28-87 and 30-87 be gathered?

Page 2-50. What further sampling and analysis will be done to resolve methylene chloride and acetone contamination at well 36-87BR?

Section 2.3.6 Page 2-81.

The ambient air data is not provided by individual station, which is important, as the individual station data of significance is washed out in averaging. The resultant summary talks in generalities only. There is a need to require historical air sampling data as current concentrations are lower, due to surficial burial of the contamination.***

Page 2-84.

The last sentence refers to airborne plutonium contamination as being in compliance with Clean Air Act regulations (40 CFR 61). Subpart H of 40 CFR 61 is the National Emission Standard for Radionuclide Emissions from Department of Energy (DOE) facilities. This covers radionuclide emissions as a whole and not specifically for plutonium as implied in the document. There are not specific standards for plutonium in the CFR or State Regulations.

Section 2.3.8 Page 2-85.

The summary of contamination only addresses ground water. There are no statements regarding soil contamination.

SECTION 2.4

Applicable or Relevant and Appropriate Requirements should also include a reference to the Colorado Clean Air Act and the Air Quality Control Commission's (AQCC) Regulations. The AQCC regulations are especially important for considerations of complete or partial removal and treatment of wastes and contaminated soils, which are again referred to in Section 2.5. The regulations also apply for in-situ treatment.

SECTION 2.4 Page 2-87 to 2-95 Table 2-12.

Table 2-12 and Section 2.4 on ARARs addresses water only. No mention of ARARs for soil and sediment contamination for radiological and hazardous substances.

Table 2-12 starting on Page 2-89 lists ARARs which I understand were based on ground water standard or surface water drinking standards or other appropriate standards but did not specifically list as potential standards the site specific surface water standards based on aquatic life uses -- I assume because there would be no aquatic life use of "ground water." However, I believe both sets of standards should be listed because:

a) pages 2-87 of the document states there is "significant interaction of alluvial ground water and surface water in the drainages of the Rocky Flats Plant"; and

b) any discharge to the surface waters, e.g., during remediation, must meet the surface water standards, and these surface water standards could be more stringent than the presently identified ARARs (i.e., aquatic life standards for metals can be significantly more restrictive than drinking water standards).

Many of the standards for surface water metals are listed as Table Value Standards (TVS) referring to formulas in the Basic Standards which are based on hardness as CaCO_3 .

Page 2-89. The effective site specific surface water standard for chloroform is 1.0 micrograms per liter (based on detectable levels).

The detection level specified by CDH for tetrachloroethene and 1,1,2,2-Tetrachloroethane is 1.0 microgram per liter, not 5.

Page 2-93. Typo. It should state: "Analytical results are total nitrate plus nitrite nitrogen."

Page 2-94. The units should be pCi/liter for rads, rather than mg/liter, and the gross alpha ARAR is CDH surface water standard (not ground water).

Table 2-13 Page 2-96.

Response actions and remedial technologies should include controls of air emissions for study and review.

Page 3-7 Table 3-2.

Are the units in mg/liter or pCi/L for radiological parameters? The table does not address soil or sediments.

SECTION 4.0

The author of this section has provided a well written concise outline of the work ahead.

Section 4.1.7 page 4-14. The four methods proposed for treatability study sound interesting and promising.

SECTION 5.0

The Divison realizes that the site wide Health and Safety Analysis, Quality Assurance, Prevention of Contaminant Dispersion and Sampling and Analysis documents have not been submitted for review at this time. Inclusion of the relevant parts of these documents is appropriate.

It appears that some of the earlier comments on additional sampling were premature.

Page 5-30.

Don Michels in the 1970's identified that the plutonium contamination had penetrated to at least 8 cm. There is not enough detail presented to concur in the sampling approach. The proposal is not definitive. Pu contamination identified at BH30-87 is at depths greater than 20 feet. Inventory sampling procedures will yield much greater than 2 dpm/gram all the way to Indiana Street. Depth profile (inventory) soil sampling data needs to be presented in uCi/m² or mCi/km² for comparisons with historical information and materials balance (there has been no mass wasting or erosion and removal from these large areas).

Figure 5-5. needs a profile sample due east at Indiana Street due to the windstrewn field in that area.

Section 5.2.3 Page 5-43. This section needs uranium analysis data included. Regarding the East Trenches data, all BH 53-87 2-3.5 feet deep analyses 0.98 pCi/gram, which is in excess of the State soil standard.

Appendix D. The appendix does not include soil or sediment ARARs.