

INFORMATION

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RFP/ERM-94-00037



ROCKY FLATS

# Final Report Health & Safety Plan Phase I and Phase II RCRA Facility Investigation/ Remedial Investigation Operable Unit 4



September 1994

ADMINISTRATIVE

A-OU04-000279

**Final  
Health and Safety Plan**

**Phase I and Phase II RCRA Facility  
Investigation/Remedial Investigation  
Operable Unit No. 4**

Prepared for  
U.S. DEPARTMENT OF ENERGY

Rocky Flats Environmental Technology Site  
Golden, Colorado

September 1994

DOCUMENT MODIFICATION REQUEST (DMR)

Refer to 1-A01-PPG-001 for Processing Instructions.  
Print or Type All Information (Except Signatures)

INFORMATION ONLY

1 Date September 7, 1994	25. DMR No. 94-DMR-ERM-0129 <i>10/26/94</i>
3 New Document Number or Document Number if it is to be changed with this Revision N/A	
5 Document Title Health and Safety Plan Phase I RFI/RI OU4	

2 Existing Document Number/Revision  
RFI/RI 94-00037

4 Originator's Name/Phone/Page/Location  
Steve Paris Ext: 8543/Building 080

6 Document Type  Procedure  
 Other Health and Safety Plan

7 Document Modification Type (Check only one)  
 New  Revision  Intent Change  Nonintent Change  Editorial Correction  Cancellation

8. Item	9. Page	10. Step	11. Proposed Modifications
1	N/A	N/A	Change Title Page from Phase I to Phase I and Phase II.
2	1	1.0	Add Phase II.
3	1	1.0	Add Phase I.
4	2	1.0	Add Phase I.
5	2	1.0	Added the following paragraph: <ul style="list-style-type: none"> <li>Characterize the surface waters, unconsolidated materials, and bedrock hydrologic systems and their interactions;</li> <li>Delineate the contribution of ground water contaminants to OU4 from upgradient sources;</li> <li>Characterize contamination in OU4 surface and ground water systems;</li> <li>Delineate the extent of ground water contamination;</li> <li>Evaluate mobility characteristics in OU4 media;</li> <li>Evaluate ITS effectiveness;</li> <li>Evaluate compliance with ARARs and conduct a baseline risk assessment; and</li> <li>Evaluate the Bowman's Pond (Building 774) water system.</li> </ul>
6	3	1.0	Add Phase II.
7	3	1.1	Add Phase II.
8	3	1.1	Add Environmental Management Radiological Guidelines (EMRG)
9	4	1.2	Added the following paragraph. The scope of services to be covered by this HASP for the Phase II RFI/RI field investigations are: <ul style="list-style-type: none"> <li>Installation of groundwater monitoring wells at multiple locations within OU4;</li> <li>Establishing surface water sampling stations at multiple locations including discharge and drainage ditches, Building 774 area drain, culverts and the hillside north of SEPs;</li> <li>Sampling of surface water, sediment and gauging stations at multiple locations around the SEPs;</li> <li>Establishment of monitoring and sampling stations within the ITS;</li> <li>Conducting slug tests;</li> <li>Mapping the top of bedrock with ground penetrating radar (GPR) and by acquiring compressional and shear wave seismic refraction data;</li> <li>Conducting pumping tests;</li> <li>Acquiring frequency domain electrometric data; and</li> <li>Estimating hydraulic activity using a heat pulsing flow meter if slug tests and/or pumping tests are inconclusive.</li> </ul>

12. Justification (Reason for Modification, EJOB#, TP#, etc.)  
Modification of OU4 Phase I RFI/RI Health and Safety Plan to include Phase II activities and other pertinent modifications.

If modification is for a new procedure or a revision, list concurring disciplines in Block 13, and enter N/A in Blocks 14 and 15. If modification is for any type of change or a cancellation, organizations are listed in Block 13, then Concuror prints, and signs in Block 14, and dates in Block 15.

13. Organization	14. Print and Sign (if applicable)	15. Date (if applicable)
OU4	S.M. PARIS <i>S.M. Paris</i>	
EQS	<i>[Signature]</i>	10/17/94
Industrial Hygiene	<i>[Signature]</i>	10/23/94
Occ. Health	N/A <i>[Signature]</i>	N/A
Rad. Engineering	R.W. NORTON <i>R.W. Norton</i>	10/13/94
EDM/ERNSD	<i>[Signature]</i>	10/26/94

16. Originator's Supervisor (print/sign/date)  
Randy T. Ogg *Randy T. Ogg*

17. Assigned SME/Phone/Page/Location Keith D. Anderson 6979/5142/080	18. Cost Center 0248	19. Charge Number ENV-H+S	20. Requested Completion Date	21. Effective Date NOV 29 1994
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22. Accelerated Review? Yes  No

23. ORC Review  
N/A

24. Responsible Manager (print, sign, date)  
-Randy T. Ogg *J.A. Ledford* James A. Ledford 10/26/94

Item	Page	10. Step	11. Proposed Modifications	12. Justification (Reason for Modification, EIOH, TPN, etc.)
10	2	2.2	Added Phase II	
11	2	2.2	Added His/her	
12	3	Table 2.1	Added current E&G&G personnel and deleted personnel no longer performing these duties.	
13	4	2.3	Added his/her	
14	4	2.4	Added Phase II	
15	4	2.4	Added or professional engineer	
16	5	2.5	Changed Field Team Leader to Site Manager	
17	5	2.5	Added Phase I and Phase II	
18	5	2.6	Deleted the following ending from the 2nd sentence in the 1st paragraph after of this HASP, "and conformance with applicable health and safety regulations."	
19	6	2.6	Deleted the last sentence from paragraph: The PHSM will maintain a task record which includes all information relative to site accidents, injuries, or incidents.	
20	6	2.7	Added Phase I and Phase II to first sentence, first paragraph.	
21	6	2.7	Added the Phase I and Phase II to second sentence, first paragraph.	
22	6	2.7	Added the following responsibilities of the SSHO to first paragraph: - Conformance with applicable health and safety regulations; - Implementation of this HASP; - Maintaining a task record which includes all information relative to site accidents, injuries, or incidents.	
23	7	2.7	Added the following responsibilities of the SSHO to first paragraph: - Monitoring and inspecting health and safety conditions during the Phase I and Phase II RFI/RI activities and deciding when more stringent personal protection equipment is required. - Notifying E&G&G representatives of emergencies related to the Phase I and Phase II RFI/RI activities.	
24	8	2.8	Added Phase I and Phase II	
25	6	3.2.1	Deleted the last sentence of paragraph 4: OVA is currently in the Phase II RFI/RI stage and replaced with the following: Phase II is designed to investigate surface water, groundwater, air, biota, and the environment.	
26	6	4.7	Added Phase I and Phase II	
27	2	5.2	Added the following sentence at the end of paragraph 1: Extensive data was also collected during Phase I RFI/RI activities.	
28	4	5.2	Added Phase I	

Modification of OVA Phase I RFI/RI Health and Safety Plan to include Phase II activities, shift Health and Safety responsibilities from Project Health and Safety Manager (PHSM) (Item 17) to Site Safety and Health Officer (SSHO) (Item 20), add Health and Safety responsibilities to SSHO (Item 12)

3. Document Title: Health and Safety Plan Phase I RFI/RI OVA

3. Document Number: RFP/ERM-94-0037

3. Document Date: ERM-0129

3. Document Revision: 1

3. Document Author: NA

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25.

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3. Document Title

Health and Safety Plan Phase I RFI/RI OU4

8. Item	9. Page	10. Step	11. Proposed Modifications
29	18	5.3	Added Phase I and Phase II.
30	20	5.5	Added Phase I and Phase II.
31	22	5.5.1	Added Phase I and Phase II.
32	22	5.5.2	Added Phase I and Phase II.
33	23	5.5.2	Added Phase I and Phase II.
34	1	6.0	Added Phase I and Phase II.
35	9	6.13	Added Phase I and Phase II to first paragraph.
36	1	7.0	Added the following sentence to the last paragraph: Data from the Phase I RFI/RI project were also evaluated prior to Phase II activities. Original evaluations are consistent with recent findings except as noted.
37	2	7.1	Added the following paragraph as a last paragraph in the section:  Analysis of water, soil, and air samples collected during the Phase I RFI/RI indicated that contaminant levels for organics, pesticides and PCBs were uniformly low, when detected at all. Radionuclides and metals, although at concentrations above background in some areas, were not detected at levels which would pose a significant health hazard to individuals participating in Phase II activities. Routine radiological ambient air monitoring, in fact, documented plutonium concentrations as being generally low and not posing a significant health threat to workers in the area. As a conservative measure, however, control measures (PPE, personal decon and dust control where warranted) will be implemented to minimize exposure when working in areas where cadmium and chromium levels were consistently higher than background; cadmium in both surface and unsaturated soils and chromium contamination in alluvial groundwater. Although it is unlikely that either metal will pose a significant health risk to Phase II workers, extra precautions are warranted because exposure to both have been linked to cancer.
38	2	7.1.1	Omitted sentence beginning with "Because it is difficult..." on line 10 and replaced with:  Because contaminant levels detected in Phase I did not indicate a need, personal breathing zone samples will only be obtained when direct reading instruments indicate that airborne concentrations in the breathing zone of workers may exceed the MADC for plutonium. If personal samples are collected,—
39	6	Table 7.1	Added to Table 7.1, Work Activity Hazards, the last three rows and columns starting with Groundwater Sampling, Surface Water Sampling and Slug Testing/Pump Testing, etc. Add: Full face respirator (HEPA filter) required if soil is not maintained in moist condition. Ear plugs should be worn in area with noise levels greater than 85dB. Dermal protection (gloves) will consist of leather, latex, or nitrile work gloves depending on the activity.
40	9	7.1.8	Omitted the last 4 lines of the 1st paragraph which began with "However, due to the absence..." and was replaced with: Due to the extensive characterization of contaminants from samples collected during the Phase I RFI/RI activities, breathing zone samples are not warranted during Phase II activities unless direct reading instruments readings in the breathing zone of workers indicate that MADCs may be exceeded for a particular activity in a particular area.
41	9	7.1.8	Added Phase I and Phase II. Added Phase I and Phase II.
42	3	8.3.2	Added the following to 1st sentence of 1st paragraph:
43	4	8.4	Add sentences: Baseline sampling will be established to ensure proper engineering controls and work practices. Baseline sampling will also be established during noise-generating evolutions.
44	5	8.4	When direct reading instruments indicate a need; i.e. when contaminant concentrations are detected which exceed the MADC, personal...etc. Omitted the 2nd paragraph and replaced it with the following:  Personal sample pumps will be placed on individuals working in areas or participating in activities where the SSHO has determined by direct reading instrumentation that MADCs may be exceeded. Personal samples will be collected and analyzed with expedited turnarounds so that levels of protection and engineering controls can be applied and/or eliminated in a timely manner.

12. Justification (Reason for Modification, EJO#, TP#, etc.)

Modification of OU4 Phase I RFI/RI Health and Safety Plan to include Phase II activities and other pertinent modifications.

Modifications to the Health and Safety Plan also included a discussion on the Phase I data to identify any changes to the original Phase I evaluation.

25.  
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Print or Type All Information (Except Signatures)3. Document Number/Revision *line* **RFP/ERM-94-00037**3. Document Title  
Health and Safety Plan Phase I RFI/RI OU4

8. Item	9. Page	10. Step	11. Proposed Modifications
45	5	8.6	Added Phase I and Phase II.
46	2	Table 9.1	Added to Table 9.1, Training Requirements For Employees Working at OU4, last column RCRA-CBT.
47	3	9.4	Change: Radiation Worker Training to Radiation Worker Training II.
48	3	9.5	Added Phase I and Phase II to second paragraph.
49	5	9.7.2	Added Phase I and Phase II to first paragraph.
50	1	13.1	Added Phase I and Phase II to paragraph.
51	1	14.1	Added Phase I and Phase II to first sentence of first paragraph.
52	1	15.1.1	Added Phase I and Phase II to first sentence of first paragraph.
53	-1	17.0	Added Phase I and Phase II to first and third sentences of first paragraph.
54	3	17.3.3	Added Phase I and Phase II to first sentence of first paragraph.
55	4	17.4	Added Phase I and Phase II to first sentence of first paragraph.
56	6	17.6.3	Omitted the name of Bruce Peterman and his extension and pager number and replaced with Randy Ogg, Extension 8608, Pager 4622. Change: Lisa LeLievre to Peggy Schreckengast
57	1	18.1	Change: Contractor and subcontractor personnel shall not be allowed to wear contact lenses while wearing respirators; to Contractor and subcontractor personnel will be allowed to wear contact lenses while wearing respirators.
58	1	18.1	Added Phase I and Phase II to last sentence of 5th rule and regulation.
59	2	18.1	Added Phase I and Phase II to sentence of 12th rule and regulation.
60	2	18.1	Add: Field team members will also adhere to the guidelines addressed in the radiation work permit (RWP).
61	3	18.2	Added Phase I and Phase II to first sentence of paragraph.
62	5	18.5	Added the following as a second paragraph:  The Phase II RFI/RI involves: OU wide geophysical surveys surface water sampling, groundwater development and sampling, monitoring well installation and aquifer testing. The activity and corresponding ECEG Standard Operating Procedures (SOPs) which apply to the Phase I and Phase II OU4 activities are described below:
63	6	18.5	Added Phase I and Phase II to last sentence of second paragraph.
64	6	18.5	Added the following activities:  SW.01 Surface Water Data Collection Activities SW.02 Field Measurement of Surface Water Field Parameters SW.03 Surface Water Sampling SW.06 Sediment Sampling GW.04 Slug Testing GW.08 Aquifer Pumping Tests
65	1	20.0	Added Phase I and Phase II to first sentence, first paragraph.

## 12. Justification (Reason for Modification, EJO#, TP#, etc.)

Modification of OU4 Phase I RFI/RI Health and Safety Plan to include Phase II activities and other pertinent modifications.  
Modifications also included a listing of SOPs pertinent to the Phase II field activities.

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•94-DMR-ERM-0129	Inclusion of Phase II activities to OU4 (changes made throughout the document)	0	11/29/94
	Detailed Table of Contents	0	09/15/94
1.0	General Information	0	09/15/94
2.0	Project Organization	0	09/15/94
3.0	General Site Location, Description and History	0	09/15/94
4.0	Process Operations	0	09/15/94
5.0	Chemical Hazard Contamination and Analysis	0	09/15/94
6.0	Physical Hazard Identification and Analysis	0	09/15/94
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8.0	Employee Exposure and Environmental Monitoring	0	09/15/94
9.0	Employee Training	0	09/15/94
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11.0	Decontamination and Personal Hygiene	0	09/15/94
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13.0	Accident Prevention Plan	0	09/15/94
14.0	Site Control	0	09/15/94
15.0	Bloodborne Pathogen Exposure Control Plan	0	09/15/94
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18.0	Standard Operating Procedures	0	09/15/94
19.0	RCRA Permits and New Technologies	0	09/15/94
20.0	Logs, Records, and Reports	0	09/15/94
21.0	References	0	09/15/94
APPA	Appendix A: Health and Safety Plan Acceptance Statement	0	09/15/94
APPB	Appendix B: Field Change Form	0	09/15/94
APPC	Appendix C: Site History	0	09/15/94
APPD	Appendix D: EG&G Form FO.16A	0	09/15/94
APPE	Appendix E: Summary of Liquid, Sludge, and Soil Data From Operable Unit 4	0	09/15/94
APPF	Appendix F: Estimation of Airborne Radionuclide Concentrations	0	09/15/94
APPG	Appendix G: Real Time Instrument Calibration and Data Sheets	0	09/15/94
APPH	Appendix H: Personal Sampling Calibration and Data Sheets	0	09/15/94
APPI	Appendix I: Safety Briefing Log	0	09/15/94
APPJ	Appendix J: Material Safety Data Sheets	0	09/15/94
APPK	Appendix K: Accident Report	0	09/15/94
APPL	Appendix L: NIOSH Methods	0	09/15/94
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19.1 EVALUATION PROCEDURES BY EG&G DEPARTMENT

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APPROVED BY:

R. T. Ogg 19 8-31-94  
OU4 Project Manager Date  
Environmental Restoration Management

### 1.0 GENERAL INFORMATION

This site specific Health and Safety Plan (HASP) has been prepared in conformance with requirements of the Occupational Safety and Health Administration (OSHA) Title 29 Code of Federal Regulations (CFR) Part 1910.120 - Hazardous Waste Operations and Emergency Response, OSHA 29 CFR 1910.1200 - Hazard Communication, Department of Energy (DOE) regulations, and EG&G Standard Operating Procedures (SOPs). In addition, this plan complies with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Resource Conservation and Recovery Act (RCRA). This HASP represents the minimum health, safety, and emergency response activities required for the Phase I and Phase II RCRA Facility Investigation (RFI)/Remedial Investigation (RI) for Operable Unit Number 4 (OU4) at the EG&G Rocky Flats Plant (RFP) in Golden, Colorado. The OU4 site is on the U.S. Environmental Protection Agency's (EPA) Superfund National Priorities List. Compliance with this HASP is required of all personnel working at or visiting the RFI/RI site, including all employees and subcontractors of EG&G.

The purpose of the Phase I RFI/RI is to characterize soil contamination around the Solar Ponds and under the pond liners and determine risk of the contamination. In addition, this project

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will attempt to delineate the original pond area location. Lastly, the Phase I RFI/RI will try to determine where underground objects, powerlines, and pipelines are located in the Solar Pond area.

The specific objectives of the Phase II RFI/RI field investigations are as follows:

- Characterize the surface waters, unconsolidated materials, and bedrock hydrologic systems and their interactions;
- Delineate the contribution of ground water contaminants to OU4 from upgradient sources;
- Characterize contamination in OU4 surface and ground water systems;
- Delineate the extent of ground water contamination;
- Evaluate mobility characteristics in OU4 media;
- Evaluate ITS effectiveness;
- Evaluate compliance with ARARs and conduct a baseline risk assessment; and
- Evaluate the Bowman's Pond (Building 774) water system.

The purpose of this HASP is to detail the health, safety, accident, and fire protection standards and procedures to be used during the course of the Phase I and Phase II RFI/RI; outline standard operating procedures to ensure the health and safety of all personnel performing activities connected to the project; outline emergency and contingency plans for protection of personnel and for any contingencies which might also affect the surrounding populace and environment; and designate the responsibilities and authorities for implementing this HASP, as well as reporting procedures.

All employees who work on this project must be familiar with the information, instructions, and emergency response actions contained in this HASP. All employees directly involved in Phase I and Phase II RFI/RI field activities must read this HASP and sign a statement included in Appendix A, prior to participating in any field activity, indicating they have read and understand this HASP. Any modifications to this HASP will be presented to project personnel involved in field activities during

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safety briefings. The safety briefings will be documented and the modifications incorporated into this HASP.

The HASP shall be available for inspection and review by all personnel participating in the Phase I and Phase II RFI/RI field activities; authorized EG&G personnel; representatives for DOE, EPA, OSHA, and the State of Colorado; and other authorized visitors. A copy of the HASP shall be readily available during field activities.

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All field team members will be qualified by the Project Manager (PM) and Project Health and Safety Manager (PHSM) prior to participating in Phase I and Phase II RFI/RI field activities at RFP to verify that required training and medical surveillance has been completed.

### **1.1 REFERENCES, REGULATIONS, AND GUIDELINES**

This HASP and all Phase I and Phase II RFI/RI field activities conducted throughout OU4 and the Solar Evaporation Ponds area will be in compliance with the requirements of the most current edition of the following documents:

- U.S. Department of Energy Regulations;
- U.S. Department of Labor, OSHA Standards  
29 CFR Part 1910, specifically 29 CFR 1910.120 and 29 CFR 1010.1200;
- U.S. Environmental Protection Agency, Standard Operating Safety Guidelines  
July 1988;
- National Institute of Occupational Safety and Health (NIOSH)/OSHA/U.S. Coast Guard (USCG)/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities  
October 1985;
- EG&G Health and Safety Practices Manual;
- EG&G Standard Operating Procedures; and
- Field Sampling and Geophysical Investigation of the Existing Solar Ponds Area.
- Environmental Management Radiological Guidelines (ERMGs)

### **1.2 SCOPE OF SERVICES**

The scope of services to be covered by this HASP for the Phase I RFI/RI field sampling project at RFP are briefly summarized below.

- OU-wide radiological survey and surficial soil sampling;

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- OU-wide vadose zone monitoring;
- Field sampling and geophysical investigation in the vicinity of the Original pond;
- Field sampling and geophysical investigation of the existing Solar Ponds area; and
- Field sampling and investigation of the Interceptor Trench system and site remainder.

The scope of services to be covered by this HASP for the Phase II RFI/RI field investigations are:

- Installation of groundwater monitoring wells at multiple locations within OU4;
- Establishing surface water sampling stations at multiple locations including discharge and drainage ditches, Building 774 area drain, culverts and the hillside north of SEPs;
- Sampling of surface water, sediment and gauging stations at multiple locations around the SEPs;
- Establishment of monitoring and sampling stations within the ITS;
- Conducting slug tests;
- Mapping the top of bedrock with ground penetrating radar (GPR) and by acquiring compressional and shear wave seismic refraction data;
- Conducting pumping tests;
- Acquiring frequency domain electromatic data; and
- Estimating hydraulic activity using a heat pulsing flow meter if slug tests and/or pumping tests are inconclusive.

### **1.3 FIELD CHANGES**

A field change form is included in Appendix B. Any employee or subcontractor working on the OU4 RFI/RI can initiate a change in the HASP by filling out the Field Change Form and Submitting it to the Project Health and Safety Manager (PHSM). This form must then be signed by the PHSM, Program Manager (PRM), and Project Manager (PM). Before the field change becomes final, signatures must also be obtained from the EG&G Health and Safety Liaison Officer and the EG&G Project Manager.

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Once the change is approved, the Field Change Form must be incorporated into the HASP in the appropriate section.

#### 1.4 HASP CONTENTS AND ORGANIZATION

The HASP includes the following information:

- Staff organization and responsibilities - Section 2.0;
- Site description and contamination characterization - Sections 5.0, 6.0, and 7.0;
- Hazard Assessment, Levels of Protection, and Action Levels - Sections 6.0, 7.0, and 10.0;
- Accident Prevention - Section 13.0;
- Heat and cold stress monitoring - Sections 6.0 and 16.0;

Project technical support personnel should include a project engineer, hydrogeologist, geochemist, certified industrial hygienist, or health physicist and toxicologist. Each individual will have direct responsibility for their respective technical areas throughout the entire project. Additional technical resources should include the field team leader, and project health and safety officers as needed to fulfill project requirements.

An appropriate number of subcontractors should be included in the project team, as necessary, to provide additional technical expertise. A recommended listing of the subcontractors, their addresses and phone numbers, the name of the contact person, and a description of the responsibilities of each subcontractor should be presented in a table format within this chapter.

Table 2.1 provides a list of key EG&G personnel, their title, telephone number, and pager number.

## 2.2 PROGRAM MANAGER

The Program Manager (PrM) is primarily responsible for overall technical performance and the administrative management of all tasks that will be conducted during the performance of the OU4 Phase I and Phase II RCRA Facility Investigation/Remedial Investigation (RFI/RI). The PrM has the complete authority for commitment of resources for any task.

The PrM also has overall responsibility for safety during the site activities. His/her responsibilities include:

- Coordinating preparation of an effective, approved site health and safety plan for the project;

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**TABLE 2.1  
EG&G MANAGEMENT AND PERSONNEL FOR THE OU4 RFI/RI**

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Name	Title	Telephone Number	Pager Number
Randy Ogg	Project Manager	966-8608	5472
Marla Broussard	Operations Manager	966-8517	4010
<del>Keith Anderson</del> <del>Richard Norton</del>	Radiological Engineering Representative	966-4075	7973
<del>Keith Anderson</del>	<del>Environmental Health and Safety Officer</del>	966-6979	5142
<del>Lisa LeLievre</del> <del> Peggy Schreckengast</del>	Health and Safety Liaison Officer	966-6790	3059
<del>Brian Fielding</del> <del>Nancy Candlish</del>	Site Health and Safety Coordinator/Industrial Hygiene Representative	966-5471	3063
Jim Fitzimons	Permitting and Compliance Representative	966-6264	1497
Dr. Furman	Occupational Health Director	966-2985	2356
Keith Miller	Fire Protection Representative	966-6042	0024
Steve Balint	Operational Meteorologist	966-2453	-
Pat Stephens	Health and Safety Area Management Representative	966-4813	3307
Doug Perryman	<del>Industrial Safety Representative</del> <del>Occupational</del>	966-5827	1655

- Characterizing the potential specific chemical and physical hazards which may be encountered in the conduct of the RFP in conjunction with the SSHO and the PHSM;
- Determining the levels of potential employee exposure to hazardous materials;
- Assuring that adequate and appropriate health and safety training and equipment are available for project personnel;
- Arranging for medical examinations for specified project personnel, if necessary; and
- Designating a PHSM.

### 2.3 DEPUTY PROGRAM MANAGER

The deputy program manager will report directly to the PrM and be responsible for the day-to-day conduct of the project. The deputy program manager will also be responsible for coordinating the specified portions of the project and can perform PrM duties in his/her absence. These two individuals are the primary contacts for the project team along with an EG&G OU4 Project Manager.

### 2.4 PROJECT MANAGERS

Due to the size and complexity of the implementation of the Phase I and Phase II RFI/RI, it may be necessary to assign two overall project managers and three deputy project managers. A registered professional geologist or professional engineer should be responsible for the implementation of the RFI/RI field program, preparation of technical memoranda related to project activities, and preparation of the report. Additional technical support will be provided as needed to assist with the implementation of the field program. A certified industrial hygienist (CIH) will be responsible for the overall completion of the health and safety aspects of the project. A deputy project manager may be added to the

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team as necessary to support day-to-day field activities. The CIH and the deputy project manager will be assisted by technical support staff.

## 2.5 SITE MANAGER

The site manager and project hydrogeologist will be responsible for the following:

- Conduct of day-to-day activities during the Phase I and Phase II RFI/RI implementation;
- Conduct plan of the Day (POD) meetings;
- Interaction with other subcontractors working in the area;
- Arranging for escorts for uncleared personnel;
- Determination of borehole placement;
- Resolution of other logistical problems;
- Temporary suspension of field activities, if health and safety of personnel are endangered, pending an evaluation by the PHSM and/or the SSHO; and
- Temporary suspension of an individual from field activities for infraction of this HASP, pending an evaluation by the PrM, the PHSM, the SSHO, and the employee's supervisor.

## 2.6 PROJECT HEALTH AND SAFETY MANAGER

An RFI/RI PHSM will be assigned prior to the initiation of field activities. The PHSM has overall responsibility for development of this HASP ~~and conformance with applicable health and safety regulations.~~ The PHSM will be the primary contact for matters relating to health and safety. The PHSM will be consulted when any changes to this HASP or modifications of any procedures are required or requested, or when any new activities not

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delineated in this HASP are proposed. The PHSM will be responsible for the

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development of any new health and safety protocols and procedures necessary for new field operations and will also be responsible for the resolution of any outstanding health and safety issues which arise during the conduct of site work. When required, the PHSM will revise this HASP or prepare amendments for new operations. The PHSM or his designate will approve the health and safety qualifications of the contractor and subcontractor employees to fill designated health and safety roles during field activities. Authorization for personnel to perform work onsite relative to employee training and medical surveillance policies must be cleared ahead of time with the PHSM. ~~The PHSM will maintain a task record which includes all information relative to site accidents, injuries, or incidents.~~

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**2.7 SITE SAFETY AND HEALTH OFFICER**

An SSHO for all Phase I and Phase II RFI/RI activities will be assigned prior to the initiation of field activities. This person will be responsible for the proper implementation of this HASP during the Phase I and Phase II RFI/RI activities. The responsibilities of the SSHO or a designated representative include:

- Overseeing all activities to ensure compliance with this HASP;
- Conformance with applicable health and safety regulations;
- Implementation of this HASP;
- Maintaining a task record which includes all information relative to site accidents, injuries, or incidents;
- Coordinating activities with EG&G personnel present on the site;
- Conducting daily safety briefings as needed for all contractor and subcontractor personnel performing construction activities;
- Verifying that communication systems are in place;

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- Managing health and safety equipment (e.g., respirators, instruments, boots, gloves, suits, etc.), used during field activities;
- Supervising and overseeing the activities of the Environmental Health and Safety Specialist (EHSS);
- Processing Radiation Work Permits and Radiological Deficiency Reports (copies of these forms are located in Appendix M);
- Establishing work/rest regimen;

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- Arranging for emergency response provisions in conjunction with local authorities (e.g., hospital, fire, police);
- Monitoring and inspecting health and safety conditions during the Phase I and Phase II RFI/RI activities and deciding when more stringent personal protection equipment is required;
- Maintaining a daily safety log to record weather conditions, personnel involved in field activities, safety problems, and any other pertinent health and safety information;
- Overseeing the setup, inspection, and execution of equipment and personnel decontamination;
- Providing EG&G personnel with information regarding the planned field activities as needed;
- Notifying EG&G representatives of emergencies related to the Phase I and Phase II RFI/RI activities;
- Reporting health and safety violations or problems to the PHSM; and
- Controlling visitor access to the potentially hazardous areas of the site.

EG&G and the SSHO have the authority to stop field activities if conditions are deemed unsafe (e.g., weather conditions). The go ahead to proceed with field activities following such an action will be determined by EG&G and the SSHO. The SSHO will also have the authority to temporarily remove any contractor or subcontractor employee from field activities if that individual is not complying with this HASP. When an incident occurs which could have resulted in an accident, injury, or loss or damage to property, the SSHO will contact the PHSM for the required documentation and reporting procedures.

The SSHO will have completed the minimum training requirements presented in Section 9.0. In addition, the SSHO or designate will hold current CPR and First Aid certification. The SSHO will have a working knowledge of federal and state regulations, as well as a positive and conscientious attitude toward health and safety.

## **2.8 ENVIRONMENTAL HEALTH AND SAFETY SPECIALIST**

The Environmental Health and Safety Specialist (EHSS) must be approved by the EG&G Industrial Hygiene and Radiological Engineering departments. This individual will be responsible for performing contaminant and noise monitoring during the Phase I and Phase II RFI/RI activities. The responsibilities of the EHSS will include:

- Performing all radiological monitoring duties in accordance with the Environmental Management Radiological Guidelines (EMRGs);
- Monitoring for respirable dust concentrations utilizing the MiniRam real time aerosol monitor;
- Monitoring for organic vapors with a PID;
- Performing personal breathing zone monitoring for particulates, beryllium, and radionuclides;
- Performing radiological surveys during core logging procedures;
- Performing personal monitoring on individuals when leaving the site for lunch and at the end of the day;
- Taking smears on equipment leaving the exclusion zone;
- Periodically checking break rooms, shower rooms, and contractor trailers for radionuclide contamination;
- Taking periodic sound level measurements during noisy operations;
- Calibrating and maintaining all monitoring equipment supplied by the contractor according to the American National Standards Institute (ANSI) N. 323, and making sure all equipment supplied by EG&G is calibrated and maintained by EG&G;
- Reporting all health and safety problems observed to the SSHO;
- Setting up a decontamination station in the Contaminated Reduction Zone;

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finalized by representatives of the DOE and the EPA on July 31, 1986. CEARP is now known as the ER Program. (EG&G Rocky Flats, 1991d).

On June 28, 1989, DOE and the State of Colorado entered into the Agreement in Principle (AIP). This document states that certain contaminated sites (e.g., the solar ponds) at RFP require special and accelerated actions. The AIP specifies in part that DOE will expedite cleanup of the Solar Ponds in order to stem the flow of harmful contaminants into the ground water and soil.

On January 22, 1991, the DOE, EPA and the State of Colorado entered into a Federal Facility Agreement and Consent Order, commonly known as IAG. The IAG establishes the work and schedule for the RFI/RI and Corrective Measures Study/Feasibility Study (CMS/FS) response process. Phase I requires the characterization of sources and soils. ~~OU4 is currently in the Phase II RFI/RI stage.~~ Phase II is designed to investigate surface water, groundwater, air, biota, and the environment.

In accordance with the IAG and to fulfill the intent of the AIP, OU4 (the Solar Ponds) is presently in an Interim Measure/Interim Remedial Action (IM/IRA) process. The current IM/IRA is part of the enabling action taken to facilitate waste removal operations, cleanout of the ponds, and eventually site closure. Changes to the operation of the Solar Ponds are required to allow the dewatering of liquids and removal of sludges from the ponds. The IM/IRA proposes an alternate means of storing water collected by the ITS, and a means to treat these collected waters and excess liquids currently contained in the Solar Ponds. A summary of Solar Pond area history is provided in Appendix C.

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#### **4.6 INTERCEPTOR TRENCH SYSTEM (ITS) AND REMAINDER OF SITE**

A radiation survey, surficial soil survey, and unconsolidated soil sample analysis will also be performed in the ITS and in areas away from the existing ponds throughout the site remainder. These procedures are described in Sections 4.1, 4.2, and 4.4.3, respectively. In addition, piezometers will also be installed.

Borehole construction and soil sample analysis will be conducted at the appropriate locations in the ITS and on the outer edges of the Solar Ponds area. Proposed borings will be advanced deeper than described in standard drilling and sampling collection procedures. These boreholes will be between 40 and 60 feet deep. Procedures for advancing these borings past the depth required for environmental sampling will follow SOP GT.4, Rotary Drilling and Rock Coring. Prior to the drilling of borings advancing into weathered bedrock, a surface casing will be installed according to SOP GT.3, Isolating Bedrock from the alluvium with Ground Surface Casing. The analytical parameter list includes metals, nitrate, inorganics, and radionuclides.

##### **4.6.1 Piezometer Installation**

Piezometers will be installed immediately upgradient and downgradient of the primary interceptor trench to provide information on water table configuration at the trench. Piezometer installation procedures will be in accordance with SOP GT.6. Water level measurements will be made in accordance with SOP GW.1 Once installed and preliminary effectiveness evaluated, tracer studies may be proposed to investigate potential, contaminated flow pathways.

#### **4.7 SAMPLE ANALYSIS**

All sample analyses will follow procedures stated in Section 4.2. All sample designation generated for the Phase I and Phase II RFI/RI will conform to the input requirements of the Rocky Flats

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removal from the solar ponds. This information was compiled by Applied Environmental and incorporated into the Phase I RFI/FS workplan. These data were obtained for waste characterization purposes and provide an indication of the contaminants which may present a health risk during OU4 site activities. However, because these data were obtained for characterization purposes, they are not indicative of occupational exposures anticipated during site activities. Extensive data was also collected during Phase I RFI/FI activities.

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The major contaminants of concern at the OU4 site are heavy metals and radionuclides. Other compounds such as cyanide, hydrogen sulfide, phenol, and tetrachloroethene are also present onsite. These compounds are present in small concentrations and are not considered to be a significant hazard. However, since these compounds could probably become a hazard at higher concentrations, they will be monitored. All contaminants of concern are listed in Table 5.1 and in Sections 5.2.1 - 5.2.15. These compounds may be found in both air and soil and vary in their chemical, physical, and toxicological properties. Table 5.1 lists the compounds as well as their toxicity, volatility, skin absorption potential, carcinogenicity, exposure limits, and other pertinent information from a health and safety standpoint. This list is not inclusive of all chemicals which may be encountered at the OU4 site, but only those which have a greater frequency of detection, are present in the highest concentrations, and have the greatest potential for concern from a health and safety standpoint.

Toxicity indications are primarily based on acute effects. A compound's acute toxic effects are determined by the amount of chemical it takes to kill 50 percent of test animals ingesting the compound, over a short period of time. This chemical concentration is known as the Lethal Dose<sub>50</sub> (LD<sub>50</sub>). If the compound is administered through inhalation, the resulting chemical concentration which kills 50 percent of test animals is known as the Lethal Concentration<sub>50</sub> (LC<sub>50</sub>). In addition, available data on carcinogenic effects is

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presented to provide information for identifying chemicals which present the greatest potential for health risks.

The compounds found in highest concentrations at the OU4 site are metals and radionuclides with the primary route of exposure being inhalation. Inhalation hazards may be significant if particulate matter (dust) is not adequately controlled. However, based on the activities to be completed as well as appropriate administrative controls, engineering controls, and personal protective equipment (PPE) being utilized, it is believed that the overall chemical hazard is low.

Protective clothing and procedures described in Section 8.0 are designed to protect employees from chemical exposure via inhalation or dermal exposure. The potential for exposure depends primarily on the work activities and the care with which these procedures are performed. Any crew member will be removed from the work site if these initial symptoms persist:

- Dizziness or stupor;
- Nausea, headaches, or cramps;
- Irritation of the eyes, nose or throat;
- Euphoria;
- Chest pains and coughing; and
- Rashes or burns.

The majority of contaminants found in liquid, sludge, and soil throughout OU4 are not present in amounts great enough to create airborne exposures greater than the PEL. In addition, before the Phase I RFI/RI activities commence in the solar ponds area, all sludge and liquid

### 5.2.2.8 pH

Sludge and liquid stored within the Solar Ponds have pHs between 7.3 and 10.2. A pH of 7.0 is considered neutral. The higher a pH rises above 7.0, the more corrosive the compound or mixture will be. Corrosive mixtures can cause skin irritation, dermatitis, and burns. Table 5.3 lists the pH of sludge and liquid in the Solar Ponds.

## 5.3 EXPOSURE ROUTES

Although contaminants described in the previous sections can enter the body through inhalation, ingestion, absorption, and injection, the most common exposure route for the Phase I and Phase II RFI/RI activities will be inhalation of contaminants in dust which will be generated throughout the site. In order to prevent inhalation of contaminants, administrative and engineering controls will be implemented to reduce airborne dust concentrations. If administrative and engineering controls are ineffective, or not feasible, personal protective equipment such as respirators, will be utilized to further reduce dust concentrations. In order to assess the health risks associated with airborne contaminants, a calculation is used to extrapolate the Maximum Airborne Concentrations (MAC) which will expose the worker to the contaminant's PEL-TWA. This extrapolation procedure is described in Section 5.4.

## 5.4 MAXIMUM AIRBORNE CONCENTRATIONS (MAC)

Since the available site characterization data was sampled for waste characterization purposes, this data cannot be directly utilized to determine human exposures. However, the waste characterization data can be extrapolated to determine the amount of contamination which will become airborne. This extrapolation is performed by determining a maximum airborne dust concentration in milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ). This value determines the approximate amount of dust which a worker must inhale in order to exceed the OSHA PEL-TWA for a specific compound. When performing this calculation, a given compound concentration in parts per million (ppm) is divided by 1 million ppm. This calculation yields

$$\frac{1570 \text{ ppm of beryllium in sludge}}{1,000,000} = 0.0016$$

$$\frac{0.002 \text{ mg/m}^3}{0.0016} = 1.25 \text{ mg/m}^3$$

Therefore, the Maximum Airborne Dust Concentration which workers can be exposed to without exceeding the PEL-TWA for beryllium is 1.25 mg/m<sup>3</sup>

The respirable nuisance PEL-TWA dust of 5 mg/m<sup>3</sup> is rarely reached during drilling activities. This is due to the fact that most of the soil brought to the surface while drilling is moist and therefore does not become airborne. In addition, engineering controls such as misting of dry soil will be implemented to reduce airborne dust concentrations. Therefore, it is highly unlikely that dust concentrations will reach high enough levels to require PPE for non-radioactive contaminants.

### 5.5 RADIONUCLIDE HAZARDS

Workers may potentially be exposed to radionuclides during the Phase I and Phase II RFI/RI. The risks from exposure vary according to the dose the worker receives, the type of radiation a worker is being exposed to, and the route of exposure.

The radionuclides of concern throughout the OU4 site include plutonium-239, americium-241, and uranium-233, 234, and 238. These radionuclides emit the majority of their radiation as alpha particles. Alpha particles do not penetrate the skin and are relatively harmless outside the body. However, once inhaled, these particles can cause internal damage. Relatively few beta particles and gamma photons are released. The beta and gamma radiations that are produced are of low energy. Beta particles can only penetrate the eye and outer layers of the skin and are also more of an internal hazard. Gamma

- Rocky Flats Plant. Sections 6.1 - 6.2.8 which relate to mass loading calculations are included in Appendix F of this HASP.

In order to determine employee exposures during the Phase I and Phase II RFI/RI, daily real time radiation monitoring as well as personal monitoring will be performed. These values will be compared with calculated maximum dust concentrations in order to stay below the DAC for invasive and non-invasive procedures.

The DOE has established DACs for specific radionuclides, that are the maximum levels which can be inhaled by workers. However, the DOE has established a policy requiring all radiation exposure to be reduced to levels "As Low As Reasonably Achievable" (ALARA). To reduce employee exposure to radionuclides during OU4 activities, administrative and engineering controls will be utilized to suppress airborne dust concentrations. If these controls cannot sufficiently reduce dust concentrations to a safe level, personal protective equipment will also be utilized.

#### 5.5.2 Site Conditions and Site Activities Which May Create Potential Radionuclide Exposures

The potential for employee exposure to radionuclides depends on the following factors:

- Radioactivity levels of sludge and liquid present in the ponds, and the amount of airborne dispersion of radionuclides when the Phase I and Phase II RFI/RI activities commence;
- Radioactivity levels inside the ponds once they are cleaned out;
- Radioactivity levels of soils surrounding the ponds; and
- Radioactivity levels encountered when drilling activities are performed below the pond liner.

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In addition, procedures performed during the Phase I and Phase II RFI/RI activities may also contribute to exposure to radionuclides. These procedures include the following:

- Drilling operations;
- Soil Sample collection;
- Decontamination of workers and equipment;
- Driving of vehicles and heavy equipment in radionuclide contaminated areas; and
- Maintenance and repair of process equipment.

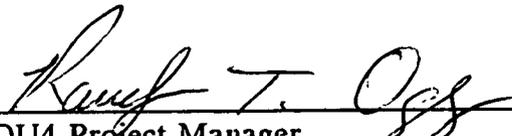
As stated above, administrative, engineering, and personal protective equipment controls will be utilized to reduce airborne radionuclide concentrations, and exposures will be kept ALARA.

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\_\_\_\_\_  
OU4 Project Manager  
Environmental Restoration Management

10/12/94  
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Date

## 6.0 PHYSICAL HAZARD IDENTIFICATION AND ANALYSIS

In addition to the chemical hazards described in the preceding chapter, a variety of physical hazards may be present throughout OU4 during the Phase I and Phase II RFI/RI activities. These include temperature stresses, noise, adverse weather conditions, and mechanical hazards.

### 6.1 HEAT STRESS

In the spring, summer, and fall, temperatures in the Denver area can reach 100°F. A combination of these high temperatures, the use of personal protective equipment, and strenuous field work may result in heat stress.

Heat stress is caused by external heat sources such as high ambient air temperature and direct sunlight, or internal body heat build-up resulting from heavy work or prolonged use of such protective gear as encapsulating suits. Heat stress manifests itself in four disorders listed from most to least severe.

- Heat Stroke;
- Heat Exhaustion; and
- Heat Cramps.

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performed. Table 7.1 lists the hazards associated with work activities and equipment and provides safety measures to be implemented in each situation.

#### 6.10 VIBRATION

A jackhammer will be utilized throughout the Solar Ponds area to break through the pond liners where boreholes will be drilled. Jackhammer use can cause excessive vibration. This vibration can lead to biomechanical diseases such as White Finger Disease.

#### 6.11 ELECTROMAGNETIC RADIATION

Ground penetrating radar which will be used during the geophysical investigation, is a source of electromagnetic radiation. This type of radiation can also cause eye damage and has been linked to cancer.

#### 6.12 SLIPS, TRIPS, AND FALLS

Obstacles such as heavy equipment, drill rigs, rocks, and vegetation can also cause slips, trips, and falls onsite. Only a minimum field crew should be in the vicinity of heavy equipment. In addition, the Solar Ponds area should be cleared of rocks and other obstacles before field work starts.

#### 6.13 HAZARD COMMUNICATION

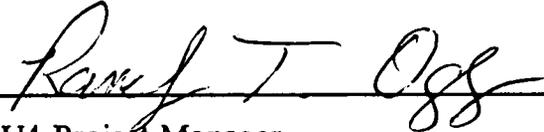
Several hazardous materials as defined by OSHA in 29 CFR 1910.1200 will be utilized and/or potentially encountered during the OU4 Phase I and Phase II RFI/RI. In order to comply with the OSHA Hazard Communication standard, the SSHO will obtain Material Safety Data Sheets (MSDS) for all hazardous materials utilized during the course of the project. The MSDS will be kept onsite and made available to field team members upon their request. The hazards of these materials will be communicated along with other site hazards using site specific training and periodic safety briefings as necessary.

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APPROVED BY:

  
\_\_\_\_\_  
OU4 Project Manager  
Environmental Restoration Management

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## 7.0 HAZARD EVALUATION

Potential hazards which exist at the OU4 site were evaluated by reviewing the work plan and existing data regarding the liquid, sludge, and soil present onsite. In addition, physical hazards which may be encountered by field team members and subcontractor personnel during the Phase I and Phase II RFI/RI activities have also been evaluated. These hazards include chemical exposure from contaminated air and soils; physical hazards such as noise, weather conditions, heavy equipment, and motor vehicles; ergonomic hazards associated with drilling activities; and encounters with native wildlife. They shall be covered in site specific training and during daily safety briefings. The following briefly describes some of these anticipated hazards and guidelines.

Although the chemical hazards of acetone, tetrachloroethene, hydrogen sulfide, cyanide, and ammonia were described in Section 5.0, these compounds are only present in small quantities. Therefore, it is estimated that these chemicals will not be a hazard onsite. In addition to these chemical hazards, site-specific mechanical hazards briefly presented in Section 6.0 are summarized in Table 7.1. All data utilized to perform this hazard evaluation were obtained from the Solar Evaporation Ponds Closure Plan published by Rockwell International in 1988, A Summary of Chemical Analyses of Sludge and Water published by Dames & Moore in 1991, and the EG&G Rocky Flats Environmental Database (RFEDs). Data from the Phase I RFI/RI project were also evaluated prior

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EVAPORATION PONDS  
ROCKY FLATS PLANT

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to Phase II activities. Original evaluations are consistent with recent findings except as noted.

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## 7.1 SITE HAZARD SUMMARY

Pond sludge was analyzed for waste characterization purposes between 1986 and 1991. Sludge samples were analyzed for volatile organics, semi-volatile organics, anions, metals, and radionuclide specific activities. A limited amount of soil sample data exists. The vast majority of these samples are not of surficial soil. Soils were analyzed for metals and radionuclide specific activity. Characteristics of all contaminants of concern are described in Sections 5.0 - 5.2.17 and summarized in Tables 5.1 - 5.5. Hazards to be encountered in each site within OU4 are detailed below. Maps showing locations of the sites are provided in Figures 3-1 and 3-2. Site-specific action levels are also listed in Table 10.1.

Analysis of water, soil, and air samples collected during the Phase I RFI/RI indicated that contaminant levels for organics, pesticides and PCBs were uniformly low, when detected at all. Radionuclides and metals, although at concentrations above background in some areas, were not detected at levels which would pose a significant health hazard to individuals participating in Phase II activities. Routine radiological ambient air monitoring, in fact, documented plutonium concentrations as being generally low and not posing a significant health threat to workers in the area. As a conservative measure, however, control measures (PPE, personal decon and dust control where warranted) will be implemented to minimize exposure when working in areas where cadmium and chromium levels were consistently higher than background; cadmium in both surface and unsaturated soils and chromium contamination in alluvial groundwater. Although it is unlikely that either metal will pose a significant health risk to Phase II workers, extra precautions are warranted because exposure to both have been linked to cancer.

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### 7.1.1 Pond 207-A

Sludge and soils in Solar Evaporation Pond 207-A indicate maximum chromium and cadmium concentrations of 19,700 parts per million (ppm) and 10,500 ppm, respectively. Exposures to these metals above regulatory limits are not expected. However, 1,570 ppm of beryllium in sludge have been measured in this area. If airborne dust concentrations exceed  $1.3 \text{ mg/m}^3$ , it is possible that beryllium levels will reach or exceed the PEL. In addition, data from soil samples indicate specific activities of americium-241 and plutonium-239 to be 930 picoCuries per gram (pCi/g) and 438 pCi/g, respectively. These radionuclides were also found in sludge with specific activities of 4400 and 3700 pCi/g, respectively. If soil dust concentrations rise above  $0.001 \text{ mg/m}^3$  in Pond 207-A, the MAC of these radionuclides will be exceeded. ~~Because it is difficult to detect airborne dust at levels this low using real-time equipment, personal breathing zone samples will be obtained to document airborne radionuclide specific activities for determination of appropriate control procedures.~~ Plutonium concentrations will be analyzed by either EPA Method 908.0, which is an isotopic analysis, or EPA Method 908.1, a fluorometric method. Because contaminant levels detected in Phase I did not indicate a need, personal breathing zone samples will only be obtained when direct reading instruments indicate that airborne concentrations in the breathing zone of workers may exceed the MADC for plutonium. If personal samples are collected, plutonium concentrations will be analyzed by either EPA Method 908.0, which is an isotopic analysis, or EPA Method 908.1, a fluorometric method. In addition, plutonium and americium will be analyzed by hydrofluoric acid and nitric acid digestion. In addition to inhalation hazards, the pond liquid is alkaline with a pH of 9.9. This may present a

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**TABLE 7.1  
 WORK ACTIVITY HAZARDS**

Work Activity	Equipment Utilized	Hazards Associated with Equipment and/or Work Activity	Safety Measures Implemented
		<p>Insect and snake bites</p> <p>Ergonomic problems such as improper lifting can cause back injury.</p> <p><del>Prolonged inhalation exposure to platinum can produce lung and bone tumors.</del></p> <p><del>Noise</del></p> <p><del>Hand injury or exposure</del></p>	<p>Use insect repellent, keep work area clear of vegetation. Workers will be warned if known rattlesnake areas exist on site.</p> <p>Use two people to lift heavy loads. Use lifting aids such as hand-trucks. Lift with legs not back.</p> <p><del>Full-face respirator (HEPA filter) required if soil is not maintained in moist condition.</del></p> <p><del>Ear plugs should be worn in area with noise levels greater than 85dB</del></p> <p><del>Hand protection (gloves) will consist of leather, latex, or nitrile work gloves depending on the activity.</del></p>
Geophysical Evaluation	Ground Penetrating Radar (GPR)	This unit will be pulled around the site by a truck and dust will be generated. This device is also a source of electromagnetic radiation.	Only essential personnel will work in areas of heavy vehicle and GPR activity. If it is feasible, engineering controls, such as dust, will be utilized to reduce airborne dust concentrations. GPR will be properly checked and calibrated by the manufacturer to prevent overexposures to electromagnetic radiation. Individuals utilizing GPR will be properly trained.

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TABLE 7.1 (cont.)  
 WORK ACTIVITY HAZARDS

Work Activity	Equipment Utilized	Hazards Associated with Equipment and/or Work Activity	Safety Measures Implemented
Groundwater Sampling	Water Quality Parameters Equipment	Dermal exposure of potentially contaminated groundwater.	Workers will wear splash guards on hard hat and chemical resistant rubber gloves.
Surface Water Sampling	Volumetric flow measurements and water quality parameters equipment	Dermal exposure of potentially contaminated surface water.	Workers will wear chemical resistant rubber gloves.
Slug Testing/Pump Testing	Groundwater Pump	Dermal exposure of potentially contaminated groundwater	Workers will wear chemical resistant rubber gloves.

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**NOTE:** The above hazards are specific for each activity and piece of equipment. All activities and pieces of equipment must also follow HASP regulations regarding daily inspections, proper equipment operation, personal protective equipment, air monitoring, decontamination, personal restrictions, employee training, heat and cold stress monitoring, and work/rest regimes.

### 7.1.8 Conclusion

Ponds 207-A and 207-C have the potential to produce the highest chemical concentrations, pHs, and radionuclide specific activities during the Phase I and Phase II RFI/RI activities. In other locations throughout OU4, the respirable dust standard PEL of 5 mg/m<sup>3</sup> is expected to be reached before the PEL of the specific chemical hazards in question. ~~However, due to the absence of data characterizing soils below the pond liners, unexpected hazards can be encountered anywhere, at anytime during RFI/RI activities. Therefore, breathing zone samples as well as other types of ongoing health and safety monitoring will be performed during the entire RFI/RI.~~ Due to the extensive characterization of contaminants from samples collected during the Phase I RFI/RI activities, breathing zone samples are not warranted during Phase II activities unless direct reading instruments readings in the breathing zone of workers indicate that MADCs may be exceeded for a particular activity in a particular area.

In addition to the chemical hazards present throughout OU4, mechanical dangers are also associated with the Phase I and Phase II RFI/RI activities and equipment. These hazards are listed in Table 7.1.

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### 8.3 REAL-TIME MONITORING

#### 8.3.1 Particulate/Aerosol Monitoring

Field team members will monitor particulate concentrations on a continuous basis during all dust generating activities. Monitoring will be completed with the use of a MiniRam real-time aerosol monitor. This instrument will measure aerosol concentrations over a range of 0.01 mg/m<sup>3</sup> to 100 mg/m<sup>3</sup>. The monitor also provides preferential response to the respirable size particulate of 0.1 to 10 microns (µm).

The monitor will be located where the area of highest exposure will be encountered as determined by the SSHO based on site observations and work activities. The MiniRam will be calibrated and maintained according to the manufacturer's recommended procedures. The SSHO will be responsible for maintaining and calibrating the instrument. Action levels for airborne dust concentrations are found in Table 10.1.

#### 8.3.2 Organic Vapor Monitoring

Although data indicates that organic vapors are not present onsite in hazardous concentrations, field team members will monitor organic vapors using a PID during site operations. The PID is sensitive to organics found at OU4. The SSHO or designate will monitor organic vapors at breathing zone height during the Phase I and Phase II RFI/RI activities.

Action levels for health, safety, and emergency response actions are listed in Table 10.1. Action levels are based on the relative response of the measuring instrument to the contaminants being monitored, Permissible Exposure Limit, and the protection factors of the respirators worn in each level of protection.

The PID will be calibrated daily according to the manufacturer's recommendations and guidelines. The SSHO or designee will calibrate the PID daily using isobutylene. In

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addition, the SSHO will measure background levels of organic vapors daily at the support zone.

Responses to action levels will take place when organic vapor readings are sustained for more than 30 seconds and less than two minutes apart. When at least three readings of 30 seconds or more, less than two minutes apart from one to the other are recorded, appropriate responses will be taken.

### 8.3.3 Real-Time Monitoring Data Reporting and Documentation

When organic vapor or particulate levels exceed background levels, the SSHO will report this information to the PHSM. The PHSM will then advise the SSHO as to when operations should cease, levels of protection upgraded, and/or emergency response/contingency plans initiated.

The SSHO will record all real-time air monitoring data on the log sheet as shown in Appendix G. This log sheet will be completed daily for each piece of real-time monitoring instrument used. Calibration data will be recorded on the Calibration Check Sheet located in Appendix G.

### 8.4 PERSONAL SAMPLING PUMPS

Baseline sampling will be established to ensure proper engineering controls and work practices. Baseline sampling will also be established during noise-generating evolutions.

When direct reading instruments indicate a need; i.e. when contaminant concentrations are detected which exceed the MADDC, personal sampling pumps will be utilized in accordance with National Institute of Occupational Safety and Health (NIOSH) methods 7300, 0600, and 0500 to collect samples for inductively coupled plasma (ICP) metals, beryllium, chromium, respirable dust, and total dust. These methods are provided in Appendix L. Appendix H contains Personal Sampling Pump Calibration Sheets and Air Sample Data Sheets. Dust samples will then be analyzed for total dust, respirable dust, and radionuclide specific activity. Beryllium samples will be analyzed for total beryllium.

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~~Personal samples will be obtained throughout OU4. Personal sampling pumps will be placed on personnel having the highest exposures as determined by the SSHO. Personal samples will be obtained during the first two or three days of invasive activities in each Solar Evaporation Pond. In addition, personal samples will also be taken during the first day of the invasive activities outside of the Solar Evaporation Ponds. Personal sampling results will determine if levels of protection should be upgraded or down graded.~~

Personal sample pumps will be placed on individuals working in areas or participating in activities where the SSHO has determined by direct reading instrumentation that MADCs may be exceeded. Personal samples will be collected and analyzed with expedited turnarounds so that levels of protection and engineering controls can be applied and/or eliminated in a timely manner.

**8.5 SMEAR/WIPE PAPER**

Smear/wipe paper will be utilized to perform smear tests to verify that equipment meets DOE and EG&G radiological limits before leaving OU4. Guidelines for releasing equipment are presented in Table 11.3.

**8.6 LITMUS PAPER**

Litmus paper will be utilized to monitor the pH of any liquid and/or saturated soils encountered during the Phase I and Phase II RFI/RI activities.

**8.7 HYDROGEN SULFIDE AND HYDROGEN CYANIDE DIRECT READING INSTRUMENTS**

During drilling operations within the solar ponds, at least one employee working in worst case areas specified by the OSSHO shall wear a direct reading instrument measuring hydrogen sulfide and hydrogen cyanide concentrations. This instrument must have an alarm which triggers when contaminant concentrations reach the PEL.

**8.8 DETECTOR TUBES**

Ammonia concentrations throughout OU4 shall be measured utilizing a Sensidyne Detector Tube Pump with corresponding Detector Tubes.

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TABLE 9.1  
 TRAINING REQUIREMENTS FOR EMPLOYEES WORKING AT OU4

Operation Personnel	40-Hour Hazardous Waste Site Training	8-Hour Refresher Training	8-Hour Supervisor Training	Radiation Worker Training II	Site Safety Briefings	EG&G General Employee Training	Bloodborne Pathogen Training	Respirator Fit Testing and Training	Hazard Communication	RCRA CBT
Routine or Occasional Site Worker	X	X		X	X	X	X	X	X	X
Routine or Occasional Site Worker (Support Zone)					X	X	X	X	X	X
Supervisors	X	X	X	X	X	X	X	X	X	X
Site Visitors (Level A or B PPE)	X	X			X			X	X	X
Site Visitor (Level C PPE)	X <sup>a</sup>	X			X			X	X	X
Site Visitor (Level D or No PPE)					X			X	X	X

<sup>a</sup> or 24-hour hazardous waste site training.

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activities. The training requirements are intended to provide employees with the knowledge and skills necessary to perform hazardous waste site operations with minimal risk to their safety and health.

### 9.3 SUPERVISOR TRAINING

All site supervisors must have completed an 8-hour training session for supervisors at hazardous waste sites, the basic 40-hour training course, and 3 days of onsite training. The supervisor training must address worker-on-the-job training, in addition to safety planning and legal aspects of managing hazardous waste site workers.

### 9.4 RADIATION WORKER TRAINING II

In addition to the training requirements discussed above, all field employees shall be required to receive the 24-hour EG&G sponsored Environmental Radiation Worker Training II Class. This course is required by DOE Order 5480.11 and is used to educate employees about standard industry radiation protection procedures:

### 9.5 SITE SPECIFIC TRAINING

All Project Team employees participating in EG&G RFP field activities shall also receive site specific training. The site specific training shall be conducted by the SSHO with assistance and/or consultation from the PHSM as necessary.

Prior to commencement of field activities, site specific training shall be conducted for all OU4 personnel, including subcontractors, working on the Phase I and Phase II RFI/RI. The site specific training shall consist of an initial health and safety briefing on the following information:

- Names of personnel and alternates responsible for site safety and health;
- Safety, health, and other hazards present on the site;

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## 9.7 HAZARD COMMUNICATION

According to 29 CFR 1910.120, hazardous waste operations must implement a hazard communication program meeting the requirement of 29 CFR 1910.1200. A copy of the contractor's hazard communication program will be retained in their main office.

The hazard communication program must apply to all field team members and subcontractor employees working throughout OU4. This program covers the hazards of chemicals which will be utilized throughout the OU4 site. In addition, training requirements as well as the use and limitations of MSDS are covered in this program.

### 9.7.1 Material Safety Data Sheets (MSDS)

MSDS utilized by all field team members will contain information on physical characteristics, properties, routes of exposure, exposure limits, and symptoms of exposure for each hazardous material used for OU4 activities. The SSHO will keep a copy of all MSDS for compounds utilized throughout the OU4 site at the work site. These will be available for review by all employees, subcontractors, and site visitors. Most of the chemicals and radionuclides present on the OU4 site are waste products. Therefore, MSDS will not be supplied for these compounds. Sample field MSDSs are located in Appendix J.

### 9.7.2 Training

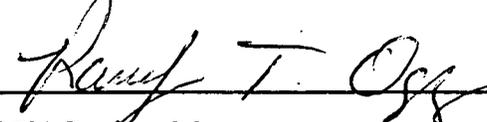
Before working on the OU4 site, all employees will undergo site-specific Hazard Communication Training. This training will outline the specific hazards of chemicals utilized by employees during the Phase I and Phase II RFI/RI activities. Employees will also be informed of the hazards of waste products which are present throughout the OU4 site.

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OU4 Project Manager  
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10/12/94  
\_\_\_\_\_  
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### 13.0 ACCIDENT PREVENTION PLAN

This Accident Prevention Plan (APP) along with the rest of the HASP will be the accident prevention policy of the contractor and its subcontractors during work at the RFP. Details of the APP are presented below.

#### 13.1 PERSONNEL RESPONSIBILITIES

All contractor and subcontractor employees participating in RFP Phase I and Phase II RFI/RI activities are expected to conduct themselves and their actions in a manner so as to minimize the potential for accidents. All field team members supervisory personnel will be responsible for seeing that individuals under their direct supervision are aware of the standard operating procedures for field activities and that they are carrying out the procedures in a safe manner. Variations in procedures or the addition of new procedures from this document must have the written approval of the PHSM prior to initiation. The SSHO will have day to day responsibility for enforcing this APP.

#### 13.2 EXPECTED SAFETY HAZARDS

Section 5.0 and 6.0 discusses the hazards anticipated during site work at RFP. In summary, these hazards include:

- Chemical - inhalation or skin contact with metals and radionuclides;

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*10/12/94*

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#### 14.0 SITE CONTROL

Controlling the spread of contamination and unauthorized access to the site will be accomplished through the use of work zones, communication, and site security. Each of these will be detailed below.

##### 14.1 WORK ZONES

Prior to the commencement of Phase I and Phase II RFI/RI activities at OU4, controlled zones of activity will be established as suggested by the NIOSH/OSHA/USCG/EPA's document titled "Occupational Safety and Health Guidance Manual for Hazardous Waste Activities." This will reduce the spread of any potentially contaminated material and reduce personnel exposure. The controlled zones will include the following:

- Exclusion Zone - where contamination does or could occur and where construction activities will take place;
- Contamination Reduction Zone - where decontamination operations will occur; and
- Support Zone - clean zone outside the contamination reduction zone.

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8-31-94

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## 15.0 BLOODBORNE PATHOGEN EXPOSURE CONTROL PLAN

Under EG&G directive, an example of the contractor's Bloodborne Pathogen Exposure Control Plan has been included in this HASP. This Bloodborne Pathogen Exposure Control Plan (BPECP) will be the bloodborne pathogen exposure prevention policy for all contractor and subcontractor employees who may come into contact with human blood or other human body fluids while working at RFP. Although all first aid procedures will be performed by EG&G personnel, this bloodborne pathogen control program will be followed in the unlikely event of contractor and subcontractor employee exposure to blood and body fluids.

### 15.1 PERSONNEL RESPONSIBILITIES

The following subsections outline responsibilities of Project Team members, supervisors, the PHSM, and the SSHO.

#### 15.1.1 Onsite Personnel

All personnel participating in the Phase I and Phase II RFI/RI field activities are required to participate in occupational exposure to bloodborne pathogens training. In addition, Project Team employees are expected to read and understand this BPECP, and conduct themselves and their actions in a manner so as to minimize the potential for exposure to bloodborne pathogens. Employees are also responsible for immediately notifying their supervisor of any exposure incidents.

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*10/12/94*

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**17.0 EMERGENCY RESPONSE PLAN AND CONTINGENCY PROCEDURES**

This emergency response and contingency plan has been developed in anticipation of potential onsite and offsite emergencies during the Phase I and Phase II RFI/RI activities. The purpose of the plan is the provision of procedures and policies to minimize the impact of site-related emergencies. Emergencies which may occur during the Phase I and Phase II RFI/RI include worker-related emergencies such as chemical exposure, accidents, medical problems, PPE failure, and physical injuries. Possible waste-related emergencies include fire, explosion, leaks, release of toxic vapors, and collapse of containers. This plan will outline the responsibilities and procedures for responding to these onsite emergencies.

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**17.1 PERSONNEL ROLES AND RESPONSIBILITIES**

All site personnel will have the responsibility of reporting all accidents and emergency situations to the SSHO immediately. Upon receiving information concerning site emergencies, the SSHO will activate emergency response procedures as outlined in this plan. Upon initial activation of the plan, the SSHO or his designee will immediately notify the Project Manager by telephone. Within 24 hours of notification, the SSHO will submit a written report to the contractor's main office. The written report shall include:

- Name and title of person reporting the incident;
- Date and time of incident;

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- One long blast - evacuate area immediately;
- Two short blasts - localized problem (not dangerous to workers); and
- Two long blasts - all clear.

Visual signals will include:

- Hands on head - need assistance;
- Thumbs up - all okay;
- Thumbs down - no; and
- Grip partners' waist with both hands - leave area immediately.

### 17.3.2 Offsite Communications

The support zone office will be connected with telephone service for communication offsite. Next to each telephone will be a list of emergency telephone numbers and other vital information necessary for quick emergency response actions.

### 17.3.3 Alarms

Although employees working on the Phase I and Phase II RFI/RI activities throughout OU4 will not be working inside buildings, they will be working in the PA near several buildings. Therefore, it is imperative that all employees become familiar with different types of RFP alarms. RFP has alarms for the following emergencies:

- Fire;
- Civil Defense;
- Civil Defense attack;

- Criticality;
- Glove Box Overheat; and
- Selective Alpha Air Monitor Alarm.

If an alarm is sounded, evacuate the area and proceed to the evacuation point stipulated by the SSHO. An announcement will come across the RFP life support/plant warning public address system with further instructions.

It is imperative that all employees learn the different alarm sounds. Therefore, before starting work at OU4, all employees must call 966-7541 and listen to a recorded message of the different RFP alarms.

#### 17.4 EMERGENCY RECOGNITION AND PREVENTION

The elements of the HASP for the Phase I and Phase II RFI/RI project will minimize the risk of an emergency situation occurring. However, regardless of how alert and careful site personnel are, unforeseen circumstances beyond the control of the field personnel can result in an emergency. It is important that field personnel are able to recognize when a situation occurs that is or may lead to an emergency situation.

In order to assist field personnel in recognizing these situations, daily safety briefings will be held which will be used as a forum to remind personnel of potential emergency situations and the procedures to follow in the event of an emergency. These meetings will review the tasks to be performed, the time constraints and work limitations for the day, hazards that may be encountered, and emergency procedures.

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All contractor employees, subcontractors, and visitors must evacuate the OU4 site under the following condition:

- If instructed by the Life Support/Plant Warning (LS/PW) Public Address System;
- If instructed by the Site Supervisor; and
- When the wind speed reaches 35 miles per hour (mph).

Personnel will be directed to evacuate an area in the event of a high wind or lightning warning.

On a daily basis, the SSHO will designate two safe evacuation areas. If evacuation is necessary from an area, the upwind safe area will be used as a gathering place where the SSHO or his designate can account for all site personnel and visitors. At this time, further instructions will be provided to evacuees.

### 17.6.3 EG&G Notification

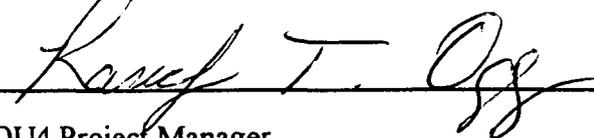
EG&G notification requirements are based on the type and seriousness of the situation. If a spill or other non-life threatening situation occurs, the Project Manager, ~~Bruce Peterman~~, must be notified at extension 8659 (~~pager 5472~~). Randy Ogg, must be notified at extension 8608 (pager 4622). In addition, the Health and Safety Liaison Officer, ~~Lisa LeLievre~~ Peggy Schreckengast, must also be notified at extension 7691 (pager 5390). If the above personnel cannot be contacted, Rocky Flats Emergency response personnel must be directly notified.

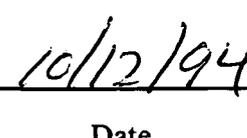
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## 18.0 STANDARD OPERATING PROCEDURES

In addition to the detailed procedures and requirements of the HASP, common sense will prevail at all times. The following is a list of standard operating procedures to be adhered to by site personnel at all times.

### 18.1 PERSONNEL PRACTICES

The following are rules and regulations to be followed by all contractor's and subcontractor personnel participating in field activities:

- The personal protective equipment required by the SSHO and this HASP shall be worn by all contractor and subcontractor personnel;
- Eating, drinking, chewing tobacco or gum, smoking, and any other practice that may increase the possibility of hand-to-mouth contact is prohibited in the exclusion and contamination reduction zones;
- Contractor and subcontractor personnel shall be allowed to wear contact lenses while wearing respirators;
- Alcoholic beverages shall not be allowed onsite;
- No individual shall engage in field activities without proper notification. Workers must also comply with the buddy system which will always be used for field activities during the Phase I and Phase II RFI/RI;

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FOR OPERABLE UNIT 4, SOLAR  
EVAPORATION PONDS  
ROCKY FLATS PLANT**

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- Personnel should wash their hands and face thoroughly with soap and water prior to eating, drinking or smoking;
- Personnel will avoid contact with potentially impacted substances. Personnel shall not walk through puddles, pools, mud, etc. and will avoid, whenever possible, kneeling on the ground, leaning or sitting on equipment or ground. Monitoring equipment should not be placed on potentially impacted surfaces (i.e., ground, etc.);
- All field crew members should make use of their senses to alert them to potentially dangerous situations in which they should not become involved (i.e., presence of strong, irritating, or nauseating odors);
- Field team members will prevent, to the extent possible, spillages. In the event that a spillage greater than one pint or one pound occurs, EG&G personnel will contain and clean-up the spill. If the spill is smaller than this amount, it can be cleared by contractor or subcontractor employees;
- Field crew members will be familiar with the physical characteristics of the site, including:
  - Wind direction in relation to impacted area
  - Accessibility to equipment and vehicles
  - Communications
  - Areas of known or suspected constituents
  - Site access
  - Nearest water sources;
- The number of personnel and equipment in the impacted area should be minimized but only to the extent consistent with workforce requirements of safe site operations;
- All wastes generated during the Phase I and Phase II RFI/RI activities should be disposed of as directed by the EG&G and the PM; and
- All personal protective equipment should be used as specified and as required by the SSHO or PM; and
- Field team members will also adhere to the guidelines addressed in the radiation work permit (RWP).

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## 18.2 WORK RESTRICTIONS

All Phase I and Phase II RFI/RI activities at the OU4 site will be conducted during daylight hours unless adequate lighting as approved by the SSHO is provided. Work will cease immediately upon the signs of impending thunderstorms and lightning, high winds, or other severe weather.

## 18.3 TRAFFIC HAZARDS

Personnel will adhere to all Colorado and RFP traffic regulations and exercise due caution. Personal vehicles will not be allowed in the exclusion zone or contamination reduction zone. Seat belts where provided, must be worn at all times by all passengers while driving at the RFP.

## 18.4 HEAVY EQUIPMENT SAFETY

Heavy equipment can represent a substantial hazard to workers. In general, requirements for motor vehicles and material handling equipment are provided in the OSHA Construction Industry Standard 29 CFR 1926, Subpart O. The following safe work practices (SWPs) should be followed when heavy equipment is in use:

- Use common sense. Workers should not assume that the equipment operator is keeping track of their whereabouts. Never walk directly in back of or to the side of, heavy equipment without the operators knowledge;
- Hard hats, steel toe boots, and safety glasses are to be worn at all times around heavy equipment. Other protective gear as specified in this health and safety plan is also applicable;
- Remain alert at all times;
- Maintain visual contact at all times;
- Establish hand signal communication when verbal communication is difficult. Determine one person per work group to give hand signals to equipment operators;

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- Vehicles may not have cracked windshields or windows;
- Blades, buckets, dump bodies, and other hydraulic systems must be fully lowered when equipment is not in use;
- Parking brakes shall be engaged when equipment is not in use;
- All vehicles with rollover protective structures (ROPS) will have seat belts; operators will be trained in the use of seat belts, and the seat belts shall be used at all times during vehicle operation;
- With certain exceptions provided in 29 CFR 1926, Subpart O, all material handling equipment will be provided with ROPS;
- Equipment with an obstructed rear view must have an audible alarm that sounds when it is operating in the reverse direction (unless a spotter guides the vehicle operator);
- Material handling equipment that lacks a ROPS must not be operated on a grade, unless the grade can safely accommodate the equipment involved;
- A safety barrier will be used to protect workers whenever a tire is inflated, removed, or installed on split rims; and
- Heavy equipment will be inspected by the operator prior to the beginning of each work shift, and the SSHO shall ensure the compliance to this regulation.

### **18.5 EG&G SOPS**

The RFI/RI involves OU wide radiological survey, surficial soil sampling and vadose zone monitoring. In addition, field sampling and geophysical investigations will be performed in the vicinity of the original pond, in the existing solar ponds, and in the interceptor trench system. Furthermore, some boreholes will be drilled off site.

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The Phase II RFI/RI involves: OU wide geophysical surveys, surface water sampling, groundwater development and sampling, monitoring well installation and aquifer testing.

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activity and corresponding EG&G Standard Operating Procedures (SOPs) which apply to the Phase I and Phase II OU4 activities are described below:

- F0.1 Windblown Contaminant Dispersion Control
- F0.2 Field Document Control
- F0.3 General Equipment Decontamination
- F0.4 Heavy Equipment Decontamination
- F0.5 Handling Purge and Development Water
- F0.6 Handling of Personal Protective Equipment
- F0.7 Handling of Decontamination Water and Wash Water
- F0.8 Handling of Drilling Fluids and Cuttings
- F0.9 Handling of Residual Samples
- F0.10 Receiving, Labeling, and Handling of Waste Containers
- F0.11 Field Communications
- F0.12 Decontamination Facility Operations
- F0.13 Containerizing, Preserving, Handling, and Shipping Soil and Water Samples
- F0.14 Field Data Management
- F0.15 Use of Photoionizing and Flame Ionizing Detectors
- F0.16 Field Radiological Measurements
- F0.18 Environmental Sample Radioactivity Content Screening
- GW.1 Water Level Measurements in Wells and Piezometers
- GW.2 Well Development
- GW.5 Measurement of Ground Water Field Parameters
- GW.6 Ground Water Sampling
- GT.1 Logging Alluvial and Bedrock Material
- GT.2 Drilling and Sampling Using Hollow-Stem Auger Techniques
- GT.3 Isolating Bedrock from Alluvium Using Grouted Surface Casing
- GT.4 Rotary Drilling and Rock Coring
- GT.5 Plugging and Abandonment of Wells
- GT.6 Monitoring Well and Piezometer Installation
- GT.8 Surface Soil Sampling
- GT.10 Borehole Clearing
- GT.15 Geophysical Borehole Logging
- GT.18 Surface Geophysical Surveys
- GT.20 Installation of Lysimeters

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- SW.01 Surface Water Data Collection Activities
- SW.02 Field Measurement of Surface Water Field Parameters
- SW.03 Surface Water Sampling
- SW.06 Sediment Sampling
- GW.04 Slug Testing
- GW.08 Aquifer Pumping Tests

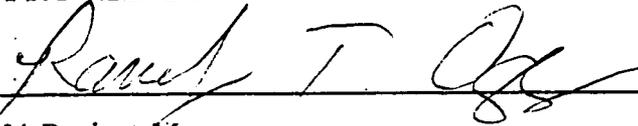
A copy of all EG&G SOPs will be kept onsite.

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APPROVED BY:



10/12/94

OU4 Project Manager  
Environmental Restoration Management

Date

## 20.0 LOGS, RECORDS, AND REPORTS

A safety log book and various forms will be kept by the SSHO to document events related to safety during the Phase I and Phase II RFI/RI activities. General procedures that pertain to the use of all log books and log forms include recording on each page of the safety log books: the initial of persons making the entry; date and time of each entry (military time); a description of the activities as they are occurring; and location. Each log or form will be signed at the end of each day or work shift. All blanks on a form will be filled in with appropriate information of the words "none" or "not applicable" (NA). All entries will be made in ink. No pages will be removed from the log book.

Daily safety briefings will be recorded in the safety log book. This log will include an outline of the topics discussed and the names of personnel attending.

A variety of records will be collected and organized prior to and during field activities, including:

- Training logs;
- Employees and visitors' log;
- Medical information;

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