

# **NOTICE**

**All drawings located at the end of the document.**

Ref: OJ-RF-01550; JUB-100-03

**ENVIRONMENTAL RESTORATION  
RFCA STANDARD OPERATING PROTOCOL  
FOR ROUTINE SOIL REMEDIATION  
DRAFT FY03 NOTIFICATION #04-03  
IHSS GROUPS 500-1 AND 500-5**

**October 2003**

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## ACRONYMS

AL	action level
COC	contaminant of concern
DOE	Department of Energy
ER	Environmental Restoration
ER RSOP	Environmental Restoration RFCA Standard Operating Protocol
FY	Fiscal Year
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
nCi/g	nanocuries per gram
NPWL	New Process Waste Lines
PA	Protected Area
PAC	Potential Area of Concern
PCB	Polychlorinated Biphenyls
PCOC	potential contaminant of concern
pCi/g	picocuries per gram
POC	Point of Compliance
POE	Point of Evaluation
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RSOP	RFCA Standard Operating Protocol
SSRS	Subsurface Soil Risk Screen
SWD	Soil-Water Database
UBC	Under Building Contamination
VOC	volatile organic compound
WRW	Wildlife Refuge Worker

## 1.0 INTRODUCTION

This Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) (DOE 2002) Fiscal Year (FY) 04 Notification includes the notification to remediate Individual Hazardous Substance Sites (IHSSs), Potential Areas of Concern (PACs), and Under Building Contamination (UBC) Sites at the Rocky Flats Environmental Technology Site (RFETS) Industrial Area (IA) during FY04. The purpose of this Notification is to invoke the ER RSOP for IHSS Groups 500-1 and 500-5. Activities specified in the ER RSOP are not reiterated here; however, deviations from the ER RSOP are included where appropriate.

Soil with contaminant concentrations greater than the RFCA Action Levels (ALs), or as indicated by the Subsurface Soil Risk Screen (SSRS) and associated debris will be removed in accordance with RFCA and the ER RSOP (DOE et al 2003).

IHSS Groups 500-1 and 500-5 are shown on Figure 1, and the proposed remediation sites covered under ER RSOP Notification #04-03 are listed in Table 1.

**Table 1**  
**Potential Remediation Areas for IHSS Groups 500-1 and 500-5**

IHSS Group	IHSS/PAC/UBC Site	PCOCs	Media	Estimated Remediation Volume
500-1	IHSS 500-186, Valve Vaults 11, 12 and 13	Radionuclides, Metals, VOCs, Nitrate, Nitrite	Surface and Subsurface soil	<2 cy
500-1	IHSS 500-117.1, North Chemical Storage Site	Radionuclides, Metals, VOCs	Surface and Subsurface soil	<2 cy
500-1	IHSS 500-197, Scrap Metal Storage Site	Radionuclides, Metals, VOCs, PCBs	Surface and Subsurface soil	<2 cy
500-5	PAC 500-904, Transformer Leak – 223-1/223-2	PCBs	Surface and Subsurface soil	<2 cy

VOCs – volatile organic compounds

PCBs – polychlorinated biphenyls

cy – cubic yards

ft – feet

## 2.0 IHSS GROUPS 500-1 AND 500-5

IHSS Group 500-1 includes IHSS 500-186, Valve Vaults 11, 12 and 13; IHSS 500-117.1, North Chemical Storage Site; and IHSS 500-197, Scrap Metal Storage Site. IHSS Group 500-5 includes PAC-904, Transformer Leak – 223-1/223-2. IHSS Groups 500-1 and 500-5 are shown on Figure 2.

### 2.1 Potential Contaminants of Concern

Potential contaminants of concern (PCOCs) at IHSS Groups 500-1 and 500-5 are listed in Table 1. The PCOCs were determined based on process knowledge and data collected during previous studies (DOE 1992-2002, DOE 2001, DOE 2000a).

## **2.2 Project Conditions**

The following conditions are present within IHSS Groups 500-1 and 500-5:

- IHSS 186, Valve Vaults 11, 12, and 13 consists of the L-shaped area including Valve Vaults 11, 12 and 13 and the associated underground New Process Waste Lines (NPWLs) (see Figure 1).
- IHSS 117.1, North Chemical Storage Site includes a site employee parking area and Buildings 223 and 549. The northeastern portion of IHSS 117.1 overlaps IHSS 197 and includes a section of the former Protected Area (PA) perimeter fence area. The southern section of IHSS 117.1 overlaps the eastern portion of IHSS 186, which includes Valve Vault 11 (see Figure 1).

In 1981, excavation during construction of the PA security fence uncovered scrap metal debris buried in trenches west of Building 559. The burial sites were re-excavated, and the buried materials were removed (DOE 1992). These areas were backfilled to complete construction of the PA fence. Some of the excavated areas may have been located within the northeastern corner of IHSS 117.1 (and the northeastern part of IHSS 197).

- IHSS 197, Scrap Metal Storage Site consists primarily of former PA perimeter fence area. IHSS 197 also includes a section of the PA patrol road west of Building 559 (see Figure 1). In 1981, excavation during construction of the PA security fence uncovered scrap metal debris in trenches located west of Building 559. The trenches were re-excavated, and the buried materials were removed (DOE 1992). IHSS 197 bounds the re-excavated burial sites.
- PAC-904, Transformer Leak – 223-1/223-2 consists of two electrical transformers on concrete pads. These transformers are known to have leaked.

## **2.3 RFCA Subsurface Soil Risk Screen Evaluation**

The SSRS is performed when non-radionuclides and uranium are present in the soil between 6 inches and 3 feet below ground surface, and when americium and plutonium are present between 3 feet and 6 feet below ground surface. Current site conditions are evaluated to determine if remediation is required by the SSRS. Some aspects of the SSRS cannot be evaluated now, but will be evaluated after characterization.

### **Screen 1 – Are contaminant of concern (COC) concentrations below RFCA Table 3 soil action levels for the Wildlife Refuge Worker (WRW)?**

Existing soil data, discussed in the Industrial Area Sampling and Analysis Plan (IASAP) Addendum for IHSS Group 500-1 and IHSS Group 500-5 (DOE 2003a), do not indicate that there are contaminant concentrations that exceed RFCA WRW ALs. However, historical knowledge indicates that additional characterization is warranted. For example, contaminants may have been released from the NPWL and valve vaults to the surrounding soil. Soil contamination also may have resulted from historical disposal

activities within IHSS 500-197. In addition, transformers within PAC 500-904 leaked dielectric fluid containing PCBs. The IHSS Groups will be further characterized in accordance with IASAP Addendum #IA-04-03, and results will be documented in a data summary or closeout report.

**Screen 2 – Is there a potential for subsurface soil to become surface soil (landslide and erosion areas identified on Figure 1)?**

IHSS Groups 500-1 and 500-5 are not located in an area subject to erosion and landslides in accordance with Figure 1 of the RFCA Modification (DOE et al 2003).

**Screen 3 – Does subsurface soil contamination for radionuclides exceed criteria defined in Section 5.3 and Attachment 14?**

Existing soil data, discussed in the IASAP Addendum for IHSS Groups 500-1 and 500-5 (DOE 2003a), do not indicate that concentrations of radionuclides exceed RFCA WRW ALs (RFCA Section 5.3; DOE et al 2003). However, historical knowledge indicates that additional characterization is warranted (refer to Screen 1). Therefore, the IHSS Groups will be further characterized in accordance with IASAP Addendum #IA-04-03, and results will be documented in a data summary or closeout report. [Note that Original Process Waste Lines are not located in the IHSS Group, and therefore, RFCA Attachment 14 does not apply.]

**Screen 4 – Is there an environmental pathway and sufficient quantity of COCs that would cause an exceedance of the Surface Water Standards?**

Contaminant migration via erosion and groundwater are the two possible pathways whereby surface water could become contaminated from IHSS Groups 500-1 and 500-5. The nearest downgradient RFCA Surface Water Point of Evaluation (POE) is SW093 (DOE 2003b). However, SW093 receives water from a large part of the IA, and surface water quality at SW093 may not be attributable to any single upgradient IHSS Group. See additional information in Section 2.5.2. In addition, based on existing data (DOE 2003a), there does not appear to be sufficient contaminant concentrations in the IHSS Groups to cause downgradient exceedances of surface water standards. However, additional characterization is warranted (refer to Screen 1), and the potential for the IHSS Groups to cause exceedances of surface water standards will be re-evaluated after the additional characterization is completed.

**Screen 5 – Are COC concentrations below RFCA Table 3 Soil Action Levels for Ecological Receptors?**

Existing soil data, discussed in the IASAP Addendum for IHSS Groups 500-1 and 500-5 (DOE 2003a), do not indicate that there are contaminant concentrations that exceed RFCA WRW ALs. However, historical knowledge indicates that additional characterization is warranted (refer to Screen 1). Therefore, the IHSS Groups will be further characterized in accordance with IASAP Addendum #IA-04-03, and results will be compared to the Ecological Receptor ALs and documented in a data summary or closeout report.

## **2.4 Remediation Plan**

This RSOP Notification remediation plan for IHSS Groups 500-1 and 500-5 includes the following objectives:

- Remove the two 500-904 transformer pads. The concrete pads will be recycled in accordance with the RSOP for Recycling Concrete (DOE 1999) or disposed at an appropriate facility based on waste characterization results. If contaminated soil is removed, collect confirmation soil samples in accordance with the Industrial Area Sampling and Analysis Plan (DOE 2001).
- Remove soil with non-radionuclide or uranium contaminant concentrations greater than the proposed RFCA WRW ALs to a depth of 6 inches. If soil contamination greater than the ALs extends below 6 inches in depth, perform the SSRS to evaluate the potential risk of exposure and the need for further accelerated action.
- Remove soil with plutonium 239/240 concentrations greater than the proposed RFCA WRW AL to a depth of 3 feet, or to less than 50 picocuries per gram (pCi/g), whichever comes first. If concentrations are greater than 3 nanocuries per gram (nCi/g) between 3 and 6 feet, characterize and remediate pursuant to RFCA Attachment 5 (DOE et al 2003). If plutonium 239/240 is present below 6 feet, conduct a SSRS.
- Consult with regulatory agencies if contaminant concentrations are greater than the proposed ecological ALs but lower than the WRW ALs.
- If contaminated soil is removed, collect confirmation soil samples in accordance with the Industrial Area Sampling and Analysis Plan (DOE 2001).

Valve Vaults 11, 12 and 13 and the associated process waste lines connecting these valve vaults will be closed in accordance with the Closure Description Document of the Partial Closure of Unit 374.3 – 700 and 800 Area Process Waste Transfer System (DOE 2003c). Removal of the Building 223 and 549 slabs located in IHSS 117.1 will be conducted in accordance with the RSOP for Facility Disposition (DOE 2000b).

It is anticipated that after remediation there may be areas with concentrations of metals, radionuclides, and organics greater than background mean plus two standard deviations or method detection limit or reporting limit, but below RFCA ALs.

## **2.5 Stewardship Evaluation**

Based on the PCOCs (Table 1 and Section 2.1) and the ER RSOP (DOE 2002), it is anticipated that all contamination above RFCA ALs will be remediated. Figure 2 shows the potential remediation areas (IHSS, PAC and UBC sites).

If remediation is conducted, an additional stewardship evaluation will be conducted during remediation using the consultative process and will be documented in a closeout report for IHSS Groups 500-1 and 500-5. A new map of residual contamination will be generated after remediation. The following sections present the stewardship evaluation.

### **2.5.1 Proximity to Other Contaminant Sources**

IHSS Groups 500-1 and 500-5 are in the RFETS IA and are located close to other contaminant sources. IHSS Group 300-3, which includes UBC 371, and IHSS Group

300-4, which includes UBC 374, are located to the northwest of IHSS Group 500-1. IHSS Group 500-3, which includes UBC 559 and UBC 528, is located to the east of IHSS Group 500-1. IHSS Group 500-2, which includes IHSS 500-158, and IHSS Group 500-4, which includes IHSS 500-117.2, are located to the south of IHSS Group 500-1.

### **2.5.2 Surface Water Protection**

Surface water protection includes the following considerations:

#### ***Is there a pathway to surface water from potential erosion to streams or drainages?***

Soil contaminants from IHSS Groups 500-1 and 500-5 could migrate to surface water via erosion. The general drainage is to the north, and surface runoff is conveyed to North Walnut Creek.

#### ***Do characterization data indicate there are contaminants in surface soil?***

Existing soil data, discussed in the IASAP Addendum for IHSS Groups 500-1 and 500-5 (DOE 2003a), do not indicate that there are contaminant concentrations that exceed RFCA WRW ALs. However, historical knowledge indicates that additional characterization is warranted (refer to Section 2.3, Screen 1). Therefore, the IHSS Groups will be further characterized in accordance with IASAP Addendum #IA-04-03, and results will be documented in a data summary or closeout report.

#### ***Do monitoring results from Points of Evaluation (POEs) or Points of Compliance (POCs) indicate there are surface water impacts from the area under consideration?***

Recent water quality monitoring results from SW093, which receives runoff from IHSS Groups 500-1 and 500-5 and is the nearest POE, indicate no adverse surface water impacts from the IHSS Groups. Surface water data for the IHSS Groups' PCOCs indicate no exceedance of surface water standards (DOE 2003b). However, the findings and conclusions of prior Walnut Creek and SW093 source evaluations suggest that one or more low-level distributed actinide source areas exist within the SW093 subdrainage.

#### ***Is the IHSS Group in an area with high erosion potential, based on the 100-Year Average Erosion Map?***

IHSS Groups 500-1 and 500-5 are not located in an area subject to erosion in accordance with Figure 1 of the RFCA Modification (DOE et al 2003).

### **2.5.3 Monitoring**

Monitoring includes the following considerations:

#### ***Do monitoring results from POEs or POCs indicate there are groundwater impacts from the area under consideration?***

Two groundwater monitoring wells are located within IHSS Group 500-1: P114589 and P114789. These are not POE or POC wells. Data in the RFETS Soil-Water Database (SWD) indicate that all contaminant concentrations in both wells were below the RFCA Tier I groundwater ALs. Contaminant concentrations in Well P114589 were also below Tier II ALs. Well P114789 had tetrachloroethene concentrations greater than the Tier II

AL in samples collected in November 1993, August 1994, November 1994, January 1995, and June 2003.

The groundwater contamination at IHSS Group 500-1 is considered part of the IA Plume. The Site plume location map (DOE 2003d) indicates that the VOC plume underlies the IHSS Group. This plume is much larger than the IHSS Group and probably is attributable to multiple sources within the IA, including perhaps IHSS Group 500-1. Groundwater in the area of this IHSS Group is downgradient of a significant portion of the IA, and contaminant levels could be attributable to upgradient sources. Further groundwater evaluation will be conducted as part of the groundwater plume remedial decision and future sitewide evaluation.

***Can the impact be traced to a specific IHSS Group?***

Impacts can not be traced to IHSS Groups 500-1 and 500-5; however, IHSS Group 500-1 could be a source of contamination.

***Are additional monitoring stations needed?***

Not applicable at this time. The need for and placement of monitoring stations will be re-evaluated in the *Long-Term Stewardship Plan*.

***Can existing monitoring locations be deleted if additional remediation is conducted?***

Not applicable. Existing wells monitor contamination from areas within and outside IHSS Groups 500-1 and 500-5.

**2.5.4 Stewardship Actions and Recommendations**

The current stewardship actions and recommendations for IHSS Groups 500-1 and 500-5 are as follows:

- Use Best Management Practices to reduce erosion into surface water drainage.
- Implement near-term institutional controls until final closure and stewardship decisions are implemented, including the following:
  - Fencing and signs to restrict access; and
  - Soil excavations controlled through the Site Soil Disturbance Permit process.
- Implement long-term stewardship actions, including the following:
  - Prohibitions on construction of buildings in the IA;
  - Restrictions on excavations or other soil disturbance; and
  - Prohibitions on groundwater pumping in the area of IHSS Groups 500-1 and 500-5.

These recommendations may change based on in-process remediation activities and other future RFETS remediation decisions.

## **2.6 Accelerated Action Remediation Goals**

ER RSOP remedial action objectives include the following:

1. Provide a remedy consistent with the RFETS goal of protection of human health and the environment;
2. Provide a remedy that minimizes the need for long-term maintenance and institutional or engineering controls; and
3. Minimize the spread of contaminants during implementation of accelerated actions.

## **2.7 Treatment**

Not applicable.

## **2.8 Project-Specific Monitoring**

High-volume air samplers may be used at the remediation area consistent with work controls to determine airborne radioactivity concentrations. Approximate locations of air samplers are shown on Figure 2.

## **2.9 Resource Conservation and Recovery Act (RCRA) Units and Intended Waste Disposition**

Valve Vaults 11, 12 and 13 and the associated process waste lines connecting these valve vaults will be closed in accordance with the Closure Description Document of the Partial Closure of Unit 374.3 – 700 and 800 Area Process Waste Transfer System (DOE 2003c).

RCRA Unit 1 is currently planned to be closed during the 1<sup>st</sup> or 2<sup>nd</sup> quarter of FY05. Closure activities will be conducted in compliance with RCRA and RFCA.

## **2.10 Administrative Record Documents**

DOE, 1992-2002, Historical Release Reports for the Rocky Flats Plant, Golden, Colorado.

DOE, 1996, Annual Update for the Historical Release Report, RF/ER-96-0046, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE 2003, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-04-03, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003c, Closure Description Document of the Partial Closure of Unit 374.3 – 700 and 800 Area Process Waste Transfer System, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, CDPHE, EPA, 1996, Final Rocky Flats Cleanup Agreement, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, July.

DOE, CDPHE, EPA, 2002, Proposed RFCA Modifications, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, November.

DOE, CDPHE, EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement Attachment, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

### **2.11 Projected Schedule**

Remediation of IHSS Groups 500-1 and 500-5 is expected to begin in the second quarter of FY 04.

### **3.0 PUBLIC PARTICIPATION**

ER RSOP Notification #04-03 activities were discussed at the October 2003 ER/D&D Status meeting. A PDF version of this notification was provided to the local governments. This notification is available at the Rocky Flats Reading Rooms and on the EDDIE website at [www.rfets.gov](http://www.rfets.gov).

### **4.0 REFERENCES**

DOE, 1992, Historical Release Reports for the Rocky Flats Plant, Golden, Colorado, June.

DOE, 1996, Annual Update, Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, RFCA Standard Operating Protocol for Recycling Concrete, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000a, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000b, RFCA Standard Operating Protocol for Facility Disposition, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2003a, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-04-03, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Automated Surface Water Monitoring Report – Second Quarter FY 03, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, 2003c, Closure Description Document of the Partial Closure of Unit 374.3 – 700 and 800 Area Process Waste Transfer System, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2003d, Passive Reactive Barriers and Plume Locations at Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, CDPHE, EPA, 1996, Final Rocky Flats Cleanup Agreement, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement Attachment, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

**Figure 1**  
**IHSS Groups 500-1 and 500-5**  
**Location Map**

**KEY**



500-1



500-5

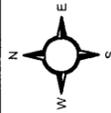


Demolished  
Building



Standing  
Building

Paved Road



200 0 200 400 600 800 Feet

Scale = 1:8,000

State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD 27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

Prepared by:

**RADMS**  
REMEDIATION AND DESIGN SERVICES

Prepared for:



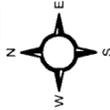
File: w:\projects\2003\500-1\500-1 characterization.apr Date: 10/06/03



**Figure 2**  
**Potential Remediation Areas**  
**IHSS Groups 500-1 and 500-5**

**KEY**

- NPWL
- Storm Drain
- Sewer Line
- Foundation Drain
- Paved Road
- Dirt Road
- Streams
- Fence
- Building
- IHSS
- PAC
- Valve Vault
- Approximate Location of Air Sampler



Scale = 1:1,000

State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD 27

U.S. Department of Energy  
 Rocky Flats Environmental Technology Site

Prepared by:



Prepared for:



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Date: 08/27/03

