

**Final Environmental Restoration
RFCA Standard Operating Protocol
for Routine Soil Remediation
FY04 Notification #04-05
IHSS Group 700-2**

December 2003

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Approval received from the Colorado Department of Public Health and Environment
December 22, 2003.

Approval letter is contained in the Administrative Record.

December 2003

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ACRONYMS

AL	action level
bgs	below ground surface
BMP	best management practice
COC	contaminant of concern
cy	cubic yard
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
DOP	Decommissioning Operations Plan
EDDIE	Environmental Data Dynamic Information Exchange
EPA	U.S. Environmental Protection Agency
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
in.	inches
mg/kg	milligrams per kilogram
nCi/g	nanocuries per gram
PAC	Potential Area of Concern
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
PCOC	potential contaminant of concern
PDF	Portable Document Format
POC	Point of Compliance
POE	Point of Evaluation
ppm	parts per million
RAO	remedial action objective
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
SVOC	semivolatile organic compound
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 2003a) 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 Group 700-2. 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 (DOE et al, 2003) and the ER RSOP (DOE 2003a).

IHSS Group 700-2 is shown on Figure 1. The UBC and IHSS sites are shown on Figures 2. The proposed remediation sites covered under ER RSOP Notification #04-05 are listed in Table 1.

Table 1
Potential Remediation Areas for IHSS Group 700-2

IHSS Group	IHSS/PAC/UBC Site	PCOCs	Media	Estimated Remediation Volume
700-2	UBC 707 – Plutonium Fabrication and Assembly	Metals PCBs Radionuclides SVOCs VOCs	Concrete and subsurface soil	~1000 cy ^a
	UBC 731 – Building 707 Process Waste	Metals Radionuclides SVOCs VOCs	Concrete and subsurface soil	~20 cy ^a
	IHSS 000-121, OPWL – Tank 11, Building 731	Metals Radionuclides SVOCs VOCs	Piping and subsurface soil	~10 cy ^a
	IHSS 000-121, OPWL – Tank 30, Building 731	Metals Radionuclides SVOCs VOCs	Piping and subsurface soil	~10 cy ^a

^a – Based on removing 10 percent of the soil volume under the building footprint to a depth of 2.5 feet bgs.

Figure 1

**IHSS Group 700-2
Location Map**

KEY

-  UBC Site (707 and 731)
-  Demolished structure
-  Structure
-  Paved area
-  Dirt road
-  Stream, ditch, or other drainage
-  OPWL piping

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100 0 100 200 Feet

Scale = 1:6,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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

Prepared by:



Prepared for:

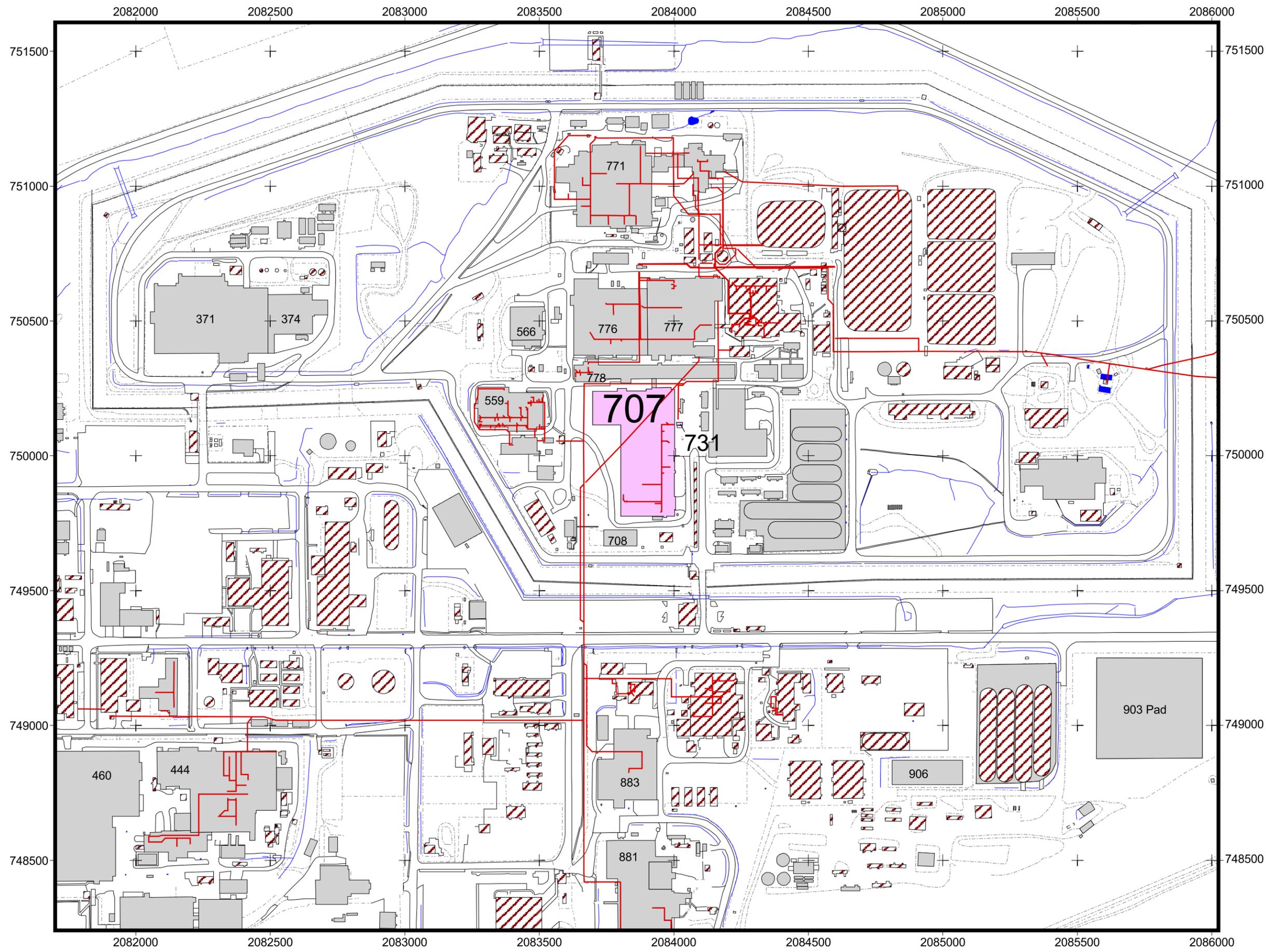
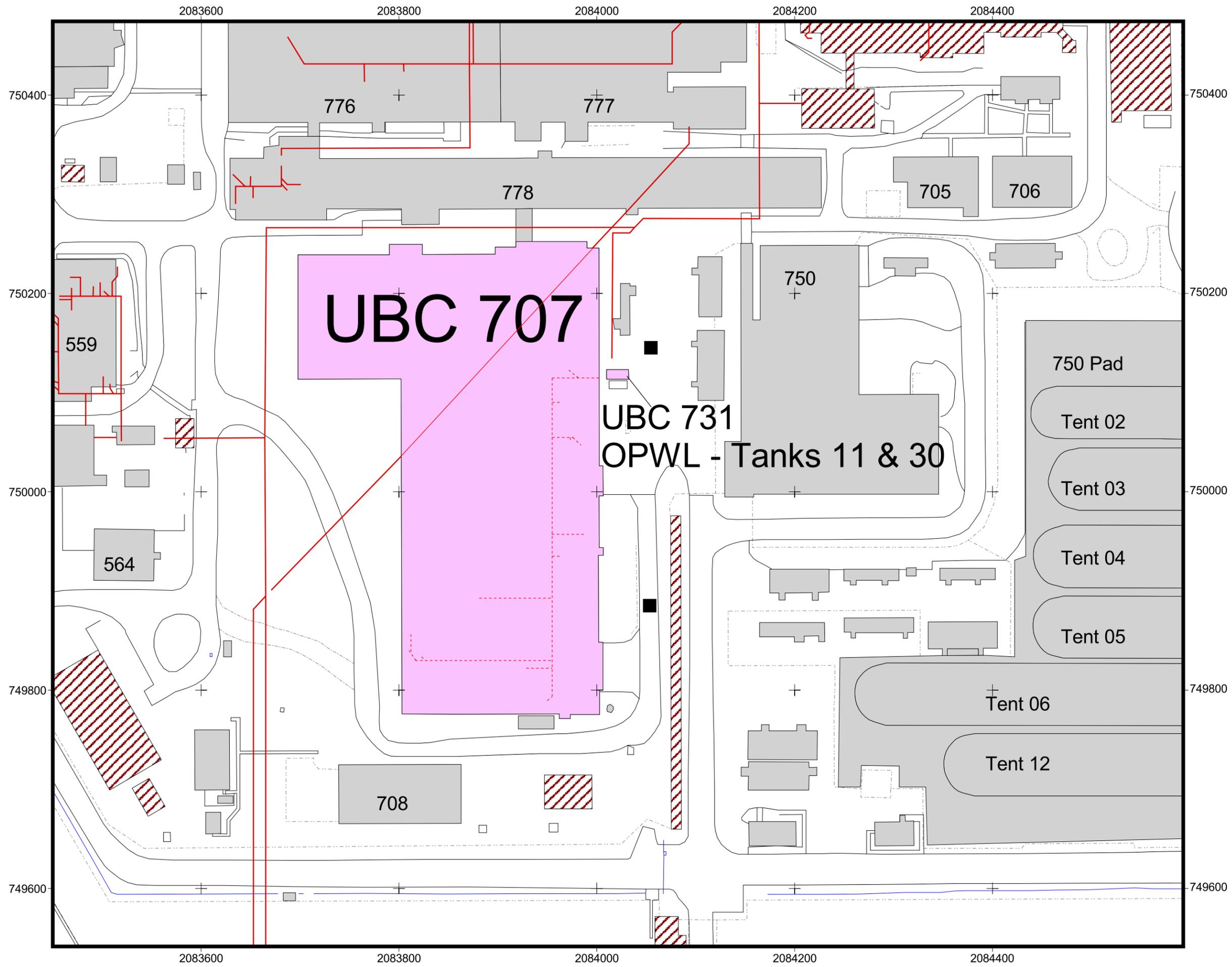


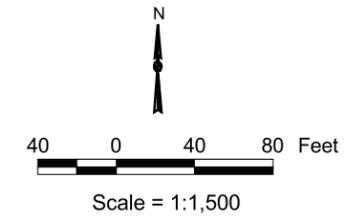
Figure 2
IHSS Group 700-2
Potential Remediation Areas



KEY

-  UBC Site
-  Demolished structure
-  Structure
-  Paved area
-  Dirt road
-  Stream, ditch, or other drainage
-  OPWL
-  OPWL (P-19) derived from as-built drawings
-  Approximate location of air sampler

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State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD 27

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

Prepared by:



Prepared for:



2.0 IHSS GROUP 700-2

IHSS Group 700-2 includes the following:

- UBC 707 – Plutonium Fabrication and Assembly;
- UBC 731 – Building 707 Process Waste;
- IHSS 000-121, Original Process Waste Line (OPWL) – Tank 11, Building 731; and
- IHSS 000-121, OPWL – Tank 30, Building 731.

2.1 PCOCs

Potential contaminants of concern (PCOCs) at IHSS Group 700-2 are listed in Table 1. The PCOCs were determined based on process knowledge and data collected during previous studies (DOE 1992-2002, 2001).

2.2 Project Conditions

The following conditions are present within the IHSS Group 700-2 area:

- UBC 707 consists of the contaminated soils associated with Building 707. The building area is approximately 107,500 square feet and contains depressed floor slabs, glove box underpasses, sumps, pits, and process waste lines.
- UBC 731 consists of contaminated soils associated with Building 731, which is located in the courtyard east of Building 707. Building 731 is approximately 210 square feet and consists of a below-ground surface concrete vault that houses two 1,650-gallon fiberglass tanks (IHSS 000-121 OPWL – Tanks 11 and 30) and associated transfer pumps. Liquid process wastes from Building 707 were stored in the tanks prior to being sent to Building 374 for treatment. The tanks underwent RCRA closure in 1995 (DOE 2000a). To date, the tanks have not been removed.
- OPWL (P-14 and P-15) present north and west of Building 707. Although not listed as a separate IHSS within IHSS Group 700-2, these process lines will be included as part of the UBC 707 accelerated action sampling activities.

Additionally, soil remediation activities were conducted adjacent to the east side of the Building 707 near the radiometry vault (approximately 120 feet south of Building 731) during September 1995 to remove PCBs contaminated soil. The release of PCBs was from the transformer area located on the roof of the building. Approximately 65 cubic yards of contaminated soil were excavated from the area and shipped to an approved waste disposal facility in Kettleman, California. The depth and dimensions of the excavation were guided by numerous soil sampling locations. Following completion of soil excavation activities and backfilling with clean material from off-site, confirmation samples were obtained to determine if the cleanup criteria of 25 ppm had been achieved. The highest PCB detections remaining in the soil consisted of Aroclor 1254 at a concentration of 7.0 ppm and Aroclor 1260 at a concentration of 5.0 ppm (RMRS 1997).

2.3 RFCA SSRS Evaluation

An SSRS is performed when non-radionuclides and uranium are present in the soil 6 inches from the ground surface, when americium and plutonium are present below 3 feet from the ground surface, and for soil beneath below-grade structures. Current site conditions are evaluated using available characterization data to determine whether remediation is required by the SSRS. The SSRS will be conducted again after the accelerated action and related characterization tasks are completed. The accelerated actions taken, characterization results, and a revised SSRS will be documented in the IHSS Group 700-2 Closeout Report.

Screen 1 – Are contaminant of concern (COC) concentrations below RFCA Table 3 soil ALs for the wildlife refuge worker (WRW)?

Existing soil data, discussed in the IA Sampling and Analysis Plan (IASAP) Addendum #IA-04-02 for IHSS Group 700-2 (DOE 2003b), indicate that contaminant concentrations exceed RFCA WRW ALs. Specifically, arsenic exceeded the WRW AL of 22.2 mg/kg at one location with a concentration of 29.7 mg/kg and chromium exceeded the WRW AL of 268 mg/kg at one location with a concentration of 593 mg/kg

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

IHSS Group 700-2 is 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 IASAP Addendum #IA-04-02 for IHSS Group 700-2 (DOE 2003b), 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. Therefore, the IHSS Group will be further characterized in accordance with IASAP Addendum #IA-04-02, and results will be further evaluated and documented in the closeout report.

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 Group 700-2 soil or structures. Run-off from IHSS Group 700-2 flows through gauging station GS40 (DOE 2003c). The nearest downgradient RFCA surface water point of evaluation (POE) is GS10 (DOE 2003c). This POE has had reported concentrations greater than water quality action levels; however, GS10 receives water from a large part of the IA, and surface water quality at this location may not be attributable to any single upgradient IHSS Group. The potential for the IHSS Group to cause concentrations greater than surface water action levels will be reevaluated based on the final characterization data and documented in the closeout report.

Screen 5 – Are COC concentrations below RFCA Table 3 soil action levels for ecological receptors?

Existing soil data, discussed in the IASAP Addendum #IA-04-02 for IHSS Group 700-2 (DOE 2003b), indicate that lead and arsenic concentrations near the western edge of Building 707 and south of Building 731 exceed RFCA ecological receptor ALs. Therefore, the IHSS Group will be further characterized in accordance with IASAP Addendum #IA-04-02. Results will be compared to the ecological receptor ALs and used for the accelerated action ecological evaluation as well as documented in the closeout report.

2.4 Remediation Plan

The RSOP Notification remediation plan for IHSS Group 700-2 includes the following objectives:

- If the slabs remain after building decontamination and decommissioning (D&D), remove slabs within 3 feet of the final grade in accordance with the RSOP for Facility Disposition (DOE 2000b).
- If necessary, dispose of Buildings 707 and 731 building components in accordance with applicable site procedures. Components will be recycled in accordance with the RSOP for Recycling Concrete (DOE 2003d) or disposed at an appropriate facility based on waste characterization results.
- Remove OPWL drains and piping within 3 feet of the final grade in accordance with RFCA Attachment 14 (DOE et al, 2003).
- Remove foundation, sanitary, and storm drains to within 3 feet of final grade.
- Remove soil with non-radionuclide or uranium contaminant concentrations greater than the 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 need for further accelerated action.
- Remove soil with plutonium-239/240 or americium-241 concentrations greater than the RFCA WRW AL to a depth of 3 feet, or to less than the applicable AL, whichever comes first. If activities 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 or americium-241 is present at activities greater than the RFCA WRWAL but less than 3 nCi/g below 3 feet, conduct an SSRS.
- Consult with regulatory agencies if contaminant concentrations are greater than the ecological receptor ALs but lower than the WRW ALs.
- If contaminated soil is removed, collect confirmation soil samples in accordance with the IASAP (DOE 2001).

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

2.5 Stewardship Evaluation

Based on the PCOCs (Table 1) and the ER RSOP (DOE 2003a), it is anticipated that all contamination above RFCA ALs will be remediated. Figure 2 shows the potential remediation areas (IHSS and UBC sites).

Because the full extent of excavation and remediation is not known at this time, an additional stewardship evaluation will be conducted during remediation using the consultative process and will be documented in a closeout report for IHSS Group 700-2. 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 Group 700-2 is in the RFETS IA and is located close to other contaminant sources. IHSS Group 700-3, which includes UBCs (776, 777, 778, and 701), IHSSs, and OPWLs, is located north of IHSS Group 700-2. IHSS Group 700-7, which includes UBC 779, IHSSs, and OPWLs, is located northeast of IHSS Group 700-2. IHSS Group 700-8, which includes the 750 Pad – Pondcrete/Saltcrete Storage, is located east of IHSS Group 700-2. IHSS Group 500-3, which includes UBCs (559 and 528) and OPWLs, is located west of IHSS Group 700-2.

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 Group 700-2 could migrate to surface water. The runoff from Buildings 707 and 731 is captured by the storm sewer system, flows south, then flows northeast through surface water gaging station GS40 (a D&D performance monitoring station). From GS40, surface water is conveyed to the northeast in South Walnut Creek via GS10 (a surface water POE) to Pond B-4.

Do characterization data indicate there are contaminants in surface soil?

Existing soil data, discussed in IASAP Addendum #IA-04-02 for IHSS Group 700-2 (DOE 2003b), indicate there are concentrations of arsenic and chromium that exceed RFCA WRW ALs. Additional sampling within IHSS Group 700-2 will provide the data needed to characterize contaminants in surface soil.

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

The nearest RFCA POE is GS10 and concentrations greater than water quality action levels have been detected at this monitoring station. However, GS10 receives water

from a large part of the IA, and surface water quality at the monitoring station cannot be attributable to any single IHSS Group.

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

IHSS Group 700-2 is 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?

The groundwater monitoring wells in the vicinity of IHSS Group 700-2 are wells 00200, 00300, 60399, 60499, 60599, 60699, 61499, FD-707-4, and P218089. All of the wells are used for D&D at Building 707. Data in the RFETS Soil Water Database (SWD) are summarized as follows:

- Well 00200 contained detections of volatile organic compounds (VOCs); however, RFCA Tier 1 and Tier 2 groundwater ALs were not exceeded.
- Well 00300 contained detections of uranium-235 and VOCs. Concentrations of uranium-235 and trichloroethene were reported at concentrations exceeding the Tier 2 ALs. No other analytes exceeded Tier 1 or Tier 2 ALs.
- Well 60399 contained detections of VOCs; however, Tier 1 and Tier 2 ALs were not exceeded.
- Well 60499 contained detections of VOCs; however, Tier 1 and Tier 2 ALs were not exceeded.
- Well 60599 did not contain reportable concentrations of PCOCs.
- Well 60699 contained detections of uranium-234, 235, and 238, americium-241, and VOCs. Uranium-234, 235, and 238 and carbon tetrachloride exceeded the Tier 2 ALs. No other analytes exceeded Tier 1 or Tier 2 ALs.
- Well 61499 contained detections of VOCs; however, Tier 1 and Tier 2 ALs were not exceeded.
- Well FD-707-4 contained detections of VOCs; however, Tier 1 and Tier 2 ALs were not exceeded.
- Well P218089 contained a detection of tetrachloroethene, nitrate, and sulfate. Nitrate exceeded the Tier 2 AL. No other analytes exceeded Tier 1 or Tier 2 ALs.

The Site plume location map (DOE 2002) indicates that the eastern part of the VOC plume underlies approximately the western half of Building 707. The plume, however, is much larger than IHSS Group 700-2 and probably is attributable to multiple sources within the IA. Groundwater in this area is downgradient of a significant portion of the IA, and contaminant levels could be attributable to many 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 cannot be definitively traced to IHSS Group 700-2; however, IHSS Group 700-2 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 Group 700-2.

2.5.4 Stewardship Actions and Recommendations

The current stewardship actions and recommendations for IHSS Group 700-2 are as follows:

- Use Best Management Practices (BMPs) 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 Group 700-2.

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 (RAOs) include the following:

- Provide a remedy consistent with the RFETS goal of protection of human health and the environment;
- Provide a remedy that minimizes the need for long-term maintenance and institutional or engineering controls; and

- 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

Building 707 contains several active Resource Conservation and Recovery Act (RCRA) units. Table 2 describes active and inactive RCRA units at Building 707. Closure activities will be conducted in compliance with RCRA and RFCA in accordance with the Building 707 Decommissioning Operations Plan (DOP).

Table 2
Building 707 RCRA Units

RCRA Unit No.	Unit Description	Regulatory Status	Closure Status	Projected Closure Date
90.74	Container Storage, Room 141 (J-Vault)	Mixed Residue Container Storage Unit	RCRA STABLE; to be closed in accordance with B707 DOP.	Jan-04
707.1	Container Storage Area, Module A, Room. 100	PERMITTED	IN ACTIVE USE, repack tent for legacy waste. To be closed in accordance with B707 DOP. C-Cell cleaned using debris rule and closed by removal in November 2002.	Jan-04
707.1	Container Staging Area, Module D Room.115	PERMITTED	IN ACTIVE USE; to be closed in accordance with B707 DOP	Jan-04
707.1	Container Staging Area, Module H Room.135	PERMITTED	RCRA STABLE, to be administratively closed in accordance with B707 DOP.	Jan-04
707.1	Container Storage, Room. 183	PERMITTED	IN ACTIVE USE; to be closed in accordance with B707 DOP	Jan-04
707.1	Container Storage, Room. 196 (90.58)	PERMITTED	IN ACTIVE USE; to be closed in accordance with B707 DOP	Jan-04
S002	Oil and/or Aqueous Solidification Treatment Process	PERMITTED	INACTIVE, may be used again if needed; to be closed in accordance with the B707 (DOP). S002 in Building 707, Unit 707.1, A Module repack tent, under treatment unit 881.3B in the site RCRA permit. The treatment will be conducted in accordance with Operations Order OO-707/776-009.	
881.3B	Mercury amalgamation	PERMITTED	INACTIVE, may be used again if needed; to be closed in accordance with the B707 DOP. Treatment in Building 707, Unit 707.1, A Module repack tent, under treatment unit 881.3B in the site RCRA permit. The treatment will be conducted in accordance with Operations Order OO-707/776-009.	

2.10 Administrative Record Documents

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

DOE, 2000, Reconnaissance-Level Characterization Report (RLCR), Building 707 Cluster, Revision 1, 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, 2003, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Modification 1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003, RFCA Standard Operating Protocol for Recycling Concrete, Rocky Flats Environmental Technology Site, Revision 1, Golden, Colorado, June.

DOE, CDPHE, and 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, and 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 Group 700-2 is expected to begin in the third quarter of FY04.

3.0 PUBLIC PARTICIPATION

ER RSOP Notification #04-05 activities will be discussed at the November 2003 ER/D&D Status meeting. A Portable Document Format (PDF) version of this Notification was provided to the local governments. This Notification is available at the Rocky Flats Reading Rooms and on the Environmental Data Dynamic Information Exchange (EDDIE) Website at www.rfets.gov.

4.0 REFERENCES

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

DOE, 2000a, Reconnaissance-Level Characterization Report (RLCR), Building 707 Cluster, Revision 1, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

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, Second Quarter RFCA Groundwater Monitoring Report, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003a, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Modification 1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003b, Industrial Area Sampling and Analysis Plan FY04 Addendum #IA-04-02, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003c, Automated Surface Water Monitoring Report, Water Year 2001, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003d, RFCA Standard Operating Protocol for Recycling Concrete, Rocky Flats Environmental Technology Site, Revision 1, Golden, Colorado, June.

DOE, CDPHE, and 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.

RMRS, 1997, Closure Report for the Source Removal of Polychlorinated Biphenyls, RF/RMRS-97-044, Rocky Flats Environmental Technology Site, Golden, Colorado, July.