

Health and Safety Plan
for
RCRA Facility Investigation/Remedial Investigation
at Operable Unit 3



Manual No. 21000-HSP OU-3

ADMIN RECORD

A-OU03-000095

REVIEWED FOR CLASSIFICATION/UCM

By *K. L. Gallardo* (UIN) 91-0104
Date 7/2/92

SITE SPECIFIC HEALTH AND SAFETY PLAN

RCRA FACILITY INVESTIGATION / REMEDIAL INVESTIGATION AT OPERABLE
UNIT 3 - FINAL

REVIEW AND APPROVAL

M. B. Hunt
Director of Environmental Management

2/15/92
Date

R. C. Conner
Manager of Safety and Hygiene

2/18/92
Date

John M. Sessone
Health and Safety Liaison Officer

2-17-92
Date

D. M. Arnold
Health and Safety Environmental
Management Officer

2-19-92
Date

REVIEWED FOR CLASSIFICATION/DCM
By William D. Ewan (afms)
Date 6/8/92
PER CONVERSATION WITH
J. Nestor

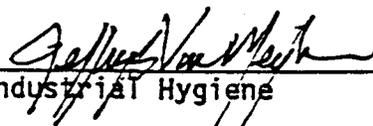
ADMIN RECORD

SITE SPECIFIC HEALTH AND SAFETY PLAN APPROVAL FORM

The following signature documents that this division at EG&G Rocky Flats, Inc., has reviewed the Site Specific Health and Safety Plan and agree that requirements which are managed by this division have been addressed in a technically correct manner.

Draft - Health and Safety Plan, Off-Site Releases, (Operable Unit 3)

Subcontractor Document X
EG&G Document _____


Industrial Hygiene

91-11-07
Date

SITE SPECIFIC HEALTH AND SAFETY PLAN APPROVAL FORM

The following signature documents that this division at EG&G Rocky Flats, Inc., has reviewed the Site Specific Health and Safety Plan and agree that requirements which are managed by this division have been addressed in a technically correct manner.

Health and Safety Plan, Off-Site Releases, (Operable Unit 3)

Subcontractor Document YES

EG&G Document NO



Radiological Operations

2/7/92

Date

SITE SPECIFIC HEALTH AND SAFETY PLAN APPROVAL FORM

The following signature documents that this division at EG&G Rocky Flats, Inc., has reviewed the Site Specific Health and Safety Plan and agree that requirements which are managed by this division have been addressed in a technically correct manner.

Draft - Health and Safety Plan, Off-Site Releases, (Operable Unit 3)

Subcontractor Document X
EG&G Document



Fire Department

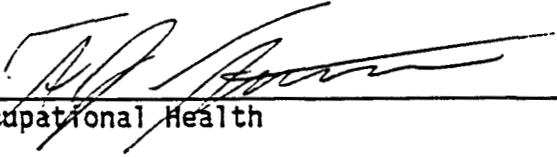
 2-6-97
Date

SITE SPECIFIC HEALTH AND SAFETY PLAN APPROVAL FORM

The following signature documents that this division at EG&G Rocky Flats, Inc., has reviewed the Site Specific Health and Safety Plan and agree that requirements which are managed by this division have been addressed in a technically correct manner.

Draft - Health and Safety Plan, Off-Site Releases, (Operable Unit 3)

Subcontractor Document X
EG&G Document


Occupational Health

10/25/91
Date

SITE SPECIFIC HEALTH AND SAFETY PLAN APPROVAL FORM

The following signature documents that this division at EG&G Rocky Flats, Inc., has reviewed the Site Specific Health and Safety Plan and agree that requirements which are managed by this division have been addressed in a technically correct manner.

Draft - Health and Safety Plan, Off-Site Releases, (Operable Unit 3)

Subcontractor Document X
EG&G Document

Lawrence T. Deane
Radiological Engineering

1-24-92
Date

SITE SPECIFIC HEALTH AND SAFETY PLAN APPROVAL FORM

The following signature documents that this division at EG&G Rocky Flats, Inc., has reviewed the Site Specific Health and Safety Plan and agree that requirements which are managed by this division have been addressed in a technically correct manner.

Draft - Health and Safety Plan, Off-Site Releases, (Operable Unit 3)

Subcontractor Document X
EG&G Document

[Handwritten Signature]

11/14/91

Industrial Safety

Date

as per comments

SITE SPECIFIC HEALTH AND SAFETY PLAN APPROVAL FORM

The following signature documents that this division at EG&G Rocky Flats, Inc., has reviewed the Site Specific Health and Safety Plan and agree that requirements which are managed by this division have been addressed in a technically correct manner.

Draft - Health and Safety Plan, Off-Site Releases, (Operable Unit 3)

Subcontractor Document X

EG&G Document _____

W. Jones
Health and Safety Area Management _____ Date _____

HEALTH AND SAFETY PLAN

FOR

**RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION
AT
OPERABLE UNIT 3**

FINAL

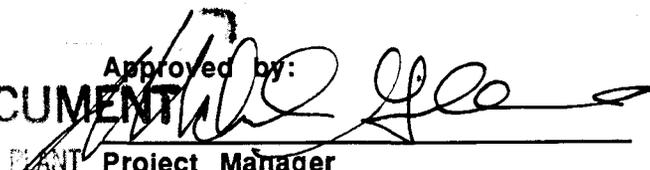
EG&G ROCKY FLATS, INC.

January 31, 1992

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3

Manual No.: 21000-HSP OU-3
Section No.: Table of Contents, Rev 0
Page: 1 of 1
Effective Date: 06/15/92
Organization: Environmental Management

Table of Contents

This is a **CONTROLLED DOCUMENT** Approved by:  Date: 6,8,92
ES&S — ROCKY FLATS PLANT Project Manager
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp TABLE OF CONTENTS
HEALTH AND SAFETY PLAN FOR
RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION
AT OPERABLE UNIT 3

<u>Section No.</u>	<u>Title</u>	<u>Rev. No.</u>	<u>Effective Date</u>
	Detailed Table of Contents	0	06/15/92
1.0	Introduction	0	06/15/92
2.0	Health and Safety Responsibilities	0	06/15/92
3.0	Hazard Assessment	0	06/15/92
4.0	Hazard Communication	0	06/15/92
5.0	Site Control	0	06/15/92
6.0	Personal Protective Equipment	0	06/15/92
7.0	Decontamination	0	06/15/92
8.0	Medical Surveillance	0	06/15/92
9.0	Air Monitoring	0	06/15/92
10.0	Training	0	06/15/92
11.0	Emergency Response	0	06/15/92
12.0	Material Handling	0	06/15/92
13.0	New Technologies	0	06/15/92

TABLE OF CONTENTS

1.0	INTRODUCTION	1-1
1.1	POLICY	1-1
1.2	REGULATIONS AND GUIDELINES	1-1
1.3	CONTENTS OF PLAN	1-2
1.4	BACKGROUND	1-2
1.5	LOCATIONS AND DESCRIPTIONS	1-3
1.5.1	IHSS 199 - Contamination of the Land's Surface	1-3
1.5.1.1	Ground Water	1-5
1.5.2	IHSS 200 - Great Western Reservoir	1-6
1.5.2.1	Surface Water	1-7
1.5.2.2	Reservoir and Drainage Sediments	1-8
1.5.3	IHSS 201 - Standley Lake	1-9
1.5.3.1	Surface Water	1-10
1.5.3.2	Nature of Contamination	1-11
1.5.4	IHSS 202 - Mower Reservoir	1-11
1.5.4.1	IHSS Conditions	1-12
1.5.4.2	Nature of Contamination	1-12
2.0	HEALTH AND SAFETY RESPONSIBILITIES	2-1
2.1	INTRODUCTION	2-1
2.2	ASSIGNMENT OF RESPONSIBILITIES	2-1
2.2.1	Division Managers	2-1
2.2.2	RP Project Manager	2-3
2.2.3	ER Health and Safety Officer	2-3
2.2.4	H&S Liaison Officer	2-3
2.2.5	Site Health and Safety Coordinator	2-4
2.2.6	Health and Safety Area Engineer	2-5
2.2.7	Health and Safety Representative	2-5
2.2.8	Radiological Operations Foreman	2-5
2.2.9	Radiological Engineering Representative	2-6
2.2.10	Occupational Health Director	2-6
2.2.11	Fire Protection Representative	2-6
2.2.12	Subcontractor Health and Safety Officer	2-7
2.3	OU 3 PERSONNEL	2-8

TABLE OF CONTENTS (Cont.)

3.0	HAZARD ASSESSMENT	3-1
3.1	INTRODUCTION	3-1
3.2	CHEMICAL CONTAMINANT BACKGROUND CHARACTERIZATION	3-1
3.3	RADIONUCLIDE CONTAMINANT BACKGROUND CHARACTERIZATION	3-3
3.4	FIELD ACTIVITIES	3-5
3.4.1	Soil	3-5
3.4.1.1	Soil Profile Sampling	3-5
3.4.1.2	Surface Soil Survey	3-6
3.4.2	Sediment	3-7
3.4.2.1	Sediment Samples in Ditches	3-7
3.4.2.2	Sediment Samples in Reservoirs	3-7
3.4.2.2.1	Near-shore Reservoir Samples	3-8
3.4.2.2.2	Reservoir Sediment Samples	3-8
3.4.3	Surface Water	3-8
3.4.3.1	Surface Water Drainages	3-9
3.4.3.2	Reservoirs	3-9
3.4.4	Groundwater	3-10
4.0	HAZARD COMMUNICATION	4-1
4.1	INTRODUCTION	4-1
4.2	HAZARDOUS MATERIALS INVENTORY	4-1
4.3	MATERIAL SAFETY DATA SHEETS	4-2
4.4	TRAINING	4-2
5.0	SITE CONTROL	5-1
5.1	OBJECTIVES	5-1
5.2	SITE CONTROL DESIGNATIONS	5-1
5.2.1	Contaminant Reduction Zone	5-3
5.2.2	Exclusion Zone	5-3
5.2.3	Task-Specific Exclusion Zones	5-4
5.2.4	Support Zone	5-4

TABLE OF CONTENTS (Cont.)

5.3	GENERAL OPERATING PROCEDURES	5-4
5.4	INTERIM PLAN FOR PREVENTION OF CONTAMINANT DISPERSION	5-5
5.4.1	Objective	5-5
5.4.2	Scope	5-5
5.4.3	Responsibility	5-6
5.4.4	Procedural Requirements	5-6
5.4.4.1	Specific Requirements	5-7
5.5	RFP PERMIT SYSTEM	5-8
5.6	MEDICAL ASSISTANCE	5-8
6.0	PERSONAL PROTECTIVE EQUIPMENT	6-1
6.1	INTRODUCTION	6-1
6.2	GENERAL APPLICATION OF PPE	6-3
6.3	PPE ISSUES APPLICABLE TO ALL SITE PERSONNEL	6-3
6.4	CONTAMINANT REDUCTION ZONE	6-7
6.5	INDIVIDUAL HAZARDOUS SUBSTANCE SITES	6-7
6.6	PPE REQUIREMENTS FOR ONSITE SPILL CLEANUP	6-7
6.7	REUSE OF PPE	6-10
7.0	DECONTAMINATION	7-1
7.1	INTRODUCTION	7-1
7.2	DECONTAMINATION PROCEDURES	7-1
7.2.1	Personnel and Small Equipment Decontamination	7-1
7.2.2	Heavy Equipment Decontamination	7-2
8.0	MEDICAL SURVEILLANCE	8-1
8.1	INTRODUCTION	8-1
8.2	FREQUENCY OF MEDICAL EXAMINATIONS	8-1

TABLE OF CONTENTS (Cont.)

8.3	CONTENT OF MEDICAL EXAMINATIONS	8-2
8.4	AVAILABILITY OF SERVICE	8-3
8.5	TRANSPORTATION FOR MEDICAL REASONS	8-4
8.6	OCCUPATIONAL HEALTH DEPARTMENT RESPONSIBILITIES	8-4
8.7	SUPERVISOR'S RESPONSIBILITY	8-5
8.8	EMPLOYEE'S RESPONSIBILITY	8-5
8.9	WORK PRACTICES	8-6
8.10	MEDICAL RECORDS	8-6
	8.10.1 Release of Medical Records and Medical Information	8-6
8.11	SUBCONTRACTOR MEDICAL SURVEILLANCE PROGRAM .	8-7
9.0	AIR MONITORING	9-1
9.1	INTRODUCTION	9-1
9.2	MONITORING INSTRUMENTS	9-1
9.3	MONITORING STRATEGIES	9-1
	9.3.1 Real-Time Monitoring	9-2
9.4	ACTION LEVELS	9-2
10.0	TRAINING	10-1
10.1	TRAINING REQUIREMENTS AND COURSE CONTENT	10-1
	10.1.1 Hazardous Waste Site Health and Safety	10-1
	10.1.2 Protecting the Radiation Worker Training	10-3
	10.1.3 Site-Specific Training	10-3
	10.1.4 Hazard Communication Training	10-3
	10.1.5 Safety Meetings	10-5
	10.1.6 Rehearsal of Emergency Response Plan	10-7
	10.1.7 Visitor Briefings	10-7

TABLE OF CONTENTS (Cont.)

10.2	IMPLEMENTATION OF TRAINING	10-8
10.3	PERFORMANCE EVALUATIONS	10-8
10.4	VERIFICATION OF TRAINING	10-9
11.0	EMERGENCY RESPONSE	11-1
11.1	PURPOSE	11-1
11.2	NOTIFICATION	11-1
11.3	SPECIFIC SITE HAZARDS	11-3
11.4	FIRES AND EXPLOSIONS	11-4
11.5	SPILLS OF HAZARDOUS AND RADIOACTIVE MIXED WASTE AND HAZARDOUS MATERIAL	11-5
11.6	POST-EMERGENCY RESPONSE EQUIPMENT MAINTENANCE	11-5
11.7	EMERGENCY EQUIPMENT LOCATION	11-5
11.8	EVACUATION PLAN	11-6
11.9	COMMUNICATION	11-6
12.0	MATERIAL HANDLING	12-1
12.1	INTRODUCTION	12-1
12.2	SUBCONTRACTOR MATERIALS HANDLING PROGRAM ...	12-1
13.0	NEW TECHNOLOGIES	13-1
13.1	INTRODUCTION	13-1
13.2	PROGRAM IMPLEMENTATION	13-1
13.3	METHODS OF EVALUATION	13-1

LIST OF FIGURES AND TABLES

Figures

Figure 2-1	Health and Safety Organization for OU 3	2-2
Figure 5-1	Radiation Work Permit	5-2

Tables

Table 3-1	Table of Assessment Activities and Potential Hazards at OU3	3-2
Table 3-2	Summary of IHSS 199 Historical Plutonium in Soil Data Throughout OU 3	3-4
Table 6-1	OSHA Standards for Use of PPE	6-2
Table 6-2	General PPE Inspection Checklists	6-4
Table 6-3	Protective Ensembles	6-8
Table 9-1	Action Levels	9-3
Table 9-2	Derived Air Concentrations (DAC) for Controlling Radiation Exposure to Workers at DOE Facilities	9-4
Table 9-3	Contamination Control Limits	9-5
Table 10-1	EG&G Hazardous Waste Workers Health and Safety Course Content	10-2
Table 10-2	Supervisor Training Course Outline	10-4
Table 10-3	Hazard Communication Training Course Outline	10-6
Table 13-1	Evaluation Procedures By Department	13-2

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3

Manual No.:
Section No.
Effective Date:
Organization:

21000-HSP-OU3
1.0 ,R0
06/15/92
Environmental Management

Introduction

Approved by:



Project Manager

6,8,92
Date

This is a
CONTROLLED DOCUMENT

EG&G -- ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI

By: William D. Ewan UNU

Date: 6/8/92

(per conversation with J. Neshedm)

1.0 INTRODUCTION

1.1 POLICY

EG&G Rocky Flats, Inc. (EG&G), in conjunction with the U.S. Department of Energy (DOE), has adopted the Federal Occupational Safety and Health Administration (OSHA) standard for hazardous waste site workers (29 CFR 1910.120) at the Rocky Flats Plant (RFP). This Health and Safety Plan (HSP) addresses the requirements of this standard for EG&G personnel managing and monitoring activities at the Operable Unit 3 (OU 3) and provides information and guidance for subcontractors when writing their site-specific HSPs. (The intent of the HSP is to protect EG&G personnel and to provide guidance for OU 3 activities in a manner that best serves the health and safety of workers, visitors, and the surrounding population.)

1.2 REGULATIONS AND GUIDELINES

Adherence to applicable federal and/or state health and safety standards, regulations, and guidance manuals is required during field operations. These include, but may not be limited to, the following:

1. EG&G Rocky Flats Plant (RFP) Health and Safety Practices Manual (HSP).
2. Title 29, Code of Federal Regulations (CFR) Part 1910 Occupational Safety and Health Standards, General Industry, latest edition.
3. Title 29, Code of Federal Regulations (CFR) Part 1926 Safety and Health Regulations for Construction, latest edition.
4. Occupational Safety and Health Guidance for Hazardous Waste Site Activities, U.S. Department of Health and Human Services, (NIOSH), October 1985.

5. Threshold Limit Values and Biological Exposure Indices for 1990-1991, American Conference of Industrial Hygienists, 1990.
6. Radiological Operating Instructions (ROI).
7. Hazardous Waste Requirements Manual.

1.3 CONTENTS OF PLAN

This HSP describes known hazardous materials and work operations associated with remedial investigation activities at OU 3. This program is identified in the Interagency Agreement (IAG). The plan specifies responsibilities and authorities of EG&G personnel involved in the supervision of activities at this site. This plan further describes the requirements for medical surveillance, personal protective equipment (PPE), hazard communication, training, monitoring, decontamination, site control, new technology, and emergency response procedures.

The potential hazards associated with remedial investigation activities at OU 3 sites have been assessed by reviewing historical activities and waste characterization studies performed previously. On the basis of the hazard assessment, plans for PPE, monitoring, decontamination, site control, and emergency response have been developed.

1.4 BACKGROUND

A comprehensive, phased program of site characterization, remedial investigations, feasibility studies, and remedial/corrective actions is in progress at RFP. These investigations are being conducted pursuant to the 1986 Compliance Agreement between DOE, the U.S. Environmental Protection Agency (EPA), and the Colorado Department of Health (CDH), which addresses hazardous and radioactive mixed waste management at the plant. Analysis of hydrogeological and hydrogeochemical characterization data, obtained during installation-

wide sampling in 1986, identified four areas (described in Section 1.4) as probable sources of environmental contamination, with each area containing several sites.

1.5 LOCATIONS AND DESCRIPTIONS

OU 3 is unique among RFP OUs in that it is located outside the RFP boundaries. OU 3 consists of four Individual Hazardous Substance Sites (IHSSs), IHSS 199 - Contamination of the Land's Surface, IHSS 200 - Great Western Reservoir, IHSS 201 - Standley Lake, and IHSS 202 - Mower Reservoir. The following are locations and descriptions of the four IHSSs located in OU 3.

1.5.1 IHSS 199 - Contamination of the Land's Surface

IHSS 199, Contamination of the Land's Surface, specifically targets offsite soil contamination from RFP releases. Included within IHSS 199 are approximately 350 acres (ac) of land (lawsuit acreage) that were the subject of a 1975 lawsuit filed in U.S. District Court (Civil Action No. 75-M-1162) by the land owners against the United States and other defendants (hereafter referred to as the lawsuit), alleging contamination of the land surface by releases from RFP during its operating history. A settlement agreement finalized in July 1985 (the Settlement Agreement) (U.S. District Court, 1985a) required that RFP undertake remedial action on those portions of the land (hereafter referred to as remedy acreage) containing plutonium at concentrations exceeding an action level adopted by the court from a CDH special construction standard for plutonium in soil of 0.9 picocuries/gram (pCi/g) (0.03 Becquerels/gram [Bq/g]). Two contiguous tracts of land, which are currently owned by the City of Broomfield and Jefferson County, were targeted for remediation based upon the CDH standard. To-date, remedial activities have been undertaken on 120 ac of Jefferson County remedy acreage.

As presently defined, IHSS 199 includes all soils outside of the RFP boundary that are contaminated by releases from RFP. The IHSS 199 boundary, therefore, is delineated by the extent of offsite contamination, which has not been conclusively defined. Past attempts

to define the presence and extent of offsite soil contamination have focused almost exclusively on airborne plutonium emissions from RFP.

The remedy acreage is located on two contiguous tracts of land totalling 350 ac in the southern half of Section 7 and the western half of Section 18, Township 2 South, Range 69 West (T2S, R69W). Both areas are just outside the eastern boundary of RFP, approximately 1.5 miles (2.4 kilometers [km]) east of the main production area of the plant. Both are generally downwind and downgradient of RFP.

Although the extent of offsite soil contamination has not been conclusively defined, studies conducted to-date, do point to the following limitations:

- IHSS 199 is most likely limited to areas downwind of RFP, namely to the northeast, east, and southeast of the plant.
- The 350 ac of lawsuit acreage targeted for remediation were shown to have the highest concentrations of plutonium in soil of all lawsuit acreage, which adjoined most of the eastern and southern boundaries of RFP (Rockwell, 1979b). "Hot spots" may occur, which were not detected through lawsuit acreage sampling; however, because other IHSS 199 lands downwind of RFP are further from the point than the remedy acreage, it is reasonable to expect that these lands contain lower concentrations of plutonium than the remedy acreage.
- The most likely pathways of plutonium migration from IHSS 199 are wind and water erosion of surface soil (SCS, 1985).

Very limited data exist for contaminants other than plutonium, which could affect offsite soils as a result of RFP releases. In 1976 and 1977, RFP tested lawsuit acreage soils for isotopes of americium, cesium, thorium, neptunium, cerium, radium, and potassium in addition to plutonium. The sampling program also included five sites far away from RFP in order to determine representative background concentrations (Rockwell, 1979a; Rockwell, 1979b). The Rockwell International Disclosure to the City of Broomfield following the lawsuit (Rockwell, 1985a) based the following conclusions on the results of the 1976-1977 sampling:

Analysis of 25 soil samples from plaintiffs' lands and samples from each of the five background locations used in the testing program show that with respect to radionuclides other than plutonium and americium, the levels of these radionuclides on plaintiffs' lands are consistent with background levels.

As indicated in this passage, americium-241, a daughter product of plutonium-241 decay, was detected in IHSS 199 soils at above background characterization recorded at the five remote sampling locations. However, Rockwell (1985a and 1979b), which also refers to americium data from the 1976-1977 sampling program, provide the analytical results for americium. Poet and Martell (1972) measured americium-241 and strontium-90 concentrations in soil samples collected in 1969 from several locations around RFP. The study calculated that americium contributed 3 to 15 percent as much alpha activity as did plutonium in the areas sampled, and estimated that the americium contribution to alpha activity would eventually approach that of plutonium, as decay of plutonium-241 into americium-241 progressed. The RFP soil sampling program conducted by CDH has periodically included analyses for cesium-137 and uranium. These limited efforts represent the only known characterizations of radionuclides other than plutonium at IHSS 199. Possible contaminants other than radionuclides present in IHSS 199 soils as a result of RFP releases have not been characterized, with the exception of beryllium measurements in 1971 under the CDH soil monitoring program (CDH, 1990a).

1.5.1.1 Groundwater

Currently, there are no dedicated groundwater monitoring wells outside the RFP eastern boundary. Numerous privately owned water wells, however, have been drilled just east of RFP. Limited information was obtained from drilling and filing records held by the Colorado Division of Water Resources (DWR). These records suggest that the thickness of surficial deposits ranges from 15 to 50 feet (4.6 to 15 meters [m]) and averages approximately 25 feet (7.6 m) near the remedy acreage. Surficial deposits typically are described in the well records as clay, sandy clay, or clay with gravel and boulders, and are typically capped by 5 or 6 feet of topsoil. The underlying bedrock is described in the well

records as alternating layers of shale and sandstone, which is assumed to be a very generalized description of the Arapahoe formation. Most of the well studies were completed in sandstones at depths ranging from 35 to 275 feet (10.7 to 84 m). Static water levels averaged 10 to 50 feet (3.0 to 15 m) higher than the screened interval, indicating moderate pressure head in the sandstones. The static water level was 20 feet (6.1 m) in one well completed in the shallow aquifer (alluvium) in the southwest corner of Section 6, just north of the IHSS 199 remedy acreage (DWR, 1990).

1.5.2 IHSS 200 - Great Western Reservoir

IHSS 200 encompasses Great Western Reservoir, offsite reaches of Walnut Creek (which formerly flowed into the reservoir from the RFP), and downstream surface water features possibly impacted by outflow from the reservoir. Portions of Walnut Creek within the boundaries of RFP will be investigated as RFP OU 6 and are not included in IHSS 200.

Great Western Reservoir is located approximately 1.5 miles (2.4 kilometers [km]) east of RFP's eastern boundary in Sections 6 and, T2S, R69W. The reservoir is owned by the City of Broomfield and is utilized solely for the city's municipal water supply. Public access to Great Western Reservoir and the surrounding area is fenced and posted to exclude public access (Broomfield, 1990).

Preconstruction information for the Great Western Reservoir site is not given in available references. The original reservoir was built in 1904 as an irrigation water supply. The dam has been enlarged on several occasions, most recently in 1958. The maximum height of the dam is 69 feet (21 m) (Hydro-Triad, 1981). The present reservoir volume is 3,250 acre-feet (401 hectare-meters). The bottom and sides of the reservoir are unlined, meaning that the reservoir may or may not be hydraulically connected to the groundwater system in the area.

The U.S. Army Corps of Engineers utilized data from two existing boreholes near Great Western Reservoir as part of a 1989 evaluation for a surface water interceptor system for the reservoir. In these boreholes, alluvium surficial deposits are underlain by Arapahoe

formation bedrock at depths of 5 and 16 feet (1.5 and 4.9 m). Bedrock consists of claystone with minor interbedded sandstone, and siltstone lenses, and dips slightly to the east (Corps of Engineers, 1989). The precise locations of these boreholes are not given in this document. The Arapahoe formation averages 250 feet (76 m) in thickness in the RFP area, and is underlain by several hundred feet of shale comprising the upper portion of the Laramie formation (USGS, 1976). It is expected that a similar stratigraphic sequence underlies Great Western Reservoir.

1.5.2.1 Surface Water

Great Western Reservoir is fed primarily by Clear Creek via Lower Church Ditch. Until recently, the reservoir also received influent from the north and south branches of Walnut Creek, both of which flow from RFP. The two branches merge into a single drainage within the RFP boundary. A chromic acid release at RFP in 1989 prompted construction of a Walnut Creek diversion around Great Western Reservoir, known as the Broomfield Diversion Ditch. Surface water affected by the chromic acid was diverted around Great Western Reservoir and did not impact the reservoir to-date (Dow et al., 1971). Walnut Creek flow from RFP is now treated and diverted south around Great Western Reservoir into the drainage below the reservoir outlet, where it combines with outflow from the reservoir. The Broomfield Diversion Ditch prevents surface water from RFP from reaching Great Western Reservoir. Walnut Creek continues below Great Western Reservoir and eventually discharges to Big Dry Creek, several miles downstream from the reservoir (USGS, 1980).

From the opening of RFP in 1952 through approximately 1979, water containing decontaminated process and laundry effluent was discharged through the B-series ponds to South Walnut Creek (DOE, 1988; Dow, 1973). Cooling tower blowdown and treatment system steam condensate were discharged to the A-series ponds, which feed into North Walnut Creek. These discharges contained radionuclides, which accumulated in varying amounts in the sediments of the holding ponds, Walnut Creek, and Great Western Reservoir

(DOE, 1980). EPA (1975) concluded that historical release of contaminants from RFP to Great Western Reservoir resulted primarily from the following activities:

- Early operational practices at the plant (1950s and 1960s)
- Reconstruction of the holding ponds between 1970 and 1973, which resuspended pond sediments and released some of this material to Great Western Reservoir
- A 1973 tritium release from RFP
- Airborne transfer of radionuclides (primarily plutonium)

Available data from onsite RFP OUs, particularly OU 6 (Walnut Creek Drainage), suggest that contaminants other than plutonium could conceivably have impacted Great Western Reservoir through surface-water transport from RFP. Leakage from the solar evaporation ponds (IHSS 101) is known to have contaminated groundwater and surface water in the Walnut Creek Drainage, primarily with nitrate and other inorganic ions. Inorganic ions, nonradioactive metals, Volatile Organic Compounds (VOCs), and uranium have been detected in the Walnut Creek holding ponds. Herbicides that have been applied in the past at various locations at RFP have also been detected in RFP surface water. Knowledge of the fate and mobility of these potential contaminants in surface water and sediments is critical in determining whether they could reasonably have impacted Great Western and if so, whether they still exist at the site today.

1.5.2.2 Reservoir and Drainage Sediments

EPA conducted the first extensive sampling of bottom sediments in Great Western Reservoir in February and September 1970. The results indicated that a layer of sediment containing plutonium above the EPA estimated baseline level of ≤ 0.1 pCi/g, or $0.0037 \leq$ Bq/g was present in the bottom of the reservoir. The thickness of the plutonium-bearing sediments was 2 inches (5 centimeters [cm]) or more at all sampling locations. The highest concentrations of plutonium were detected in sediments in the Walnut Creek inlet area and the central section of the reservoir (leading to the dam inlet). The lowest concentrations

were found in the south arm, the shoreline area between the south arm and the dam, and the western portion of the north arm (EPA, 1971; EPA, 1973).

EPA resumed their investigation of plutonium in surface-water sediments east of RFP in September 1973. This phase of the study further documented plutonium concentrations in Great Western Reservoir. Sediment samples collected both by dredging and coring indicated that plutonium above expected baseline concentrations was present over almost the entire bottom of Great Western Reservoir as a result of releases from RFP. The maximum plutonium concentration detected was 4.5 pCi/g. The results confirmed the areal distribution of plutonium delineated by the 1970 study, except that the highest concentrations were found in the deepest areas of the reservoir rather than in the Walnut Creek inlet area. It was also observed that plutonium-239 concentrations in the uppermost sediment layer increased substantially in the three years between the studies. This increase was traced to an influx of sediment resuspended from the RFP holding ponds during pond reconstruction activities. The study also measured concentrations in Great Western Reservoir sediments of selected radionuclides other than plutonium and of beryllium. No significant variations in the concentrations of these potential RFP contaminants were observed throughout the reservoir or between Great Western Reservoir and Standley Lake (IHSS 201) (EPA, 1975).

An accidental release of tritium from RFP into Walnut Creek and Great Western Reservoir occurred in 1973 (EPA, 1974). Subsequent studies measured tritium concentrations in reservoir water as a result of the release. Tritium contamination in reservoir sediments has not been studied; however, tritium would not be expected to concentrate in sediments because of its high mobility in the environment (Rockwell, 1988c).

1.5.3 IHSS 201 - Standley Lake

IHSS 201 encompasses Standley Lake, offsite reaches of Woman Creek (which flows into the reservoir from RFP), and downstream surface water features possibly impacted by outflow from the reservoir. Standley Lake is a large reservoir located approximately 2 miles

(3.2 km) southeast of RFP's eastern boundary in Sections 16, 17, 20, 21, and 28, T2S, R69W. Uses of the reservoir include municipal water supply and recreation. The reservoir has been owned by the Farmers Reservoir and Irrigation Company of Brighton, Colorado, since its construction between 1909 to 1919. Although the dam has undergone periodic maintenance and reconstruction, most recently in 1978, Standley Lake's present volume of 43,000 acre-feet (5,300 hectare-meters) has remained relatively unchanged since its construction. Approximately 67 percent of the reservoir water is used as municipal water supply for the Cities of Westminster, Northglenn, and Thornton. The remaining 33 percent is transported through irrigation ditches to agricultural areas northeast of the lake, primarily between Broomfield and Fort Lupton. Standley Lake receives approximately 96 percent of its water from Clear Creek via an irrigation ditch, but is also fed by Woman Creek, which drains the southern side of RFP.

1.5.3.1 Surface Water

Within the RFP boundary, the Woman Creek Drainage contains the two C-series holding ponds, Ponds C-1 and C-2 (south and east of the main production area, respectively). Pond C-1 receives flow from Woman Creek. This flow is diverted around Pond C-2 and back into the Woman Creek channel downstream of Pond C-2. Pond C-2 receives surface run-off from the South Interceptor Ditch, which collects surface run-off from the southern portion of the RFP main production area (Rockwell, 1988a). The South Interceptor Ditch runs along the south (downgradient) side of the main production area, between the controlled area and Woman Creek. Pond C-2 water formerly was discharged into Woman Creek in accordance with the National Pollutant Discharge Elimination System (NPDES) permit for RFP. More recently, water was pumped from Pond C-2 into a treatment facility, then through an aboveground pipeline to the Broomfield Diversion Ditch, where it was discharged in accordance with applicable regulations and by agreement with the City of Broomfield. Treatment of this water will be provided on a contingency basis, as required to meet applicable regulations. Surface water controls within RFP allow RFP to effectively prevent run-off from the main production facility from reaching Standley Lake.

1.5.3.2 Nature of Contamination

Radioactive materials released from RFP may have been transported to Standley Lake through surface water (primarily in suspended sediments) and/or airborne particulates (fugitive dust). Between 1952 and 1973, RFP discharged water treatment facility filter backwash into Pond C-1, which discharges into Woman Creek (Rockwell, 1988c). At present, only buffer zone surface run-off and natural groundwater seepage flow into the Woman Creek Drainage within the RFP boundary to-date (Dow et al., 1971).

Prospective RFP sources of contaminants other than plutonium to Standley Lake, particularly VOCs and uranium, exist in OU 1 (881 Hillside) and OU 2 (903 Pad, Mound, and East Trenches). Herbicides that have been applied in the past at various locations on RFP have also been detected in RFP surface water. The fate and mobility of these potential contaminants are addressed in the conceptual model for reservoirs.

1.5.4 IHSS 202 - Mower Reservoir

IHSS 202 encompasses Mower Reservoir, offsite reaches of an irrigation ditch (which feeds the reservoir via Woman Creek), and downstream surface water features possibly impacted by outflow from the reservoir. Portions of the irrigation ditch within the boundaries of RFP are part of RFP OU 6 and are not included in IHSS 202. Very little documentation exists for Mower Reservoir, a small, privately owned impoundment located just southeast of RFP in Section 18, T2S R69W. The reservoir is fed by Woman Creek via Mower Ditch, an irrigation ditch that originates within the RFP boundary. Mower Reservoir is used for agricultural purposes, primarily cattle watering and irrigation, and fluctuates in capacity depending upon water supply and demand. It covers an area of approximately 9 acres and is roughly 50 feet (15 m) deep at its deepest point. Outflow from Mower Reservoir flows southeast from the reservoir, eventually discharging to Standley Lake. Mower Reservoir is located on land that was the subject of a lawsuit against RFP by several landowners, alleging contamination of the land surface by releases from the plant (DOE, 1991a).

1.5.4.1 IHSS Conditions

No site-specific information is available for geologic and groundwater conditions at Mower Reservoir. The geology and groundwater hydrology of Mower Reservoir are expected to be similar to those described for Great Western Reservoir. Because Mower Reservoir is fed by a diversion from Woman Creek, surface water pathways from RFP to Mower Reservoir are similar to those described for Standley Lake.

DOE recently examined the possibility of discharging water from RFP holding Pond C-2 to Mower Reservoir via Woman Creek and Mower Ditch. The following conditions would have to be met in order to discharge Pond C-2 water to Mower Reservoir:

- All site-specific discharge standards would have to be met by RFP
- Permission would have to be obtained from the owner of Mower Reservoir
- Assurance would have to be obtained from the reservoir owner that the water would be used only for agricultural purposes

1.5.4.2 Nature of Contamination

In contrast to the extensive historical sampling data available for Great Western Reservoir and Standley Lake, only very limited data have been collected to characterize Mower Reservoir. Because the reservoir is not a public water supply, its water quality is not monitored and has not previously been evaluated. RFP-derived contaminants in Mower Reservoir are believed to have been transported primarily as airborne particulates, and to a lesser degree by surface water through the Woman Creek drainage, which may have contributed to plutonium concentrations in Standley Lake sediments. It can be inferred that contaminant concentrations resulting from releases into Woman Creek would be similar for Mower Reservoir and Standley Lake, while concentrations resulting from airborne releases and from erosion and transport of contaminated soils by surface run-off would be similar for Mower Reservoir and Great Western Reservoir.

Numerous investigations have focused on elevated plutonium concentrations in surface soils around Mower Reservoir (DOE, 1991a). These studies have concluded that the primary source of the plutonium was windborne particulates from the 903 Pad. It is expected that Mower Reservoir received similar amounts of plutonium through airborne transport as the nearby land surface.

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3

Manual No.: 21000-HSP-OU3
Section No. 2.0, R0
Effective Date: 06/15/92
Organization: Environmental Management

Health and Safety Responsibilities

Approved by:


Project Manager

6,8,92
Date

This is a
CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI
By: William D. Ewan UNU
Date: 6/8/92

(per conversation with J. Neshedn)

2.0 HEALTH AND SAFETY RESPONSIBILITIES

2.1 INTRODUCTION

OU 3 is being managed by the RFP Remediation Programs (RP) Department, which reports to the Environmental Restoration (ER) Directorate. This HSP is to be used as a guide for subcontractor health and safety plans. EG&G personnel will abide by this HSP.

RFP Health and Safety (H&S) departments that support ER activities at OU 3 include Industrial Safety, Radiological Engineering, Industrial Hygiene (IH), Radiological Operations, Health and Safety Area Managing, Fire Protection, and Occupational Medicine. These departments are part of the H&S Directorate. The health and safety organization chart for OU 3 is shown in Figure 2-1.

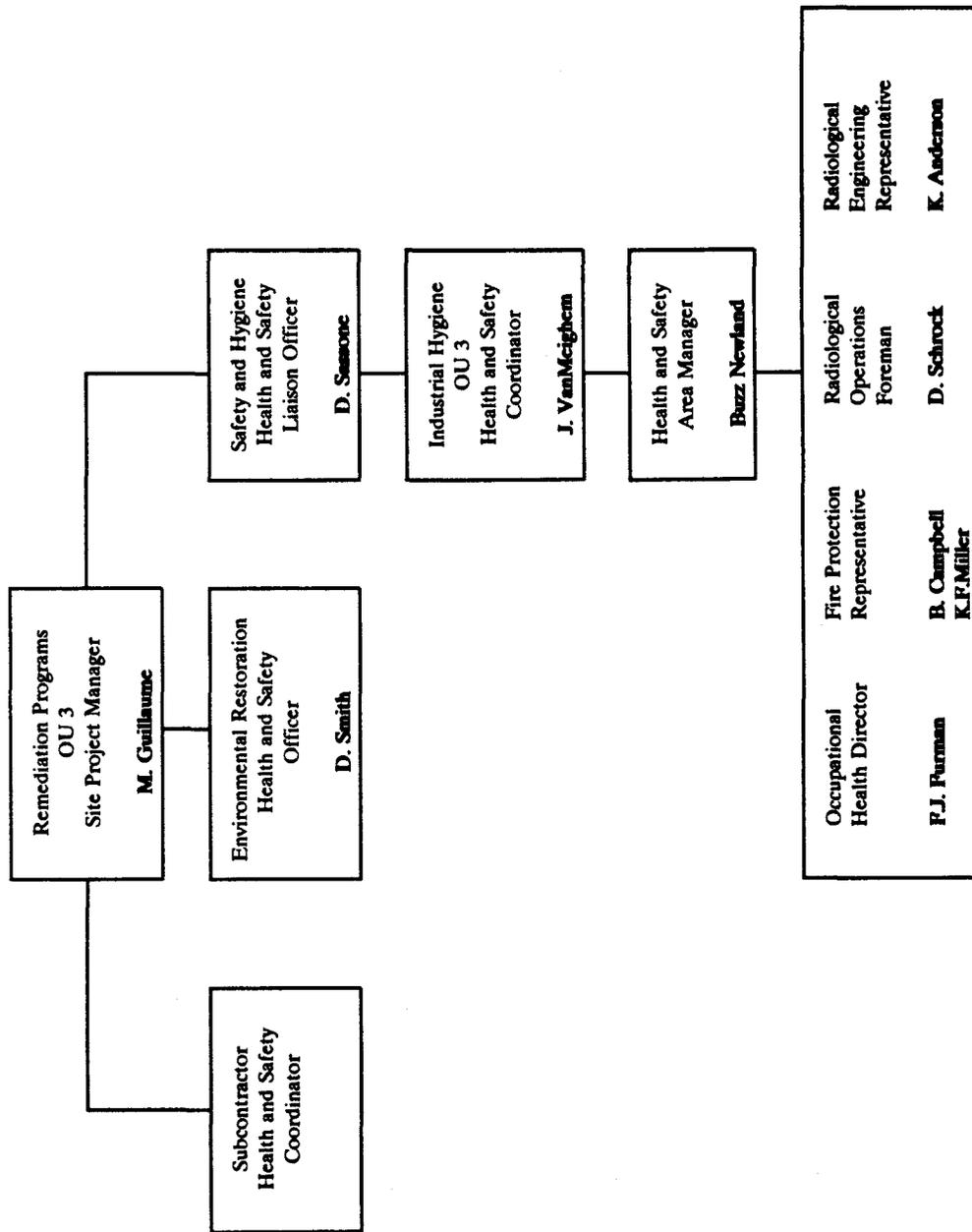
The Project Manager (PM) for OU 3 has overall responsibility for work performed at the site. The Project Manager, through line management and supervisors, has responsibility for implementing and abiding by the HSP. The ER Health and Safety Officer (ERHSO), with support from the H&S Departments, will assist the PM in coordinating the implementation of the HSP. Subcontractors will implement their own RFP-approved HSP and will be monitored by the PM.

2.2 ASSIGNMENT OF RESPONSIBILITIES

2.2.1 Division Managers

The RP department and H&S department managers assist the respective program managers in the implementation of environmental and health and safety activities.

Figure 2-1
Health and Safety Organization for OU 3



2.2.2 RP Project Manager

The RP PM for OU 3 has overall responsibility for management of the project. The PM is responsible for preparing plans and procedures; implementing the Health and Safety Program; directing, controlling, and reporting project activities; maintaining construction and health and safety documents; and communicating project requirements, including any modifications of the project scope, to the support organizations. The PM will also measure project progress; monitor the budget; evaluate project performance; ensure compliance with health and safety regulations and procedures; serve as a liaison with the DOE Rocky Flats Office (DOE/RFO), EPA, and CDH; and have 'stop work' authority. The PM will report directly to the RP Department Manager.

2.2.3 ER Health and Safety Officer

The ERHSO has responsibility for assisting the PM in implementing the ER H&S Program. Specific responsibilities include:

- Ensuring that a site-specific HSP is written for each Operable Unit
- Ensuring that subcontractors submit site- or task-specific HSPs for approval
- Ensuring that a site health and safety officer is assigned to each OU
- Ensuring that adequate safety support and review procedures are established so that site personnel are not at risk while working at the site.

In situations of noncompliance with health and safety requirements, the ERHSO will consult with the PM and initiate corrective actions through that authority. The ERHSO will be assisted by the H&S Liaison Officer.

2.2.4 H&S Liaison Officer

The H&S Liaison Officer is assigned by the Safety and Hygiene Department to serve as the central point of contact for RP projects with operational health and safety needs. The H&S

Liaison Officer reports directly to the Safety and Hygiene Department Manager and interacts with the PM and the ERHSO. The H&S Liaison Officer has the following responsibilities:

- Assisting project management
- Preparing EG&G OU HSPs
- Approving site-specific and task-specific HSPs prepared by subcontractors
- Appointing and supervising the site Health and Safety Coordinator (SHSC)
- Performing periodic audits of the implementation of the site H&S Program and program documentation requirements

2.2.5 Site Health and Safety Coordinator

The SHSC regularly monitors implementation of the EG&G Operable Unit Health and Safety Plan (HSP). The SHSC reports to the H&S Liaison Officer and informs the PM of the status of health and safety operations at the site. The SHSC has the following responsibilities:

- Monitoring the project to ensure that the requirements of the ER HSP and this HSP are followed
- Coordinating with the H&S Liaison Officer regarding the need for additional safety support required at OU 3 from supporting H&S divisions such as Industrial Safety, Industrial Hygiene, Health and Safety Area Management, Radiological Engineering, Radiological Operations, Occupational Health, and Fire Protection
- Performing audits of subcontractor health and safety operations
- Alerting the PM and the H&S Liaison Officer of health and safety violations
- Approving modified work practices in response to changing conditions at OU 3

2.2.6 Health and Safety Area Manager

The H&S Area Manager is responsible for management of a multi-disciplinary safety team. As the safety team leader, the H&S Area Manager will ensure effective communications within the H&S organization and with the Site Health and Safety Coordinator. In addition, the H&S Area Manager will assist OU 3 management with completion of Operational Safety Analysis and Job Safety Analyses.

2.2.7 Industrial Hygiene Representative

The H&S Representative is responsible for preparing and implementing the chemical monitoring program for EG&G employees working at OU 3. This includes initial evaluation of the site to ensure that levels of respiratory and clothing protection are adequate and to ensure generation of sufficient data upon which further PPE decisions can be based. In addition, the Industrial Hygiene Representative is responsible for addressing industrial hygiene complaints and concerns at OU 3 and for reviewing and approving subcontractor sampling and monitoring plans.

2.2.8 Radiological Operations Area Manager

The Radiological Operations Area Manager has responsibility for providing qualified Radiation Protection Technologists (RPTs) to OU 3 to implement the radiological monitoring program. RPTs will calibrate radiation monitoring equipment, conduct monitoring, and will know the action levels for radiological contamination defined in this plan. RPT practices will be in conformance with Radiological Operating Instructions (ROIs). RPTs will be responsible for notifying onsite supervision when action levels are approached or reached and for notifying project and task managers in the event that equipment fails. RPTs are also responsible for clearing personnel and equipment to leave OU 3 and for documenting the monitoring results.

2.2.9 Radiological Engineering Representative

The Radiological Engineering Representative defines the requirements for radiation protection for OU 3 as required by the Rocky Flats Radiation Control Program and DOE requirements. The Radiological Engineering Representative will define the protocols for monitoring, clothing, respiratory protection, and decontamination for EG&G personnel in accordance with prudent health physics practices. Complaints and concerns regarding radiological hazards at OU 3 will be addressed by the Radiological Engineer.

2.2.10 Occupational Health Director

The Occupational Health Director is responsible for administration of the RFP Occupational Medical Program. These responsibilities include:

- Providing requisite physical examinations to EG&G employees working at hazardous waste sites
- Maintaining EG&G employee medical records
- Correlating exposure data to ensure that the scope of annual physical examinations are correct
- Issuing letters to EG&G employees concerning potential exposures to hazardous materials based on bioassays

2.2.11 Fire Protection Representative

The Fire Department is responsible for minimizing the potential for damage and injury to health and property as a result of fire or explosion. This is accomplished by ensuring that adequate fire suppression systems are available sitewide, that audits and inspections are conducted to abate potentially hazardous situations (e.g., improper storage of flammable or combustible materials), and to provide emergency support in the event of an injury or accident.

2.2.12 Subcontractor Health and Safety Officer

The subcontractor H&S Officer is responsible for developing and implementing a site-specific HSP that adequately addresses the site hazards and controls necessary to safeguard personnel and property. Duties of the Subcontractor H&S Officer will include:

- Ensuring that subcontractor personnel are adequately trained so that they can safely perform their assigned tasks
- Ensuring that subcontractor personnel are aware of potential site hazards, and that they know the necessary controls to prevent overexposure or injury
- Acting as or appointing alternate subcontractor H&S Officer(s)
- Ensuring that the HSPs and the required training and medical records for site personnel are current and are maintained onsite
- Conducting the required monitoring or assuring that monitoring is conducted by the assigned personnel

2.3 OU 3 PERSONNEL

Personnel assigned to the operational and support activities described above include:

ER OU 3 Project Manager
Michael Guillaume
Extension ____/pager ____

Radiological Operations Foreman
Kenneth Sablich
Extension 4414/pager 4361

ER Health and Safety Officer
Dennis Smith
Extension 5958/pager 3836

Radiological Engineer Representative
Keith Anderson
Extension 5151/pager 3296

Health and Safety Liaison Officer
Dina Sassone
Extension 5785/pager 1023

Occupational Health Director
F.J. Furman
Extension 2895/pager 2356

Site Health and Safety Coordinator
Jeff VanMeighem
Extension 5810/pager 3055

Fire Protection/EMT
For Emergency Response Issues:
K.F. Miller
Extension 6042

Radiation Protection Area Manager
R.L. Newland
Extension 2800/pager 0730

For Fire Protection Issues:
Bruce Campbell
Extension 7642/pager 0023

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3
Hazard Assessment

Manual No.: 21000-HSP-OU3
Section No. 3.0, R0
Effective Date: 06/15/92
Organization: Environmental Management

Approved by:


Project Manager

6,8,92
Date

This is a
CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI
By: William D. Ewan UNU
Date: 6/8/92

(per conversation with J. Neshedm)

3.0 HAZARD ASSESSMENT

3.1 INTRODUCTION

Potential hazards that may be encountered during RCRA Facility Investigation/Remedial Investigation (RFI/RI) activities were identified by reviewing the RFI/RI Work Plan developed for OU 3. This document provided information on the OU 3 site characterization and identified potential contaminants in soil, groundwater, surface water, and surface-water sediment. Sources of contamination are primarily radiological in nature and are represented in OU 3 in very low concentrations. Direct hazards, such as physical stresses and mechanical and other hazards, were assessed by reviewing other documents that discussed preferred action alternatives and by anticipating the types of activities that may occur during this RFI/RI. Refer to Table 3-1 for a synopsis of assessment activities and related hazards by IHSS.

3.2 CHEMICAL CONTAMINANT BACKGROUND CHARACTERIZATION

The hazard assessment for chemical contamination in OU 3 was conducted by reviewing historical sample analysis results of Volatile Organic Compounds (VOCs) and semivolatiles.

Overall, there is little evidence indicating the presence of VOCs or semivolatile contamination in OU 3. Very low concentrations of VOCs have been detected in surface-water and surface-water sediments but in concentrations well below established Maximum Contaminant Levels (MCLs) and Resource Conservation and Recovery Act (RCRA) action levels, respectively. Only the surface-water samples will be analyzed for VOCs and semivolatiles, and because prior levels were so low, they will not be treated as being hazardous. Because there are no wells in OU 3, wells along the west side of Indiana Street were sampled for the presence of chemical compounds. These data provide the only groundwater information for OU 3.

Table 3-1

Table of Assessment Activities
and
Potential Hazards at OU 3

IHSS	ASSESSMENT ACTIVITIES	IDENTIFIED CONTAMINANTS	POTENTIAL HAZARDS		MONITORING	HAZARD CONTROL MEASURES
			PHYSICAL	CHEMICAL		
199 Contamination of Land Surface	Soil and ditch sediment sampling including trenching activities for soil profiling Monitoring well installation	Low concentrations of plutonium (Pu) (average concentration levels expected at approximately 0.2 pCi/g) and Am (pCi/g) and Am Low concentrations of VOC's may exist at levels well below MCLs.	Dangers associated with work near heavy equipment such as a backhoe (for the trenching activities) and a drill rig for monitoring well installation	Potential for inhalation and dermal absorption of dust contaminated with Pu. Potential for inhalation of VOCs.	Total suspended particulates (TSP) Sound levels Personnel will be frisked and equipment will be screened for radiation	Dust suppression in accordance per the PPCD Modified Level D
200 Great Western Reservoir	Near shore reservoir and reservoir sediment, surface-water and surface water drainages	Low concentrations of Pu (average concentration levels expected at approximately 0.2 pCi/g) and Am	Danger associated with collecting surface water and reservoir sediment samples when working from a boat	Potential for ingestion, inhalation, and dermal exposure of reservoir water and sediment possibly contaminated with Pu and/or VOCs.	Personnel will be frisked and equipment will be screened for radiation	Modified Level D
201 Standley Lake	Same as IHSS 200	Same as IHSS 200	Same as IHSS 200	Same as IHSS 200	Same as IHSS 200	Same as IHSS 200
202 Mower Reservoir	Same as IHSS 200	Same as IHSS 200	Same as IHSS 200	Same as IHSS 200	Same as IHSS 200	Same as IHSS 200

3.3 RADIONUCLIDE CONTAMINANT BACKGROUND CHARACTERIZATION

Radionuclides exist throughout OU 3 but in very low concentrations. Historical sample data indicate the presence of plutonium and associated americium, radium, strontium, tritium, and gross alpha and beta dispersed throughout OU 3 in varying levels of concentrations. Because of the lack of many data points for groundwater, surface water, and sediment, little is known about the extent and magnitude of radionuclide contamination in these media.

According to the latest soil sampling information (refer to Table 3-2), plutonium in surface soil has an average concentration of 0.2 pCi/g derived from 13 data points throughout IHSS 199. This level is significantly lower than the CDH threshold of 0.9 pCi/g. However, because this is an average, there is the possibility of higher levels existing in previously unsampled areas. The scope of the OU 3 RFI/RI will encompass a greater sampling effort to delineate areas of Pu contamination. Also, 1985 data indicates a higher average with a maximum value of 5.6 pCi/g with 24 data points.

Groundwater will be sampled for the presence of radionuclides as historical sampling efforts have indicated detections in monitoring wells on the west side of Indiana Street. Previous sample analyses have shown that plutonium, radium, strontium, and tritium have been present in levels below the MCLs, but gross alpha and beta were detected above the MCL for drinking water as defined by the CWA.

Surface-water samples have been collected in the past along Indiana Street, and radionuclides have been detected at very low levels below the CDH threshold of 0.9 pCi/g. Plutonium, radium, strontium, tritium, and gross alpha and beta were present but below MCLs for surface water. The surface water sampling program will include Standley Lake, Great Western Reservoir, Mower Reservoir, and all drainages. Each of these bodies of water will be IHSSs (refer to Table 3-1).

Table 3-2
Summary of IHSS 199 Historical Plutonium in Soil Data Throughout OU 3

Sample Year	Range (pCi/g)	Average (pCi/g)	No. of Data Points
1970	0.01-11.0	1.2	13
1971	0.03-30.1	2.6	13
1972	0.02-25.1	2.1	13
1973	0.03-0.38	0.2	5
1974	0.02-12.7	1.2	13
1975	0.01-4.30	1.1	10
1976	0.02-3.50	0.4	13
1977	0.03-4.20	0.5	13
1978	0.03-0.25	0.09	6
1980	0.01-3.1	0.3	13
1981	0.18-2.2	0.3	12
*1985	0.03-5.6	1.70	24
1986	0.01-1.5	0.2	13

Note: Background levels of Pu in Colorado are unavailable.

Source: "Rocky Flats Surface Soil Survey, 1070-1989," by CDH, February 1990.

*Source: "Remedial Action Program on Jefferson County Open Space Land in Section 7, T2S, R69r1, South of Great Western Reservoir," by C.T. Illsley.

Previous sampling points of surface water sediments have been located at similar locations to where surface water samples have been collected along Indiana Street. Low levels of plutonium, radium, strontium, tritium, and gross alpha and beta were detected in these samples. Sediment samples will be collected from all surface water locations.

3.4 FIELD ACTIVITIES

This subsection describes the OU 3 RFI/RI field investigation program by media. As part of the field sampling program, the data from the sitewide monitoring program and other OU investigations will be used, as appropriate, to add to data collected during the OU 3 investigation as previously discussed.

3.4.1 Soil

The purpose of the soil sampling program is to characterize the vertical and lateral extent of plutonium and americium contamination in OU 3. Because of the prevailing wind conditions and results from previous investigations, the OU 3 areas with the highest plutonium concentrations are believed to be east of the RFP buffer zone boundary, east of Indiana Street.

3.4.1.1 Soil Profile Sampling

Two soil sampling activities will be performed. The first activity is soil profile sampling. The purpose of the profile sampling is to characterize vertical plutonium and americium concentrations in the soils. Sampling locations will be selected by reviewing historical aerial photographs and conducting a site reconnaissance to identify areas that have not been disturbed in the past 20 years. The undisturbed areas have the highest potential for accumulation of contaminants. The exact number of samples cannot be identified until the historical review of aerial photographs is performed, but it is estimated that 10 profile samples will be collected from undisturbed areas (two profiles per undisturbed area) identified from the photos. Examples of potential locations include drainages, wetlands, and

areas of snow accumulation. Snow accumulation areas will be identified from vegetation cover and visual observation of lingering snow patches if possible.

The samples will be collected by digging a trench, 1.5 m long x 1.0 m wide x 1.0 m deep, with a backhoe or shovel. One wall of the trench will be dug as a block/staircase with each stair step being 15 cm in height. The stair-step wall helps minimize cross-contamination of soils with depth. The vegetation at the surface of the selected wall will be cropped closely to the surface and discarded. A Standard Operating Procedure (SOP) for soil sampling is currently being developed. The soil will be sampled at the appropriate interval starting at the deepest block/stair in a given pit. The soil morphology will be described according to the SOP currently being developed for logging soil samples. Soil samples will be collected using a stainless-steel scoop and template (3 cm x 20 cm), which will be pressed into the wall of the block/staircase. Three samples from each depth will be composited to provide a better representation of the site. After a sample has been collected, soil layers below it will be cleared of sloughed material to prevent possible contamination from the upper soil layers. A flag will be placed on the ground surface of a given pit, and the depth below surface for each sample will be measured from the base of the flag. Each pit will be backfilled with the original soil mixture removed during the excavation.

The samples will be analyzed for plutonium and americium. Ten percent of the samples will also be analyzed for Total Organic Compound (TOC), bulk density, and grain size. Information regarding sample analysis and field quality control samples is summarized in Subsections 6.4 and 6.5 of this document, respectively.

3.4.1.2 Surface Soil Survey

The second soil sampling activity is to perform a surface-soil survey using a grid. The purpose of this sampling activity is to delineate the lateral extent of plutonium and americium contamination in OU 3 and to confirm previous soil investigations. Numerous soil samples were collected and analyzed for plutonium in surficial soils east of Indiana Street during past investigations. Most of these analyses were performed during 1971 and

from 1975 to 1978. These past sampling events can be used to predict the spatial dependency of plutonium in the soils located in OU 3. The existing data have been used to construct a semi-variogram to aid in designing an optimal sampling strategy for plutonium and americium in soils east of Indiana Street.

3.4.2 Sediment

The sediment sampling activities proposed for OU 3 consist of sampling drainages, reservoirs, and near-shore sediments. Drainages are a potential pathway for offsite migration. Exposed sediments, in turn, are a potential pathway of dispersion of contaminants by wind.

3.4.2.1 Sediment Samples in Ditches

To characterize the extent of contamination in drainage ditches, 28 sediment samples will be collected:

- 7 sediment samples above Great Western Reservoir along Walnut Creek Drainage
- 3 samples below Great Western Reservoir
- 2 samples along Broomfield Diversion Ditch
- 3 samples above Mower Reservoir
- 3 samples below Mower Reservoir
- 6 samples above Standley Lake along Woman Creek Drainages
- 3 samples below Standley Lake
- 1 sample near the inlet of Clear Creek Irrigation Ditch

3.4.2.2 Sediment Samples in Reservoirs

Reservoir sediment samples will consist of two types: (1) sediment samples from locations near the shoreline that may potentially be exposed during low reservoir capacity and (2) samples collected from within the deeper areas of the reservoir.

3.4.2.2.1 Near-shore Reservoir Samples

The near-shore reservoir sediment samples will be collected to characterize sediments that potentially may be exposed during low reservoir capacity. The exposed sediments may be dispersed by wind, which potentially leads to ingestion by people. Previous sampling activities for sediments have focused on the reservoirs and not along the shoreline of the reservoirs.

3.4.2.2.2 Reservoir Sediment Samples

Sediment samples will also be collected from the reservoirs. Sediment reservoir samples have been collected from previous investigations in both Standley Lake and Great Western reservoirs and analyzed for plutonium. Two types of sediment samples in the reservoir will be collected; one type will be vertical profile samples and the other will be grab sediment samples. Three vertical profile sediment samples will be collected for Great Western and Mower Reservoirs and four will be collected in Standley Lake (10 total profiles). One sample from each reservoir will be located in the deepest portion of the reservoir, where historical information on accumulation of plutonium and americium will be obtained. The other vertical profile reservoir sediment samples will be collected in reservoir bays. Surface water and aquatic samples will be collected in conjunction with the sediment samples.

3.4.3 Surface Water

The surface water program for the OU 3 RFI/RI is designed to characterize plutonium, americium, uranium, Target Compound List (TCL) volatiles, and TCL metals in surface water. To accomplish this goal, surface water samples will be collected at locations in Great Western Reservoir and associated drainages, Mower Reservoir and associated drainages, and Standley Lake and associated drainages. The program is also designed to evaluate past investigations at the reservoirs. Great Western Reservoir and Standley Lake are routinely monitored by CDH and the Cities of Broomfield, Westminster, Thornton, and Northglenn. Therefore, an extensive surface water monitoring program is not required. Results from

these monitoring activities will be incorporated into the quantitative baseline risk assessment.

3.4.3.1 Surface Water Drainages

Three surface-water samples will be collected from the Walnut Creek drainage. Two samples will be located upgradient along the drainages leaving the RFP property and one will be located downgradient of Great Western Reservoir. Two surface water samples will also be collected in the Broomfield Diversion ditch. At Mower Reservoir, a surface-water sample will be collected near the eastern RFP boundary, the inlet to the reservoir, and downgradient of the reservoir. Two surface-water samples will also be collected near the inlet to Standley Lake along Woman Creek and along Smart Ditch south of Woman Creek. One surface-water sample will also be collected in Big Dry Creek downgradient of Standley Lake, performed concurrently with the monthly sampling at Walnut Creek and Woman Creek that is part of the RFP environmental monitoring. Results from this monitoring will provide information on water quality entering and exiting the reservoirs. Samples will be collected from each drainage and analyzed for plutonium, americium, uranium, gross alpha and beta, TCL volatiles, TCL metals, cations and anions, dissolved oxygen (DO), pH, and specific conductance. In addition, surface-water samples along Walnut Creek will be analyzed for tritium to assess the 1973 accidental tritium release to Walnut Creek. Surface-water samples will be collected twice, once during high flow and once during low flow periods.

3.4.3.2 Reservoirs

Three locations at each reservoir will be sampled to supplement and verify the existing data. Samples from both reservoirs and drainages will be collected in reservoir bays and from the deepest part of the reservoir, near the same location as the sediment samples. Discrete samples at each location will be collected at the near surface, the middle of the water column, and at the water/sediment interface. Stratification of the water, if present, will be identified through temperature dissolved oxygen and pH measurements taken according to

SOP No. 4.8. If stratification is identified in the reservoir, a discrete grab sample will be taken from each vertically stratified zone instead of at the top, middle, and bottom of the water column. General surface water sampling procedures described in SOP No. 4.3 will be followed. Modifications to the SOP are described in Section 11.0 of this work plan.

All surface water samples will be analyzed for plutonium, americium, uranium, gross alpha and beta, TCL metals, atrazine, simazine, cations/anions, DO, pH, and specific conductance. Samples from Mower Reservoir will also be analyzed for TCL volatiles because Mower Reservoir has not previously been sampled for volatiles, unlike Great Western Reservoir and Standley Lake. Samples will be collected twice, once during high capacity and once during low capacity, to identify changes in concentration because of reservoir conditions. High and low capacities will be identified on the basis of historical capacity of the reservoirs.

3.4.4 Groundwater

A limited groundwater field investigation will be performed at OU 3. Currently, 14 wells in the eastern buffer zone are sampled on a quarterly basis as part of the RFP site environmental monitoring program. Seven of these wells are located along Indiana Street. The groundwater monitoring wells are analyzed for total dissolved solids, anions, Contract Laboratory Program (CLP) target compounds (volatiles and semivolatiles), oil and grease, metals, and radionuclides. These wells are located upgradient of OU 3, but downgradient of the RFP source areas. The results to-date from the RFP boundary wells have not revealed contaminants (*Historical Information Summary and Preliminary Health Risk Assessment [DOE, 1991b]*). Therefore, no contaminants are believed to be leaving RFP through the groundwater pathway. Data from the buffer zone wells will continue to be reviewed quarterly during the implementation of the OU 3 work to determine whether contaminants are present in these wells. If contaminants are detected, an expanded groundwater field investigation will be developed.

The purpose of the groundwater investigation is to obtain site-specific hydrogeology in the vicinity of Great Western Reservoir and Standley Lake and to assess impacts on

groundwater from potential contamination that has been dispersed offsite to OU 3. Groundwater sampling will also identify potential contamination in the groundwater from soil/groundwater interactions and surface water/groundwater interactions, if present.

Two groundwater monitoring wells will be located downgradient of both Great Western Reservoir and Standley Lake. One well will be installed and completed in the unconfined alluvial system and one well will be completed in the confined Arapahoe formation at both locations. The shallow alluvium wells will be drilled according to SOP No. 3.2, logged according to SOP No. 3.1, installed according to SOP No. 3.6, and developed according to SOP No. 2.2. The alluvial wells are estimated to be approximately 20 to 30 feet deep.

Two bedrock wells will be drilled to the Arapahoe Formation, which will monitor the first water-producing sand encountered at Great Western Reservoir and Standley Lake. If subcropping sandstone is encountered, drilling will continue until confined sandstone is found to a maximum depth of 200 feet. The bedrock wells will be drilled according to SOP No. 3.6, logged according to SOP No. 3.1, and installed according to SOP No. 2.2. In addition, the procedures described in SOP No. 3.3 for isolating the bedrock from the alluvium will be followed. The purpose of the Arapahoe wells are to obtain information on the interaction between the alluvial system and the deeper confined system. In addition, the wells will help assess the presence or absence of plutonium, americium, uranium, and gross alpha and beta in the deeper groundwater system. If contamination is found in the groundwater monitoring wells, an additional investigation will be necessary.

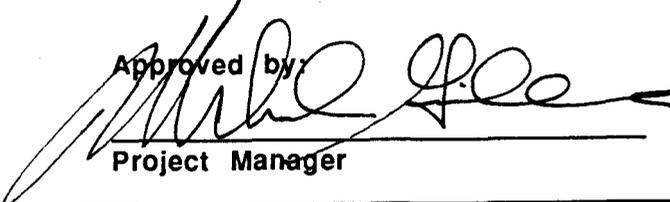
ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3

Manual No.:
Section No.:
Effective Date:
Organization:

21000-HSP-OU3
4.0, R0
06/15/92
Environmental Management

Hazard Communication

Approved by:



Project Manager

6,8,92
Date

This is a
CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI
By: William D. Ewan UNU
Date: 6/8/92

(per conversation with J. Neshedm)

4.0 HAZARD COMMUNICATION

4.1 INTRODUCTION

As required by the RFP Hazard Communication Program (Health and Safety Practices Manual, Section 9.07), EG&G personnel must follow established work practices to safely handle hazardous chemicals. In the Health and Safety Practices Manual, a hazardous chemical is broadly defined as "a chemical that is either a health hazard, a physical hazard or both." The implementation of hazard communication is also required by 29 CFR 1910.120 for RCRA treatment, storage and disposal facilities. The EG&G Hazard Communication Program has been developed to limit the risks of personnel exposures, damage to buildings and equipment, and the unplanned release of hazardous chemicals to the environment due to normal operations. The program includes protocols for assessment of the hazards associated with chemicals on site; inventory and labeling of chemicals; communication training; acquisition, transportation, and handling of chemicals; and emergency response to releases of chemicals.

The requirements of this program apply to EG&G personnel working at OU 3 in the event that they need to store hazardous chemicals such as calibration gases or radiological calibration sources for field monitoring equipment, fuel, caustic compounds for sample preservation, or solvents for equipment decontamination on the site.

Subcontractors must also implement a hazard communication program for their employees working at RFP. As part of the program, they must maintain an inventory of hazardous chemicals stored onsite, and Material Safety Data Sheets (MSDSs) for these chemicals must be available to employees at the site.

4.2 HAZARDOUS MATERIALS INVENTORY

The EG&G Industrial Hygiene Department coordinates the inventory of hazardous chemicals used or stored at the plant. The inventory is utilized for reporting and emergency

response purposes. If hazardous chemicals need to be stored by EG&G personnel at OU 3 or in the subcontractor trailer area, an inventory of these chemicals must be forwarded to the H&S Department. Data contained in the inventory is to include the name, quantity, and location of the chemical and the name and department of the chemical's owner.

Subcontractors must compile an inventory of hazardous chemicals present at their work sites or trailer areas and provide this information on their work permit. The inventory may be requested by emergency response personnel to aid in identifying hazards associated with a spill or accident at the site. Radiological check sources and/or reference sources must also be included in this inventory including applicable calibration certificates.

4.3 MATERIAL SAFETY DATA SHEETS

MSDSs must be readily available to employees for hazardous chemicals stored at the site. Information found on a MSDS includes identification of the product's hazardous chemical constituents, its physical characteristics, applicable exposure limits, symptoms of overexposure, recommended PPE, fire and explosion hazards, and spill response actions. This information is provided by the manufacturer and is typically included with the shipment of the chemical. The Industrial Hygiene Department maintains a master file containing MSDSs for materials stored or used at the plant. A complete file of MSDSs on hazardous chemicals used at OU 3 must be kept at the site field office and readily available to site employees.

4.4 TRAINING

EG&G personnel are required to complete hazard communication training. The course is a computer-based training (CBT) program developed to familiarize employees with the hazard communication program. The course includes a summary of applicable federal regulations and EG&G policies related to hazard communication, hazardous materials evaluation responsibilities within the plant, chemical labeling, MSDSs, and sources of hazard information. The course is approximately one hour in length and is required every two

years. A description of the hazard communication training and course outline are provided in Section 10.1.4 and Table 10-3 of this HSP. Specific chemical training on the information provided on the MSDSs is to be conducted by the site H&S Officer.

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3

Manual No.: 21000-HSP-OU3
Section No. 5.0, R0
Effective Date: 06/15/92
Organization: Environmental Management

Site Control

Approved by:


Project Manager

6/8/92
Date

This is a
CONTROLLED DOCUMENT

EG&D — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI

By: William D. Ewan UNU

Date: 6/8/92

(per conversation with J. Neshedm)

5.0 SITE CONTROL

5.1 OBJECTIVES

The purpose of this site control plan is to protect workers, the public, and the environment from the potential hazards associated with the RFI/RI OU 3 work. The OSHA hazardous waste operations standard, 29 CFR 1910.120, stipulates that a site control plan will include a site map, identification of site work zones, a description of site communications, the requirements for the use of a "buddy" system, safe work practices, and identification of the nearest medical facility.

OU 3, located east of Indiana Street and off plant site, is an access-controlled area because of cleanup operations and sampling of potentially contaminated soil, groundwater, and surface water. Previous data collected during other investigations (see section 3.0) indicate the presence of small quantities of radionuclides in soil at the site.

The terms "site control" and "controlled" versus "uncontrolled" are used in this section in the context of hazardous waste sites. This OSHA terminology does not necessarily apply to formal radiological definitions used in RFP production facilities.

In addition to site control measures required under the OSHA 1910.120 standard, activities conducted at OU 3 are also restricted by the RFP Work Permit System. Information required in the work permit includes job information, description of hazards, radiological and nonradiological safety requirements, preparation for the job, approval signatures, and permit duration. A copy of the radiation work permit is included as Figure 5-1.

5.2 SITE CONTROL DESIGNATIONS

Two site control designations are used at the site. The entire OU is designated as a "Contaminant Reduction Zone" (CRZ) and the IHSSs are designated as "Exclusion Zones." Access to these areas will be controlled, appropriate PPE will be required, and personnel

Figure 5-1 Radiation Work Permit

<input type="checkbox"/> EXTENDED		RADIATION WORK PERMIT Rocky Flats Plant		NO: Date:	
Specific Task of Operation _____				W/O PROCEDURE# _____	
Location: Bldg _____ Rm _____		Supervisor: Phone _____		RWP Starts _____ RWP Ends _____	
Area: _____		Name: _____		Date: _____ Date: _____	
_____		Empl # _____		Time: _____ Time: _____	
		Department			
REQUIREMENTS					
Protective Clothing _____ Inspection Only _____ Coveralls _____ Shoe Covers _____ Surgeon Gloves _____ pair _____ Anti-C Coveralls _____ Wet Suit _____ Plastic Booties _____ Rubber Boots _____ Hood _____ type _____ Work Gloves _____ type _____ Tape Openings _____ Other		Respiratory _____ Full Face, Particulate _____ Full Face, Airline _____ Supplied Air Suits _____ Portable SAAM _____ Lapel Air Sample		Dosimetry _____ XX _____ TLD _____ SRD _____ EXT _____ Other _____ Pre/Post _____ Bioassay DO NOT EXCEED _____ mRem/RWP	
		Containment _____ Pen _____ Tent _____ Point Source _____ Air Mover _____ HEPA Vacuum		Rad Ops Coverage _____ Full _____ Start _____ Oncall _____ None	
		ALAR REVIEW REQUIRED _____ Y _____ N _____		Rad Eng __ Y __ N Name: _____ Phone: _____	
Comments _____					
Smear Type: A BG		SURVEYS		Freq: S D W M R O NA	
Pre/Post/Dur _____					
Removable	Fixed	_____	_____	_____	_____
mR/hr G	_____	_____	_____	_____	_____
mRem/hr N	_____	_____	_____	_____	_____
mRem/hr @ 1m	_____	_____	_____	_____	_____
N/G Ratio	_____	_____	_____	_____	_____
RPT Name	_____	_____	_____	_____	_____
Employee #	_____	_____	_____	_____	_____
Date	_____	_____	_____	_____	_____
Time	_____	_____	_____	_____	_____
RO Foreman	_____	_____	_____	_____	_____
Employee #	_____	_____	_____	_____	_____
Original - Post at work site (Return to RAD Engineering at Termination) Copy - RWP Master File Copy - Rad Building Engineer					
RF 4738 (1/91)					

working in the areas must meet specific training requirements and be participants in a medical surveillance program. Minimum requirements for access to these designated areas are summarized below. Detailed PPE, training, and decontamination requirements are presented in the respective sections of this HSP.

5.2.1 Contaminant Reduction Zone

The contaminant reduction zone (CRZ) surrounds the exclusion zone.

5.2.2 Exclusion Zone

IHSSs will be called "exclusion zones" during investigations. Areas of investigation (drill sites, excavation sites, sample areas, etc.) outside of the IHSSs will be called "exclusion zones." Environmental samples collected at these sites may contain elevated levels of radiological and/or chemical contaminants. Personnel entering these areas will be required to utilize a sign-in/sign-out sheet and wear PPE. When leaving these areas, decontamination procedures (described in Section 7.0), including clearance by RPTs, will be followed.

Various radionuclides have been detected in surface soil samples collected in several IHSSs throughout OU 3. In addition to the PPE required within the IHSSs, Radiological Engineering may determine that respiratory protection is required in those IHSSs that have been identified as containing higher than background levels of radionuclides. Additionally, these exclusion zones may be designated as Radiological Contamination Areas and posted as such, depending on the presence of radionuclides. The support zone may be posted as a Radiological Controlled Area to alert support personnel. The IHSSs will be identified by appropriate markings. Signs will be posted to identify the IHSS number.

5.2.3 Task-Specific Exclusion Zones

During investigative activities at OU 3, exclusion zones will be established by EG&G or subcontractor personnel conducting work at the site. The limits of these zones and the PPE requirements within the zones will be based on the hazards of the work being conducted, as determined by the appropriate H&S representative. Outside of the exclusion zone will be the "Contaminant Reduction Zone" (CRZ), where appropriate measures will be in place to reduce the potential for spreading contamination via the workers and equipment.

5.2.4 Support Zone

The "Support Zone" will be outside the CRZ and will be the area where support workers will provide assistance to workers inside the exclusion zone and CRZ. The Support Zone will also have the exit to the decontamination line. Visitors and observers will comply with the site control designations and the zone requirements established at the work site. Visitors will not be allowed to enter the exclusion zone and/or CRZ without training as required in Section 10.1.7 of this HASP.

5.3 GENERAL OPERATING PROCEDURES

Standard safety guidelines for site personnel are outlined in the RFP Health and Safety Practices Manual. Specific requirements applicable to personnel at OU 3, including a description of the site communication system and the requirements of the buddy system, are described in this section.

EG&G personnel will not conduct work activities alone at OU 3. They will be accompanied by either another EG&G or subcontractor employee. The buddy system, as specified in 29 CFR 1910.120 (d)(3), will be implemented at the site. The buddy teams working at the site will maintain visual and audible contact so that they can provide emergency assistance to each other, if needed. Both members of the buddy team need not be in the same site zone, but each member must be wearing adequate PPE to assist the other member, if necessary.

The communication system at the site comprises telephones and hand-held radios. EG&G personnel will have access to telephones in the subcontractor trailer area, and when at OU 3, they will rely on the hand-held radio system utilized by subcontractors performing the investigative work.

5.4 INTERIM PLAN FOR PREVENTION OF CONTAMINANT DISPERSION

5.4.1 Objective

The objective of the Interim Plan for Prevention of Contaminant Dispersion (IPPCD) is to establish procedural requirements to mitigate potential hazards, on an interim basis, to offsite personnel as a result of contact with emissions resulting from intrusive remedial investigation activities.

5.4.2 Scope

Procedural requirements identified herein are applicable to certain intrusive actions taken at the 16 OUs as part of the RFI/RI activities described in the IAG. Intrusive activities that fall within the scope of this IPPCD are those with the potential for producing appreciable quantities of suspended particulate, primarily through mechanical actions. Intrusive activities potentially susceptible to producing appreciable quantities of suspended particulate include:

- Monitor well and soil/rock borehole installation
- Excavations (such as trenching and test pitting) using powered equipment

Additionally, heavy vehicular traffic associated with intrusive RFI/RI activities will be considered susceptible to producing appreciable quantities of suspended particulate. By contrast, activities such as surface soil sampling with hand implements are not considered susceptible to producing appreciable quantities of suspended particulate.

Procedural requirements identified herein must be evaluated on a case-by-case basis to determine their potential impact on other IAG objectives. For example, it is possible that applying certain dispersion techniques, such as wetting, could compromise sample integrity and limit the usefulness of the data for which the sampling was intended.

The procedural requirements identified in the IPPCD will remain in effect until the final PPCD is approved or until modifications are substantiated, approved, and documented in the Site-Specific H&SP.

5.4.3 Responsibility

The EG&G RFI/RI PM will be responsible for assuring that activities conducted at the OU are performed in accordance with the requirements identified herein.

The Remedial Projects Division (RPD) Manager will be responsible for follow-up and auditing the PM.

5.4.4 Procedural Requirements

A pre-startup activity review will be conducted by the PM and the Activity Field Supervisor to evaluate the potential for particulate emissions to create hazardous conditions. If the activity is being performed by non-EG&G personnel, the subcontractor's Activity Field Supervisor will participate in the review.

The pre-startup activity review involving intrusive activities in which there is a significant potential for producing appreciable quantities of suspended particulate will be documented by completion of a Radiological Work Permit (HSP 6.07).

If the review establishes that there is a significant potential for producing appreciable quantities of suspended particulates that could create hazardous conditions, the specific procedural requirements identified below will govern the activity.

5.4.4.1 Specific Requirements

Activities in which there is a significant potential for producing appreciable quantities of suspended particulates will not be conducted when the following conditions exist:

- Sustained wind speeds above 15 miles per hour (mph), as measured by a site-located anemometer. Sustained winds above 15 mph exist when the 15-minute average wind speed exceeds 15 mph for two consecutive 15-minute periods.
- Soil moisture content less than 15% in areas where major excavation or scraping is planned, as measured with a Soil Test "Speedy Moisture Tester" or equivalent instrument.
- In the special case of excavations, the top 6 inches of soil will be moved (i.e., scraped), placed in a low pile, and covered with a tarp or other suitable covering to prevent resuspension of particulates. The width of the scraped zone will be wide enough to accommodate the expected volume of soil from the excavation, without coming into contact with unexcavated adjacent surface soil.

Air quality monitoring requirements for activities in which there is a significant potential for producing appreciable quantities of suspended particulate include the following:

- Site perimeter and community Radiological Ambient Air Monitoring Program (RAAMP) monitoring
- Local monitoring of Total Suspended Particulate (TSP) at individual activity work sites will be conducted using a TSI "Piezobalance" Model 3500 Respirable Aerosol Mass Monitor real-time instrument. Local RSP measurements will be used to guide the PM's evaluation of the potential hazards associated with activity-related emissions. The threshold RSP concentration for curtailing intrusive activities will be 6.0 milligrams/cubic meter (mg/m³).
- Additional worker health and safety monitoring as required by the SSH&SP.

Additional requirements that govern activities in which there is a significant potential for producing appreciable quantities of suspended particulates that could create hazardous conditions will include the following:

- Excavated soils that are not promptly backfilled will be covered with a tarp or similar cover to prevent resuspension of particulates

- Vehicular traffic will be minimized to the extent practicable
- Vehicular traffic will not exceed 5 mph
- Roadways will be watered as necessary
- Access paths leading to activity sites that are not on roadways will be watered to prevent generation of particulates from vehicular traffic during access and egress.

Activity-specific requirements will be evaluated periodically to determine their effectiveness in preventing dispersion of contaminants. Modifications to these requirements will be documented in the Site H&SP.

5.5 WORK CONTROL SYSTEM IWCP/PROCEDURES

Remedial and investigative activities shall be performed via the Integrated Work Control Package (IWCP) currently in place. Contractors will adhere to requirements mandated by EG&G for IWCP. A radiation work permit (see Figure 5-1) may be required prior to the start of work in areas where suspected radionuclides exist.

5.6 MEDICAL ASSISTANCE

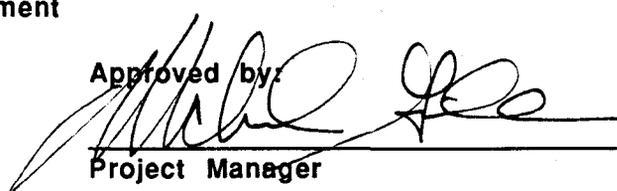
As described in Section 8.0, onsite emergency medical assistance is provided by EG&G Emergency Medical Technicians (EMTs), who can be reached by telephone or radio. Additional assistance is available through the Occupational Health Department located in Building 122.

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3

Manual No.: 21000-HSP-OU3
Section No. 6.0, R0
Effective Date: 06/15/92
Organization: Environmental Management

Personal Protective Equipment

Approved by:


Project Manager

6/8/92
Date

This is a
CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI

By: William D. Ewan U/NU

Date: 6/8/92

(per conversation with J. Neshedm)

6.0 PERSONAL PROTECTIVE EQUIPMENT

6.1 INTRODUCTION

Standard procedures for selection, inspection, and use of PPE at OU 3 are addressed in this section. The criteria used to determine appropriate levels of protective equipment include evaluation of the task being performed; potential chemical, radiological, and mechanical hazards at the site; monitoring data; effectiveness of engineering controls; and applicable regulations.

A number of federal agencies dictate the need for PPE at hazardous waste sites. Among these agencies are OSHA, EPA, and DOE. Table 6-1 lists the specific OSHA standards that impact the manufacture, selection, and use of PPE.

All subcontractors are required to evaluate the hazards of the tasks they are to perform and establish adequate PPE levels to protect their employees. At a minimum, EG&G personnel requiring access into areas zoned by subcontractors as restricted or exclusionary will follow subcontractor PPE requirements.

A site control plan has been developed to limit access of personnel to OU 3 (Section 5.0). In addition, specific historical disposal sites designated in the IAG as IHSSs have been identified at OU 3. Because of unique hazards associated with defined tasks, several subcontractors may perform tasks concurrently within an IHSS and require different zoning and PPE.

The actual selection of PPE is a complex matter that must be evaluated by the Industrial Safety, Industrial Hygiene, and Radiological Engineering as coordinated by H&S Area Manager. Minimum requirements established by EG&G are defined in this document.

Table 6-1
OSHA Standards for Use of PPE

TYPE OF PROTECTION	REGULATION	SOURCE
General	29 CFR Part 1910.132 General Requirements for Personal Protective Equipment	41 CFR Part 50-204.7
	29 CFR Part 1910.1000 29 CFR Part 1910.1001-1045	OSHA Rulemaking OSHA Rulemaking.
Eye & Face	29 CFR Part 1910.133 (a)	ANSI Z87.1-1968 ^a Eye & Face Protection
Noise Exposure	29 CFR Part 1910.95	41 CFR Part 50-204.10 & OSHA Rulemaking.
Respiratory	29 CFR Part 1910.134	ANSI Z88.2-1969 ^a Standard Practice for Respiratory Protection.
Head	29 CFR Part 1910.135	ANSI Z89.1-1969 ^a Safety Requirements for Industrial Head Protection.
Foot	29 CFR Part 1910.136	ANSI Z41.1-1967 ^a Men's Safety Toe Footwear.

^aAmerican National Standards Institute (ANSI), 1430 Broadway, New York, NY 10018. ANSI regularly updates its standards. The ANSI standards in this table are those that OSHA adopted in 1971. Since the ANSI standards which were then adopted had been set in 1967-1969, those standards, now required under OSHA, may be less stringent than the most recent in 1971.

6.2 GENERAL APPLICATION OF PPE

The use of PPE is required when engineering and administrative controls are insufficient to prevent worker exposures to hazardous chemical and radioactive materials. Due to the nature of work performed at OU 3, there is a potential for release of vapors and particulates, which cannot be completely controlled at the source. Engineering and administrative controls will be used, when appropriate, to minimize potential exposures; however, the use of PPE is necessary in maintaining exposure as low as reasonably achievable (ALARA).

6.3 PPE ISSUES APPLICABLE TO ALL SITE PERSONNEL

All personnel assigned to OU 3 must be trained in the proper inspection and use of PPE before beginning work on the site. For workers required to wear respiratory protection, this training requirement is fulfilled through completion of the 40-hour OSHA course discussed in Section 10.0, "Training," and completion of the CBT module on Respiratory Protection. All OU 3 personnel required to wear a respirator must be fit tested at least annually, per EG&G protocols. This includes a fit test approved by EG&G Industrial Hygiene.

All personnel assigned to OU 3 must have a current medical "fit-for-duty" clearance issued by a qualified physician. This clearance will be updated annually with the employee's physical exam as described in Section 8.0, "Medical Surveillance."

Workers required to use PPE must do so in buddy teams. The team members are responsible for the inspection of each others' equipment during donning and during field use. An inspection checklist is presented in Table 6-2.

Workers experiencing any unusual symptoms of fatigue, dizziness, high body temperature, skin or respiratory irritation, or suspected overexposure should immediately withdraw from the work area and proceed through decontamination. The employee should then notify

Table 6-2
General PPE Inspection Checklists¹

CLOTHING

Before use:

- Determine that the clothing material is correct for the specified task at hand.
- Visually inspect for:
 - imperfect seams
 - non-uniform coatings
 - tears
 - malfunctioning closures
- Hold up to light and check for pinholes.
- Flex product:
 - observe for cracks
 - observe for other signs of shelf deterioration
- If the product has been used previously, inspect inside and out for signs of chemical degradation:
 - discoloration
 - swelling
 - stiffness

During the work task, periodically inspect for:

- Evidence of chemical attack such as discoloration, swelling, stiffening, and softening. Keep in mind, however, that chemical permeation can occur without any visible effects.
 - Closure failure
 - Tears
 - Punctures
 - Seam discontinuities

(1) Specific procedures recommended by equipment manufacturers should be followed.

Table 6-2 (cont.)

RESPIRATORS

SCBA

- Inspect air supply/cascade system:
 - before and after each use
 - at least monthly when in storage
 - every time they are cleaned
- Check all connections for tightness.
- Check material conditions for:
 - pliability
 - signs of deterioration
 - signs of distortion
- Check for proper setting and operation of regulators and valves (according to manufacturers' recommendations).
- Check operation of alarm(s).
- Check face mask and lenses for:
 - cracks
 - crazing
 - fogginess

Supplied-Air Respirators

- Inspect Supplied Air Respirators:
 - daily when in use
 - at least monthly when in storage
 - every time they are cleaned
- Inspect air lines prior to each use for cracks, kinks, cuts, frays, and weak areas.
- Check for proper setting and operation of regulators and valves (according to manufacturers' recommendations).

Table 6-2 (cont.)

RESPIRATORS (cont.)

- Check all connections for tightness.
- Check material conditions for:
 - signs of pliability
 - signs of deterioration
 - signs of distortion
- Check face mask and lenses for:
 - cracks
 - crazing
 - fogginess

Air-Purifying Respirators

- Inspect air-purifying respirators:
 - before each use
 - after each use
(before using a newly supplied respirator ensure that the storage bag is sealed)
- Check mask for:
 - pliability
 - signs of deterioration
 - distortion
 - missing or broken parts
- Examine cartridges or canisters to ensure that they are the proper type for the intended use.
- Check face shields and lenses for:
 - cracks
 - crazing
 - fogginess
- Perform positive and negative pressure fit tests prior to use.

his/her supervisor, and the incident should be reported immediately by the supervisor to the Occupational Health Department and H&S.

Table 6-3 lists the protective clothing ensembles for A through D levels of protection, as defined in the National Institute of Occupational Safety and Health (NIOSH) document, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities." The table also lists the level of protection provided by each level, criteria for when the protective equipment should be used, and the limiting factors of the respective protective equipment.

6.4 CONTAMINANT REDUCTION ZONE

OU 3 is designated and posted as a CRZ. At a minimum, Level D PPE, including safety shoes, Class I eye protection with side shields, and a hard hat, is required for anyone entering this area (refer to Table 6-3).

6.5 INDIVIDUAL HAZARDOUS SUBSTANCE SITES

All IHSSs within OU 3 are designated and posted as "Exclusion Zones" during investigations, minimum PPE requirements for anyone entering these areas include Level D clothing (as defined above) plus Tyvek coveralls and disposable booties (Modified Level D). Each designated work zone within the CRZ may have additional PPE requirements, which must be met by anyone requiring access to the area.

6.6 PPE REQUIREMENTS FOR ONSITE SPILL CLEANUP

The PPE requirements for spill cleanup crews are designated as Level C protective clothing and will include:

- Company-furnished coveralls
- Impervious Tyvek coveralls with hoods and boots

**Table 6-3
Protective Ensembles¹**

Level of Protection	Equipment	Protection Provided	Should Be Used When:	Limiting Criteria
B	<p>RECOMMENDED:</p> <ul style="list-style-type: none"> ● Pressure-demand, full-facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA. ● Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one- or two-piece chemical splash suit; disposable chemical-resistant one-piece suit). ● Inner and outer chemical-resistant gloves. ● Chemical-resistant safety boots/shoes. ● Hard hat. ● Two-way radio communications. <p>OPTIONAL:</p> <ul style="list-style-type: none"> ● Coveralls ● Disposable boot covers. ● Face shield. ● Long cotton underwear. <p>* Based on EPA protective ensembles.</p>	<p>The same level of respiratory protection but less skin protection than Level A. It is the minimum level recommended for initial site entries until the hazards have been further identified.</p>	<ul style="list-style-type: none"> ● The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection. This involves atmospheres: <ul style="list-style-type: none"> - with IDLH concentrations of specific substances that do not represent a severe skin hazard: or - that do not meet the criteria for use of air-purifying respirators. ● Atmosphere contains less than 19.5 percent oxygen. ● Presence of incompletely identified vapors or gases is indicated by direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the intact skin. 	<ul style="list-style-type: none"> ● Use only when the vapor or gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through the intact skin. ● Use only when it is highly unlikely that the work being done will generate either high concentrations of vapors, gases, or particulates or splashes of material that will affect exposed skin.

¹From "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities", NIOSH/OSHA/USCG/EPA, 1985.

● Level A Personal Protective Equipment (PPE) ensembles are not listed here because it is not anticipated that Level A will be required during site activities.

Table 6-3
PROTECTIVE ENSEMBLES (CONT.)

Level of Protection	Equipment	Protection Provided	Should Be Used When:	Limiting Criteria
C	<p>RECOMMENDED:</p> <ul style="list-style-type: none"> ● Full-facepiece, air-purifying, canister-equipped respirator. ● Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one- or two-piece chemical splash suit; disposable chemical-resistant one-piece suit). ● Inner and outer chemical-resistant gloves. ● Chemical-resistant safety boots/shoes. ● Hard hat. ● Two-way radio communications. <p>OPTIONAL:</p> <ul style="list-style-type: none"> ● Coveralls. ● Disposable boot covers. ● Face shield. ● Escape mask. ● Long cotton underwear. 	<p>The same level of skin protection as Level B, but a lower level of respiratory protection.</p>	<ul style="list-style-type: none"> ● The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin. ● The types of air contaminants have been identified, concentrations measured, and a canister is available that can remove the contaminant. ● All criteria for the use of air-purifying respirators are met. 	<ul style="list-style-type: none"> ● Atmospheric concentration of chemicals must not exceed IDLH levels. ● The atmosphere must contain at least 19.5 percent oxygen.
D	<p>RECOMMENDED:</p> <ul style="list-style-type: none"> ● Coveralls. ● Safety boots/shoes. ● Safety glasses or chemical splash goggles. ● Hard hat. <p>OPTIONAL:</p> <ul style="list-style-type: none"> ● Gloves. ● Escape mask. ● Face shield. 	<p>No respiratory protection. Minimal skin protection.</p>	<ul style="list-style-type: none"> ● The atmosphere contains no known hazard. ● Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals. 	<ul style="list-style-type: none"> ● This level should not be worn in the Exclusion Zone. ● The atmosphere must contain at least 19.5 percent oxygen.

- Safety shoes
- Plastic boot covers (taped to Tyvek coveralls)
- Booties (over plastic covers)
- Respiratory protection
- Hood (taped in place)
- Viton gloves (or gloves with equivalent permeation resistance) over surgical gloves for wet product handling and a minimum of double surgical gloves for dry product handling

Level B or Level A PPE may be required, depending on conditions.

6.7 REUSE OF PPE

Tyvek coveralls may be used for the duration of a work period. However, they should be removed and disposed during decontamination whenever a worker leaves the exclusion or CRZ. The length of the service life of a respirator cartridge will be determined by Industrial Hygiene. This time period may be shortened if the cartridge becomes saturated with moisture, breathing resistance is excessive, or chemical odors are detected by the worker. Respirators must be sent back to the Plant Laundry when the cartridges need to be changed.

Respirators should be wiped clean by site personnel as they are removed. They must be stored in a plastic bag, with the cartridge side down, so that distortion of the facepiece does not occur.

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3
Decontamination

Manual No.: 21000-HSP-OU3
Section No. 7.0, R0
Effective Date: 06/15/92
Organization: Environmental Management

Approved by: 
Project Manager
Date: 6/8/92

This is a
CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI
By: William D. Ewan UNU
Date: 6/8/92
(per conversation with J. Neshedm)

7.0 DECONTAMINATION

7.1 INTRODUCTION

The objective of decontamination is to remove hazardous substances from workers and equipment to assure compliance with DOE Order 5480.11 and OSHA Standard 1910.120 and to preclude the occurrence of potential adverse health effects that could be caused by contact with hazardous materials. Decontamination requirements and procedures at OU 3 will vary according to the task being performed and the hazardous materials encountered. It is not expected that EG&G employees will be involved in direct handling of hazardous waste materials during the initial phases of the remedial activities at this site. The anticipated activities of EG&G employees may include: project management, site inspections, air monitoring for chemical and radiological contaminants, and radiological monitoring of personnel and equipment leaving the site. The majority of this work will be conducted outside of the exclusion zone (EZ) in either the CRZ or the site support zone, where only minimal or no decontamination will be required. In the event that decontamination of EG&G personnel or equipment is required, it is expected that they will use the decontamination equipment provided by the subcontractor performing the remediation work and follow the approved decontamination procedures that the subcontractor has established.

7.2 DECONTAMINATION PROCEDURES

7.2.1 Personnel and Small Equipment Decontamination

Decontamination procedures for the various phases of work to be conducted at OU 3 will be determined by the hazardous materials present at each site. The hazardous materials known to be present thus far include organic solvents, heavy metals, and radionuclides. It is the responsibility of the EG&G Radiation Protection and Radiological Engineering Representatives assigned to the site to determine whether radiological contamination of personnel or equipment exists and to prescribe the decontamination procedures that will be

required. The persons to contact for radiological assistance are identified in Section 2.0 (Responsibilities) of this document. The requirements for chemical decontamination will depend on the type of chemical present. Safe work practices are to be exercised at all times to prevent or minimize personnel and equipment contamination. Appropriate PPE will be used as an additional measure to prevent direct employee exposure to hazardous substances. Refer to the RFP Environmental Assessment and Monitoring Division SOPs, Volume I of VI, of Field Operations, SOP No. 1.3 - General Equipment Decontamination, for additional guidance in this area. Also consult SOP No. 1.6 - Handling of Personal Protective Equipment and SOP No. 1.7 - Handling of Decontamination Water and Wash Water for guidance pertaining to these issues. Additional guidance may be obtained from Radiological Operating Instructions (ROI) 3.1 regarding surface radiological contamination surveys of equipment.

7.2.2 Heavy Equipment Decontamination

It is not anticipated that EG&G will be providing or operating heavy equipment such as backhoes, graders, front-end loaders, etc., at OU 3. Any such heavy equipment used by contractors at the site must be checked for contamination and decontaminated (if necessary) prior to leaving the area. Each subcontractor will be responsible for submitting a monitoring and decontamination plan for their equipment to EG&G for approval prior to starting work. Typical decontamination procedures used within the facility include:

Large pieces of equipment such as backhoes will be frisked with radiation survey instruments and dry wiped as needed to meet radiological decontamination standards. Such equipment should be rinsed with clean water and/or steam and inspected by the RPT prior to being transferred from the site. Equipment leaving the Controlled Area shall be monitored as stipulated in HSP 18.02 prior to release.

Refer to the RFP Environmental Assessment and Monitoring Division SOPs, Volume I of VI, of Field Operations, SOP No. 1.4 - Heavy Equipment Decontamination.

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3
Medical Surveillance

Manual No.: 21000-HSP-OU3
Section No. 8.0, R0
Effective Date: 06/15/92
Organization: Environmental Management

Approved by:


Project Manager

6,8,92
Date

This is a
CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI

By: William D. Ewan UNU

Date: 6/8/92

(per conversation with J. Neshedm)

8.0 MEDICAL SURVEILLANCE

8.1 INTRODUCTION

The medical surveillance requirements of OSHA 29 CFR 1910.120(f) provide the framework for a medical monitoring program of workers involved in hazardous waste operations and emergency response. The standard includes provisions for baseline, periodic, and termination medical examinations to monitor for potential exposures to hazardous materials and conditions.

The Occupational Health Department, under the direction of the Occupational Health Director, is responsible for the RFP Medical Surveillance Program. The Medical Surveillance Program is designed to detect early signs of adverse health effects from chemical, radiological, and physical hazards at RFP and to facilitate protective measures.

The Occupational Health Department provides comprehensive physical examinations to EG&G employees at no cost to the employee and without loss of pay. The exam results are used to assess the health status and physical fitness of employees and to ensure that work assignments do not exceed the employee's physical capabilities.

8.2 FREQUENCY OF MEDICAL EXAMINATIONS

EG&G employees assigned to work at OU 3 must undergo a baseline medical examination prior to initiating onsite activities. After the initial exam, employees must have a follow-up medical exam at least once a year for as long as they work at the site. The attending physician may suggest a shorter or longer interval, but it must not be in excess of two years. Such a decision may be based on one or all of the following factors:

- Chemical or physical hazards that employees may be exposed to while working in or around OU 3
- Concentration(s) of chemicals present in the work area

- Health effects experienced by employee(s) that may be associated with hazards at OU 3
- Acute exposure(s) as a result of an emergency

Employees must be trained to recognize symptoms such as dizziness, nausea, skin rash, etc., which may be indicative of exposure to hazards at the site. In the event that any such symptoms develop, or where a suspected overexposure occurs, the affected personnel must receive a medical examination as soon as possible after the incident or injury.

A worker who is reassigned to an area not associated with hazardous waste or who terminates employment, thereby reducing the potential of exposure to hazardous substances, must have a final medical exam if one has not been performed within the past six months. The content of the follow-up examination and employee termination examination will include, at least, those items included in the pre-placement examination. The physician can then make comparisons to previous data and possibly detect early signs of adverse health effects and facilitate protective measures. The attending physician may add to the testing and/or examination as needed.

8.3 CONTENT OF MEDICAL EXAMINATIONS

The content of the medical examination will be determined by the Occupational Health Director or, in certain situations, by a private attending physician and may include the following elements:

- A complete occupational and medical history emphasizing those signs and/or symptoms associated with exposure(s) to the hazardous materials identified in Section 3.0
- Smoking history
- Chest x-ray
- Pulmonary function test (PFT)
- Electrocardiogram (EKG)

- Blood test and analyses for contaminants of concern identified in Section 3.0
- Urine test and analyses for contaminants of concern identified in Section 3.0
- Liver function test
- Examination of eyes, nose, and throat
- Examination of the nervous system
- Examination of the spine and other musculoskeletal systems
- Audiogram
- Pulse rate
- Body temperature
- Baseline bioassay

The examining physician will provide a written opinion of the employee's ability and fitness to perform the required job task(s) and wear specific respiratory protection (Hazardous Waste Operations Form RF-47322). The physician will also take into consideration the fact that the employee may:

- Experience temperature extremes as a result of environmental conditions and/or wearing protective clothing
- Exert themselves physically as a result of performing the required job tasks
- Experience increased breathing effort while wearing respiratory protection

8.4 AVAILABILITY OF SERVICE

The Occupational Health Department is located in Building 122. The full staff is on duty from 7:30 a.m. to 4:00 p.m. Monday through Friday. The registered nursing staff is on duty from 6:30 a.m. on Monday through 10:00 p.m. on Friday. A physician and a nurse are always on call for any emergency during off hours. Weekend coverage (Friday from 10:00

p.m. through Monday at 6:30 a.m.) is provided by EMTs. They can be contacted at Extension 4336 and will meet employees in the Occupational Health Department or respond to the site of any emergency.

8.5 TRANSPORTATION FOR MEDICAL REASONS

The company will provide transportation for employees (if it is medically safe, as determined by the Occupational Health Staff) to their home or to an appropriate medical facility for:

- An emergency: Occupational Health/EMTs will determine the appropriate mode of transportation for illness/injury requiring air or ground ambulance transport
- A non-emergency: if there is no medical necessity for ambulance transport, supervisors will be asked to arrange transportation.

In a situation where an employee is injured and requires non-ambulance transport to an offsite medical facility, the supervisor or designee will accompany that person as a representative of the company and be available to interface with outside authorities (if necessary) and to provide further transportation for the employee as appropriate. Supervisors unable to arrange transportation on weekends or during night work should contact the Shift Superintendent (RFP Emergency Coordinator) for assistance.

8.6 OCCUPATIONAL HEALTH DEPARTMENT RESPONSIBILITIES

The Occupational Health Department has responsibility for assisting management in ensuring the placement of employees in work situations that will not create undue hazard(s) to the individual, co-workers, plant facilities, the public, and the environment. The Medical Surveillance Program provides the data base for these decisions. The Occupational Health Department is also responsible for applying preventive medical measures toward the maintenance of good physical and mental health of employees.

8.7 SUPERVISOR'S RESPONSIBILITY

Supervisor responsibilities pertaining to medical surveillance requirements include:

- Confirming through the Occupational Health Department that employees are fit and do not have restrictions that will interfere with their job performance
- Recognizing detectable signs and symptoms of over exposure to chemical or physical hazards (information pertaining to recognition of such signs or symptoms is acquired through resources such as the OSHA Health and Safety training, MSDSs, and the hazard identification information provided in Section 3.0 of this document)
- Sending employees to the Occupational Health Department for a work restriction or re-evaluation if there has been a change in the employees physical or mental condition
- Consulting personnel files regarding employee restrictions prior to placing a job applicant in a vacancy

8.8 EMPLOYEE'S RESPONSIBILITY

Medical surveillance requirements are not only the responsibility of the Occupational Health Department and supervisors but are also the responsibility of each employee. These responsibilities include:

- Advising their supervisors of any physical or mental conditions that could affect work performance
- Recognizing the detectable signs or symptoms of over exposure to chemical or physical hazards
- Reporting all occupational injuries or illnesses immediately
- Reporting to the Occupational Health Department to have limitations verified or restrictions imposed (restrictions recommended by an offsite physician must be presented in writing to the Occupational Health Department)
- Reporting to the Occupational Health Department for re-evaluation as scheduled

8.9 WORK PRACTICES

Work assignments may be temporarily or permanently modified on the basis of an employee's physical or mental state and environmental factors. The Occupational Health Department will perform an assessment, communicate the need for a medical restriction to appropriate persons, and follow up on restriction status.

8.10 MEDICAL RECORDS

Occupational Health Department keeps medical information in an individual's file, including laboratory reports, EKG reports, x-ray reports, health histories, physical examinations, letters, and reports from the employee's personal or referral physician.

8.10.1 Release of Medical Records and Medical Information

The medical record will remain in the possession of the Occupational Health Department and will not be taken from the premises except for the purpose of answering subpoenas. Copies of the medical record will be released to the employee, insurance companies, attorneys, hospitals, and/or physicians when a written authorization has been presented to the Occupational Health Department. A written authorization must:

- Specify that either EG&G or RFP is to release the information
- Be dated within the last 60 days
- Specify to whom the information is to be released
- Be completed in ink
- Be signed by the employee

Medical information may not be released to anyone at RFP (supervisors, co-workers, etc.) without written authorization from the employee.

Employees of the Occupational Health Department and employees in H&S Records, who are authorized by the Occupational Health Director, are the only employees who will have access to medical records.

Release of records associated with work-related or alleged work-related illness and injury does not require signed consent. A release may be requested to expedite communication with attending physicians.

8.11 SUBCONTRACTOR MEDICAL SURVEILLANCE PROGRAM

Subcontractors are responsible for providing and implementing a medical surveillance program for all of their employees assigned to work at the OU 3 that meet the requirements of 29 CFR 1910.120(f)(2).

Subcontractors will be given a copy of this OU 3 HSP to use in developing their health and safety programs. The chemical, radiological, and physical hazards known to be present at the site are identified in the hazard assessment portion of this document Section 3.0. This information and any additional information concerning hazards at the specific work location should be provided to the subcontractor's consulting physician so that a medical surveillance program can be developed that addresses the site-specific hazards.

The subcontractor physician must provide written authorization that each employee working at OU 3 is fit to work. These records should be kept on file at the site and should be available for review by RFP personnel. If respiratory protection is required at the site, the physician must provide authorization that the employee is medically qualified to wear a respirator. Subcontractor personnel required to wear a respirator will be fit tested by the EG&G Health and Safety Department.

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3
Air Monitoring

Manual No.: 21000-HSP-OU3
Section No. 9.0, R0
Effective Date: 06/15/92
Organization: Environmental Management

Approved by:



Project Manager

6/8/92
Date

This is a
CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI

By: William D. Ewan U/NU

Date: 6/8/92

(per conversation with J. Neshedm)

9.0 AIR MONITORING

9.1 INTRODUCTION

The monitoring procedures for EG&G personnel working at OU 3 include those for chemical contaminants and for radiological contaminants. The objectives of the monitoring program are:

- To characterize concentrations of dusts, mists, fumes, gases, and vapors present in the OU 3 work areas
- To acquire sufficient quantitative data that will be used to determine appropriate levels of PPE, site control measures and boundaries, and decontamination procedures
- To identify conditions that may be immediately dangerous to life or health

9.2 MONITORING INSTRUMENTS

- An organic vapor meter (OVM), such as a photoionization or flame ionization type and a Dräger hand pump with detector tubes for carbon tetrachloride (CCL₄) and vinyl chloride, will be used to monitor for volatile organics.
- A Bicron Frisk Tech will be used to monitor dry equipment surfaces and dry PPE for the presence of alpha-emitting radioisotopes.
- A real-time dust monitor will be utilized to monitor for particulates.
- A constant-flow air sampling pump will be used to determine concentrations of non-radiological contaminants in the workers' breathing zone.

9.3 MONITORING STRATEGIES

The EG&G SHSC assigned to a field team will coordinate monitoring (as described below) and provide the monitoring results to the SHSC.

9.3.1 Monitoring

Real-time monitoring will be conducted to provide an indication of the presence of potential hazards during intrusive activities. Other types of monitoring may be required during specific activities.

9.4 ACTION LEVELS

All decisions regarding application of the following action levels for non-radioactive substances will be based on monitoring (refer to Table 9-1 for action levels). The action level for measurements of radioisotopes with the Bicron Frisk Tech will be based on surface measurements of dry soil, equipment, or PPE. The SHSC will notify the H&S Officer immediately after any upgrade in PPE. Refer to Table 9-2 for Derived Air Concentrations for radiation exposures to workers and Table 9-3 for contamination control limits. Additional action levels may be identified as a result of monitoring. This plan will be amended as necessary to these action levels.

**Table 9-1
Action Levels**

<u>Instrument</u>	<u>Action Level</u>	<u>Action</u>
Real Time VOC Monitor	greater than background greater than 5 ppm (sustained for 5 minutes)	Don level C PPE Don level B PPE
Real-time Dust Monitor	2.5 mg/m ³	Don level C PPE
Bicron Frisk Tech or approved equivalent	greater than 250 counts per minute greater than 1250 counts per minute	Don level C PPE and notify SSO Don level B PPE and notify SSO
FIDLER or approved equivalent	greater than background + 2 x background	Don level C PPE

Table 9-2

Derived Air Concentrations (DAC) for Controlling Radiation Exposure to Workers at DOE Facilities, from Attachment 1, page 4 of DOE Order 5480.11 dated 12-21-88.

Inhaled Air - Lung Retention Class

Radionuclide	D ($\mu\text{Ci/ml}$)	W ($\mu\text{Ci/ml}$)	Y ($\mu\text{Ci/ml}$)	Stochastic or Organ ^{1/} (D/W/Y)
H-3 (Water) ^{2/}	2.E-05	2.E-05	2.E-05	St/St/St
H-3 (Elemental) ^{2/}	5.E-01	5.E-01	5.E-01	St/St/St
Pu-239	--	2.E-12	6.E-12	-BS/BS
Am-241	--	2.E-12	--	-/BS/-
U-233	5.E-10	3.E-10	2.E-11	BS/St/St
U-234	5.E-10	3.E-10	2.E-11	BS/St/St

^{1/} A determination of whether the DACs are controlled by stochastic (St) or nonstochastic (organ) dose, or if they both give the same result (E) for each lung retention class is given in this column. The key to the organ notation for nonstochastic dose is: BS = Bone Surface, K = Kidney, L = Liver, Sin = Stomach wall, and T = Thyroid. A blank indicates that no calculations are performed for the lung retention class shown.

^{2/} The ICRP identifies tritiated water and carbon as having immediate uptake and distribution; therefore, no solubility classes are designated. For purposes of this table, the DAC values are shown as being constant, independent of solubility class. For tritiated water, the inhalation DAC values allow for an additional 50% absorption through the skin, as described in ICRP Publication No. 30: Limits for Intakes of Radionuclides by Workers. For elemental tritium, the DAC values are based solely on consideration of the dose-equivalent rate to the tissues of the lung from inhaled tritium gas contained within the lung, without absorption in the tissues.

Table 9-3**Contamination Control Limits**

<u>Area</u>	<u>Removable Alpha</u>		<u>Fixed And</u>
	<u>Smears</u>	<u>Swipes</u>	<u>Removable Alpha</u>
	(dpm/100 cm ²)	(cpm by Ludlum)	(cpm by Ludlum 12-1A)
Uncontrolled	< 20	N/A	< 250
Controlled	< 20	N/A	< 250
Radiological	20-200	< 250	250 - 750
Contamination	> 200	> 250	> 750

<u>AREA</u>	<u>Removable Beta/Gamma</u>	<u>Fixed And</u>
	(dpm/100 cm ²)	<u>Removable Beta/Gamma</u>
		(dpm/100 cm ²)
Uncontrolled	< 1000	< 5000
Controlled	< 1000	< 5000
Radiological	1000 - 5000	> 5000
Contamination	> 5000	

These contamination control limits are to be utilized during equipment mobilization. Movement of equipment between Exclusion Zones will be subject to the contamination level standards listed above as radiological areas. Mobilization of equipment outside of the CRZ will be subject to compliance with the contamination level standards listed above next to uncontrolled and controlled zones. The smear test will involve smearing a section of equipment for analysis with a Ludlum - 12-1A.

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3

Manual No.: 21000-HSP-OU3
Section No. 10.0, R0
Effective Date: 06/15/92
Organization: Environmental Management

Training

Approved by:



Project Manager

6,8,92

Date

This is a
CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI

By: William D. Ewan UNU

Date: 6/8/92

(per conversation with J. Neshedm)

10.0 TRAINING

EG&G personnel assigned to OU 3 must complete the H&S training required by OSHA and site-specific training courses required by EG&G. OU 3 is an Interim Response Action, which is classified as a hazardous waste operation by the OSHA Standard (29 CFR 1910.120[a][i]); therefore, the training requirements, including the initial H&S training, annual update, and supervisor training, apply to EG&G personnel working at the site. Additional training courses required by EG&G include hazard communication and radiation worker and respirator training.

10.1 TRAINING REQUIREMENTS AND COURSE CONTENT

10.1.1 Hazardous Waste Site Health and Safety

Any EG&G employee who is assigned to work at OU 3 must complete the hazardous waste health and safety course required by OSHA in 29 CFR 1910.120(e). The length of the required course may be 40 hours or 24 hours, based on the workers' assigned tasks. The 40-hour course and three days of supervised on-the-job training (OJT) is mandatory for workers who may be required to use respiratory protection equipment and/or who are engaged in activities in which they may be exposed to hazardous substances and health hazards at or above the Permissible Exposure Limits (PEL).

EG&G employees assigned to OU 3 project who are required to complete 40 hours of training include the ER Project Manager, the ER H&S Officer, the H&S Liaison Officer, and the SHSC. Additional personnel "who are onsite occasionally for a specific limited task," such as inspectors, managers, or other site visitors, are required to complete a minimum of 24 hours of training and one day of supervised OJT. An outline of the 40-hour course is presented in Table 10-1. The 24-hour course contains the same lecture material as the 40-hour course but does not include the field exercises.

Table 10-1
EG&G Hazardous Waste Workers
Health and Safety Course Content

Module 1:	Description of Lessons and Instructional Objectives	
Module 2:	Introduction	
Module 3:	Review of Regulations	2
Module 4:	Definitions	2
Module 5:	Sources of Hazard Information	3
Module 6:	Hazards in the Work Environment	4
	Section 1: Chemical Hazards	4
	Section 2: Compressed Gases	5
	Section 3: Ionizing Radiation	5
	Section 4: Heat Stress	6
	Section 5: Cold Stress	7
	Section 6: Confined Space	7
	Section 7: Safety Hazards	8
	Section 8: Noise	8
Module 7:	Generic Site Safety Plan	
Module 8:	Incident Command	9
Module 9:	Medical Surveillance	10
Module 10:	Toxicology	10
Module 11:	Site Control, Characterization, and Monitoring	12
Module 12:	Personal Protective Equipment	13
Module 13:	pH Acid/Bases	15
Module 14:	Decontamination	16
Module 15:	Spill Response	16
Module 16:	Level C & B Exercises ¹	16

¹ The 24-hour course does not include Level C or B Exercises.

All hazardous waste workers must complete an annual 8-hour refresher course. The course content is a summary of the 40-hour course.

Supervisors of hazardous waste sites or of tasks conducted on hazardous waste sites must complete, at a minimum, the same baseline training (24-hour or 40-hour) as the workers they supervise and an additional 8-hour advanced supervisor health and safety course. Table 10-2 lists examples of the topics covered in the supervisor training course.

10.1.2 Protecting the Radiation Worker Training

EG&G personnel and subcontractors working on ER sites must complete the "Protecting the Radiation Worker" course offered by the EG&G Training Department. The course is a three-day class devoted to educating contractors and EG&G personnel alike in awareness of the hazards involved in working on sites potentially contaminated with radionuclides.

10.1.3 Site-Specific Training

EG&G employees assigned to work on OU 3 must receive training that introduces the information contained in the Site H&SP. The course should provide enough detail that employees can implement the HSP and safely perform their assigned tasks. This training may be incorporated into the 24- or 40-hour hazardous waste health and safety training program and will be coordinated by the ER Project Manager in conjunction with the pre-construction conferences. One-day OJT or three-day OJT must correspond with the 24- or 40-hour health and training program (respectively) to fully complete training.

10.1.4 Hazard Communication Training

EG&G employees at RFP are required to complete the CBT module on Hazard Communication as specified in HSP 9.07. It is also required by OSHA (29 CFR

Table 10-2
Supervisor Training Course Outline

Manager and Supervisor Responsibilities

1. Worker 24-Hour On-The-Job Training
2. Work Site Characterization
3. Pre-emergency Planning
4. Selection of Proper PPE
5. Superfund Amendments and Reauthorization Act (SARA) Title III
6. Legal Aspects of Supervision
7. Potential Problem Analysis
8. Remedial Action - Lessons Learned

1910.120[p][2]) for workers conducting operations at treatment, storage, and disposal facilities. In the Hazard Communication Training Program, responsibilities for hazardous materials evaluation are assigned and hazard information sources, such as MSDSs and the chemical labeling system, are described. The training is a self-paced, computer-based course that takes approximately one hour to complete. An outline of the course is presented in Table 10-3. Subcontractors are responsible for maintaining their Hazard Communication training requirements for materials used within their business activities and for notifying H&S (through the Construction Coordinator) of any hazardous chemicals to be brought onsite. RFP will inform subcontractors of any hazardous chemicals that may be encountered during operations on site. This may include site-specific training in the hazards of materials used or present in the work place, when applicable.

10.1.5 Safety Meetings

The Area Operations Manager will conduct periodic safety meetings with EG&G personnel working at OU 3, as required by the EG&G Health and Safety Practices Manual, Procedure 2.01. The discussion at these meetings may include:

Health and safety considerations and the required PPE for current operations

- Any revisions to the EG&G HSP
- Any new MSDS filed on the ER project work site
- Documented or observed unsafe acts committed at the worksite, a clarification of the safety requirements violated, and methods to prevent future violations
- Other topics specified in the EG&G Health and Safety Practices Manual, Procedure 2.01

Table 10-3
Hazard Communication Training Course Outline

Course Content:

- OSHA, DOE, and RFP standards and policies on hazard communication
- Hazardous material evaluation responsibilities
- The warning labels used at RFP
- MSDS
- How to obtain hazard information

Course objectives are to train the employee to:

- Describe the OSHA, DOE, and RFP hazard communication policies
- Identify the agencies responsible for hazardous material evaluation
- Interpret a RFP warning label
- Describe the contents and uses of MSDS
- List several different sources from which to obtain hazard information

Workers are required to attend the meetings and sign the attendance sheet. Meeting minutes will be documented on the Safety Summary Sheet, Form RF-7060, contained in the Health and Safety Practices Manual. The SHSC will review the meeting minutes with absentees and have them sign the attendance sheet. The SHSC will submit the minutes and the attendance sheet to the ER H&S Officer. This documentation will be retained on file at the worksite and will be archived when the project is completed.

10.1.6 Rehearsal of Emergency Response Plan

OSHA 29 CFR 1910.120 requires rehearsal of the Emergency Response Plans. Such a rehearsal will be conducted within 30 days of start-up of operations at a hazardous waste site. The ER H&S Officer will coordinate and document the rehearsals, which will be used to evaluate the effectiveness of the plan. The SHSC will coordinate rehearsals with subcontractors so that site personnel are prepared to respond to an emergency. Emergency response to a RFP emergency will be handled according to the RFP Emergency Response Plan and will apply to all persons at RFP.

10.1.7 Visitor Briefings

Visitors who do not have the required OSHA training and medical certifications will not be allowed to enter the site exclusion zones or CRZs. Prior to gaining access to the site, visitors to OU 3 will have an orientation that summarizes the HSP. This orientation does not qualify the visitor to access-controlled areas of the site. The purpose of the briefing is to provide sufficient information on the hazards and control measures at the site to prevent the visitor from unknowingly violating any controls. Visitors will be escorted by a trained site employee during the entire visit.

Visitors will provide signature verification that they have read, understand, and will comply with the requirements of the HSP. Signatures are recorded in a logbook, which is maintained at the site by the PM.

10.2 IMPLEMENTATION OF TRAINING

Training for EG&G personnel is provided by the EG&G Performance-Based Training Department. Most training is conducted in-house, with the assistance of various health, safety, and environmental departments. Some training is provided by academic organizations or other subcontractors. The Manager of Plant General Employee Training serves as the point of contact for EG&G training course availability. The Manager, Mr. Jeff Nair, can be reached at 966-7706.

Training of subcontractors for work at RFP is the responsibility of the subcontractor. Training must meet the performance requirements of EG&G and OSHA. Subcontractor personnel will be required to complete EG&G computer-based training programs, including Respirator Indoctrination (required if respirators will be worn onsite) and Radiation Safety. Respirator fit tests, documented by the EG&G H&S Department, will also be required for subcontractor personnel who may be required to wear a respirator at the site.

10.3 PERFORMANCE EVALUATIONS

The training requirements described in this section are designed to teach skills applicable to fieldwork at OU 3. Workers and supervisors are responsible for learning and applying these basic skills and concepts. EG&G will evaluate its workers' abilities through the administration of tests during training courses and field performance evaluations. The training department has established testing procedures and minimum score requirements for course examinations. The SHSC will conduct field audits to evaluate worker health and safety skills. The H&S Liaison Officer will ensure that unannounced audits are performed at least quarterly. Below-average performance on examinations or field evaluations may disqualify a worker from working at the site until the worker's performance has improved.

10.4 VERIFICATION OF TRAINING

ER will maintain documentation of the completed required training for EG&G personnel working at the site; the SHSC will verify this documentation for affected personnel. Site employees will also provide signature verification that they have read, understood, and will comply with the OU 3 HSP and the EG&G Health and Safety Program Plan. These records will be kept on file by EG&G. All personnel conducting or supervising investigations in OU 3 are required to provide documentation of training.

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3

Manual No.: 21000-HSP-OU3
Section No. 11.0, R0
Effective Date: 06/15/92
Organization: Environmental Management

Emergency Response

Approved by:



Project Manager

6.8.92

Date

This is a
CONTROLLED DOCUMENT
EG&G — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI

By: William D. Ewan UNU

Date: 6/8/92

(per conversation with J. Neshedm)

11.0 EMERGENCY RESPONSE

11.1 PURPOSE

The purpose of the Emergency Response Plan for OU 3 is to have a detailed, pre-determined strategy for handling potential emergency situations. Pre-emergency planning is required to expedite appropriate action, thereby minimizing the severity and consequences of potential emergencies. The plan is designed to protect RFP personnel from possible hazards created by emergency situations. In addition to safeguarding RFP personnel, the plan is designed to protect plant personnel and the public from contaminants that could move offsite, protect property adjacent to the OU 3 area, and protect equipment loss from hazards associated with OU 3 activities. This section details procedures to be followed during an emergency at the OU 3 site.

It is critical that key personnel are informed immediately of emergency situations so that response efforts can be carried out effectively. Success will depend on the efforts of appropriate personnel and the input they can provide as a result of training and experience. Teamwork is crucial for abating hazards and minimizing damage.

Emergency assistance should always be requested when it is unclear whether there is a need for support personnel. The contacted party can decide, after hearing a description of the problem or after observing the situation, whether or not they are needed.

11.2 NOTIFICATION

LIFE-THREATENING EMERGENCIES--CALL EXTENSION 2911

NON-LIFE-THREATENING EMERGENCIES--CALL EXTENSION 2914

Notification requirements for emergency situations at OU 3 depend on the nature of the perceived emergency (e.g., spill, injury, illness, fire) and the extent to which the damage and/or injuries have progressed. Upon discovery of a release of materials or other non-life-threatening emergency situation, the onsite supervisor will be immediately notified at

extension 5355 and the H&S Area Engineer at extension 7571. The supervisor will evaluate the situation and notify appropriate personnel. If the supervisor is not available and the situation is not life-threatening, the Shift Superintendent will be notified at extension 2914. If there is no answer at 2914, refer to 2911.

If the supervisor is not available or the situation is life-threatening, RFP emergency response personnel will be notified as detailed below.

Extension 2911 will be called to obtain emergency assistance for life-threatening emergencies and to access the:

- **Emergency Coordinator (Shift Superintendent)**
- **Plant Protection Central Alarm Station**
- **Fire Department Dispatch Center**
- **Medical Department**

As much detail about the emergency as possible will be provided. A decision to dispatch any or all of the following equipment will be made on the information provided:

- **Fire Engine**
- **Ambulance**
- **HAZMAT Response Vehicle**

The following information will be provided, upon request, to the Emergency Dispatcher:

- **Informant's name**
- **Exact location of the emergency**
- **Nature of the emergency**
- **Condition of the patient if applicable (breathing, consciousness, bleeding, etc.)**
- **Special hazards in the area**

- Any other information requested

If no details are given, emergency response personnel will respond automatically.

The Emergency Coordinator (EC) will immediately respond to emergencies. The RFP Protection Central Alarm Station will activate the Building Emergency Support Team (BEST) by the Life Support/Plant Warning (LS/PW) Public Address System. The EC will activate the Emergency Operation Center (EOC) and notify departments that have an advisory role in the situation, if applicable. The EC will determine whether additional help from offsite agencies (e.g., police, hospitals) is required.

The EC will also notify the following groups when appropriate:

Radiological Engineering	Industrial Hygiene
Industrial Safety	Waste Operations
Waste Programs	Traffic
Event Notification Officer	H&S Operations

Radiological Engineering and Industrial Hygiene will assess any hazards associated with the release of spilled material. Waste Operations will determine the appropriate clean-up techniques and personnel. Waste Programs will evaluate the incident for RCRA/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) reporting requirements. In the event of a spill, notification must also be made to Response and Reporting at 7264.

11.3 SPECIFIC SITE HAZARDS

The response to and abatement of most emergency situations at OU 3 will require the expertise of RFP emergency response personnel. However, spills of hazardous substances with a volume of less than 1 pint or 1 pound can be handled by OU 3 personnel provided

that EG&G site management are available and supervise the clean-up. Situations that will require the assistance of RFP emergency responders include, but are not limited to:

- Battery acid spills
- Skin contact with battery acid
- Accidents resulting in physical injury
- Accidents resulting in a radiological exposure exceeding the following limits:
 - 2 rem (whole body)
 - 7.5 rem (skin)
 - 15 rem (extremities)
- Chemical exposures exceeding the Threshold Limit Value (TLV)
- Spills of hazardous wastes with a volume greater than or equal to 1 pint or 1 pound, or spills of radionuclides at their respective reportable quantity (RQ) values
- Fires
- Explosions

11.4 FIRES AND EXPLOSIONS

IN THE EVENT OF A FIRE OR EXPLOSION, IMMEDIATELY CALL EXTENSION 2911

In the event of a fire or explosion, personnel will immediately evacuate the area. Evacuation will be a minimum of 300 feet upwind/crosswind of the emergency. The emergency will be handled by the Fire Department and their designees.

Portable fire extinguishers are available for small, controllable incipient fires. Fires, regardless of size, are to be reported to the Fire Department.

11.5 SPILLS OF HAZARDOUS AND RADIOACTIVE MIXED WASTE AND HAZARDOUS MATERIAL

REPORT TO THE EMERGENCY COORDINATOR AT EXTENSION 2911 spills greater than 1 pint or 1 pound of a hazardous material or waste at OU 3. The Emergency Coordinator will dispatch the HAZMAT Response Vehicle and any other necessary support personnel.

Spills of less than 1 pint or 1 pound of a hazardous waste will be cleaned up by site personnel. Spills onto porous ground will require removal of contaminated dirt as well as the spilled material. The collected material will be placed into a plastic bag and monitored to determine the radioactivity of the waste. Based on existing monitoring and analytical data, spilled material is expected to be classified as low-level radioactive waste. Spills will be handled according to guidelines as defined in Section HW-11 of the Hazardous and Mixed Waste Resource Conservation Act Standard Operating Procedure Manual.

11.6 POST-EMERGENCY RESPONSE EQUIPMENT MAINTENANCE

Equipment used in emergency situations will be decontaminated by wiping with a soap solution. Rags used for decontamination will be disposed as low-level radioactive waste. Contaminated heavy equipment utilized in emergencies will be thoroughly decontaminated prior to being released from the site. Subcontractors will follow approved decontamination protocols described in their site-specific health and safety plans for heavy equipment decontamination. A decontamination pad for equipment is currently located northwest of the trailer complex at OU 3. Equipment will not be released until monitoring indicates that contaminant levels are less than 20 disintegrations per minute (dpm)/100 cm² (above background) and that chemical contamination is not present.

11.7 EMERGENCY EQUIPMENT LOCATION

Emergency equipment located at OU 3 include first-aid kits and fire extinguishers. An emergency eye wash and shower will be provided for tasks where eye hazards may exist.

These items are located in the subcontractor trailers on the site. Fire extinguishers are also located in subcontractor vehicles and are temporarily located at sites where there is a potential for fires (e.g., during welding operations). All injuries and/or illnesses must be reported to medical personnel in building 122.

11.8 EVACUATION PLAN

Personnel and visitors to OU 3 will evacuate the area if any of the following occur:

- If a site emergency (such as a fire or chemical spill) develops
- If instructed by site supervision
- If instructed by the Shift Superintendent over the site radio or telephone system

After an evacuation, each supervisor is required to verify that the employees that he/she supervises are accounted for.

11.9 COMMUNICATION

Telephones are available in subcontractor trailers at OU 3. In addition, radios are used by field personnel to maintain contact with PMs or other designated persons in the trailers who have access to telephones. Radio frequencies are monitored by the RFP security system to ensure that response time is minimal in the event of an accident or emergency on the site. In the event of a plant emergency, Central Dispatch will notify the trailers and field personnel by telephone and radio. If Central Dispatch fails in its attempt to contact anyone onsite, a security car will be sent to the site to alert personnel of the emergency.

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3

Manual No.: 21000-HSP-OU3
Section No. 12.0, R0
Effective Date: 06/15/92
Organization: Environmental Management

Material Handling

Approved by:



Project Manager

6, 8, 92
Date

This is a
CONTROLLED DOCUMENT
EGMS — ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI

By: William D. Ewan UNU

Date: 6/8/92

(per conversation with J. Neshedm)

12.0 MATERIAL HANDLING

12.1 INTRODUCTION

Guidelines for handling, transporting, labeling, and disposal of hazardous substances and contaminated soil, liquid, and other residue are outlined in 29 CFR 1910.120(j) "Handling Drums and Containers." It is not anticipated that EG&G employees will be involved in operations that require the handling of containers or drums of hazardous materials; however, subcontractors will be required to have a materials handling program in place for operations at OU 3. Refer to RFP SOPs, Volume I of VI, Field Operations, SOP No. 1.10 - Receiving, Labeling, and Handling of Waste Containers.

12.2 SUBCONTRACTOR MATERIALS HANDLING PROGRAM

Subcontractor health and safety plans shall include procedures for material handling, as outlined in the standard, if employees will be handling drums, containers, or tanks containing hazardous substances or contaminated materials. The plans will contain requirements for drum handling and labeling; spill response procedures; guidelines for excavation of drum burial locations; drum opening procedures; specific requirements for handling of radioactive, shock-sensitive, or laboratory waste; and procedures for shipping and transporting containerized waste as applicable. SOPs for waste handling have been developed by the ER Department and will be available to subcontractors for guidance in determining how to containerize and dispose of generated waste. Hazardous waste storage will be in accordance with EG&G waste guidance.

ROCKY FLATS PLANT
HEALTH AND SAFETY PLAN
FOR RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION AT
OPERABLE UNIT 3
New Technologies

Manual No.: 21000-HSP-OU3
Section No. 13.0, R0
Effective Date: 06/15/92
Organization: Environmental Management

Approved by:



Project Manager

6/8/92
Date

This is a
CONTROLLED DOCUMENT
EG&G -- ROCKY FLATS PLANT
ENVIRONMENTAL MANAGEMENT DEPARTMENT

This is a RED Stamp

REVIEWED FOR CLASSIFICATION/UCNI
By: William D. Ewan U/NU
Date: 6/8/92

(per conversation with J. Neshedm)

13.0 NEW TECHNOLOGIES

13.1 INTRODUCTION

OSHA requires that employers develop and implement procedures for the introduction of "effective new technologies and equipment developed for the protection of employees" (29 CFR 1910.120[o]) working at hazardous waste clean-up operations. New products and techniques must be evaluated by employers before they are implemented on a large scale.

13.2 PROGRAM IMPLEMENTATION

EG&G has an extensive health, safety, and environmental protection program made up of multiple departments with specific areas of expertise. A representative from each of the H&S departments is assigned responsibility for OU 3. Each representative is responsible for promoting a safe work environment by actively seeking ways to improve safety at the site. Each department (Safety and Hygiene, H&S, Radiological Engineering, etc.) participates in national conferences and seminars at which products and technology are demonstrated and studies of their effectiveness are reviewed. Departmental representatives attending these conferences and seminars are directed to review new products appropriate for use at Hazardous Waste Operations. In addition, EG&G is active in research and development of new products and technologies through specific government contracts.

13.3 METHODS OF EVALUATION

OSHA requires that EG&G's efforts, in the area of new product and technology evaluation, be documented and made available to the OSHA inspector upon request. The departments responsible for evaluation of specific products and technologies are listed in Table 13-1.

Table 13-1
Evaluation Procedures by Department

<u>Product or Technologies</u>	<u>Department</u>
Chemical protective clothing	Industrial Hygiene
Respiratory protection	Industrial Hygiene
Equipment used to protect against falls, impacts, explosions, etc.	Industrial Safety, Engineering
Radiation safety equipment	Radiological Engineering
Chemical monitoring equipment	Industrial Hygiene
Radiation monitoring equipment	Radiological Engineering
Particulate and vapor emission control devices	Industrial Hygiene, Radiological Engineering, Engineering
Chemical or radiological product containment, neutralization, or stabilization products	Radiological Engineering, Engineering
Material handling equipment	Industrial Safety, Engineering