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Industrial Area Characterization and Remediation Strategy FY02 Update

Appendix C

September 2002

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ACRONYMS AND ABRIEVATIONS

AL	action level
ALF	Action Levels and Standards Framework for Surface Water, Ground Water, and Soils
AME	Actinide Migration Evaluation
AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
ASD	Analytical Services Division
BZ	Buffer Zone
BZSAP	Buffer Zone Sampling and Analysis Plan
CAD/ROD	Corrective Action Decision/Record of Decision
CDPHE	Colorado Department of Public Health and Environment
CDR	Conceptual Design Report
COC	contaminant of concern
CRA	Comprehensive Risk Assessment
CY	Calendar Year
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
DQO	data quality objective
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ER RSOP	Environmental Restoration RSOP for Routine Soil Remediation
ET	evapotranspiration
FDCM	Field Data Collection Module
FY	Fiscal Year
GIS	Geographic Information System
HEPA	high-efficiency particulate air
HRC	Hydrogen Release Compound
HRR	Historical Release Report
IA	Industrial Area
IA Strategy	Industrial Area Characterization and Remediation Strategy
IASAP	Industrial Area Sampling and Analysis Plan
ICP	Inductively Coupled Plasma
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action
K-H	Kaiser-Hill Company, L.L.C.
LRA	Lead Regulatory Agency
MDL	method detection limit
NFA	No Further Action
NLR	No Longer Representative
NPWL	New Process Waste Lines
NTS	Nevada Test Site
OPWL	Original Process Waste Lines
OU	Operable Unit

PAC	Potential Area of Concern
PAM	Proposed Action Memorandum
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
PCOC	potential contaminant of concern
PDS	pre-demolition survey
PIC	Potential Incident of Concern
PRG	preliminary remediation goals
PU&D	Property Utilization and Disposal
QA	quality assurance
RADMS	Remedial Action Decision Management System
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RISS	Remediation, Industrial D&D, and Site Services
RSAL	Radionuclide Soil Action Level
RSOP	RFCA Standard Operating Protocol
SEP	Solar Evaporation Ponds
Service	U.S. Fish and Wildlife Service
Site	Rocky Flats Environmental Technology Site
SOP	standard operating procedure
SOR	sum or ratios
SVOC	semivolatile organic compound
SWD	Soil Water Database
SWWB	Site-Wide Water Balance
TEQ	toxicity equivalent
TM	Technical Memorandum
UBC	Under Building Contamination
UCL	Upper Confidence Level
V&V	verification and validation
VOC	volatile organic compound
WY	Water Year

1.0 INTRODUCTION

The Industrial Area (IA) Characterization and Remediation Strategy (IA Strategy) (DOE 1999) was developed by the U.S. Department of Energy (DOE) during Fiscal Year (FY) 99 to provide a roadmap for final closure of the Rocky Flats Environmental Technology Site (RFETS or Site) IA and ensure integration of remediation activities, including facility decommissioning, characterization, remediation, and regulatory agency and stakeholder participation. This FY02 (October 1, 2001, through September 30, 2002) IA Strategy Update describes progress on IA Strategy components and changes to the IA Strategy. This Update is being incorporated as Appendix C of the IA Strategy.

Because the Environmental Restoration (ER) strategy and other Site activities affect the IA Strategy, information on Buffer Zone (BZ) activities, decommissioning activities, and other pertinent Site activities are included in this Update.

Major accomplishments during FY02 include the following:

- Finalization and approval of the BZ Sampling and Analysis Plan (BZSAP) (DOE 2002a);
- Finalization and approval of the ER Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) (DOE 2002b);
- Implementation of the Field Data Collection Module (FDCM) of the Remedial Action Decision Management System (RADMS);
- Development and approval of seven IA Sampling and Analysis Plan (IASAP) Addenda;
- Development and approval of 10 ER RSOP Notifications;
- Development and approval of one BZSAP Addendum;
- Development of one Proposed Action Memorandum (PAM);
- Development of a minor modification to the Solar Evaporation Ponds (SEP) Decision Document (DOE 2002c);
- Development of four Technical Memoranda (TM) in support of the Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI);
- Approval of one of the four TMs;
- Development of a draft Comprehensive Risk Assessment (CRA)Work Plan;

- Approval of 91 No Further Action (NFA) sites;
- Approval of 49 Potential Incidents of Concern (PICs) as NFA sties;
- Characterization of 15 Individual Hazardous Substance Sites (IHSSs), 14 Potential Areas of Concern (PACs), and 6 Under Building Contamination (UBC) sites;
- Remediation of 1 IHSS and 1 UBC Site;
- Remediation of portions of 2 IHSSs, 2 PACs, and 3 UBC Sites; and
- Development of the SEP Area of Concern (AOC) risk assessment.

2.0 REGULATORY FRAMEWORK

The RFCA Parties (DOE, the Colorado Department of Public Health and Environment [CDPHE], and the U.S. Environmental Protection Agency [EPA]) evaluated current Radionuclide Soil Action Levels (RSALs) to determine whether revised RSALs were required. Results of this evaluation will be presented to the stakeholders in FY03.

3.0 DECISION FRAMEWORK

Decontamination and decommissioning (D&D) and future land use decisions affect ER decisions and activities.

3.1 Site Closure

The ability to remediate many UBC sites and associated IHSSs depends on building decommissioning. Decommissioning of nonplutonium buildings was accelerated during FY02, which resulted in the demolition of the Building 886 Cluster; Buildings 111, 123, 133, 441, 662 and 663; and the 452 Trailers.

Table 1 lists the anticipated dates for completion of South Side facility decommissioning.

3.2 Future Land Use

Future onsite land use at RFETS includes ER, D&D, and transfer of jurisdiction to the U.S. Fish and Wildlife Service (Service) for use as a wildlife refuge, in accordance with the Rocky Flats National Wildlife Refuge Act of 2001. RFCA Attachment 5, Action Levels and Standards Framework for Surface Water, Ground Water, and Soils (ALF), may be modified to implement an integrated risk-based approach for RFCA accelerated actions consistent with the anticipated final remedy for RFETS cleanup. Proposed modifications will be available for public comment in early FY03.

Table 1
South Side Decommissioning Acceleration Strategy

Facility	Decommissioning Completed
Building 865	2nd Quarter, FY03
Building 335	3rd Quarter, FY03
Building 551	1st Quarter, FY04
Water System	2nd Quarter, FY04
Building 441	4th Quarter, FY03
Building 881	3rd Quarter, FY04
Building 331	3rd Quarter, FY04
Building 991	3rd Quarter, FY04
Building 444	4th Quarter, FY04
Building 883	4th Quarter, FY04
Sanitary Sewer System	4th Quarter, FY04
Building 906	4th Quarter, FY04
Building 460	2nd Quarter, FY05
Building 566	2nd Quarter, FY05
Building 440	4th Quarter, FY05
Building 559	4th Quarter, FY05
Building 664	2nd Quarter, FY05

4.0 CHARACTERIZATION AND REMEDIATION APPROACH

Major characterization and remediation activities during FY02 included continued integration with D&D staff, developing risk assessment methodologies, and characterization and remediation field activities.

4.1 Grouping of Sites

There are no updates to the grouping of IA sites.

4.2 Integration With Decommissioning

Extensive efforts have been made over the past year to integrate environmental and decommissioning activities, projects, and organizational interfaces. This integration has included attendance at integration meetings between D&D, ER, and the regulatory agencies. Integration efforts include weekly meetings with the principal managers of both programs to discuss upcoming activities and potential issues. These meetings are used to ensure that coordination occurs during the preparation of planning documents and project scoping. Additional integration activities include the monthly ER/D&D status meetings with the regulatory agencies, DOE, Kaiser-Hill, L.L.C. (K-H) staff and stakeholders.

4.2.1 FY02 Integrated Projects

FY02 integrated projects include the following:

- D&D of Building 886 and soil remediation beneath associated structures;
- Characterization of UBC site 881;
- Characterization and remediation at UBC site 442;
- Characterization of soil beneath Buildings 662 and 663;
- Characterization of PAC 400-804, which included the T452 Trailers
- Characterization planning of Building 335; and
- Early limited characterization planning at Buildings 776/777.

4.2.2 Decontamination and Decommissioning Projects

FY02 deactivation and D&D activities that facilitate future ER work in the IA include the following:

Building 559

- Removed two cold glovebox lines (102 and 103),
- Removed the glovebox that contained the house vacuum system pumps,
- Cleaned Room 130 and converted it to a step-off pad,
- Installed a new dock door to facilitate removal of gloveboxes and large equipment, and
- Removed three glovebox lines in Room 103E (M32, M33, and M34) as well as the Inductively Coupled Plasma (ICP) unit (M35) and a hood (M36);

Building 707

- Completed the D&D of 36 Work Sets (Lifecycle 36 of 99 Work Sets completed to date), and
- Removed 167 glovebox and chainveyor sections;

Buildings 771/774

- Completed draining and treatment of actinide liquids,
- Removed and packaged 68 gloveboxes from 37 process lines including americium recovery, high-level dissolution, precipitation, calcination, reduction, and incineration,
- Removed and packaged more than 15,000 linear feet of process piping and ducts,

- Stripped and packaged five filter plenums including the incinerator filter plenum,
- Removed and packaged 122 tanks,
- Dismantled two size reduction enclosures, and
- Removed and packaged non-load bearing walls from west process areas;

Buildings 776/777

- Completed the D&D of 28 Work Sets (Lifecycle 67 of 84 Work Sets completed to date), and
- Removed 153 glovebox sections;

900 Area

Tank 207

- Removed sludge (nearly complete by end of FY02),

Building 987

- Completed transition to cold and dark,
- Readied for demolition,

Building 910

- Resolved RCRA issues,
- Removed and sold generators and ancillary equipment,
- Completed transition to cold and dark,
- Readied for dismantlement, decontamination, and demolition,

Buildings 992 & 993

- Completed transition to cold and dark,
- Readied for demolition,

Cargo Containers

- Removed approximately 7 of 48 cargo containers,

Additional Work

- Removed waste line,
- Removed steam line, and
- Removed grit blasting structure;

Southside

Buildings 111 and 125

- Completed D&D,

Building 133 and the 132 Substation Pad

- Completed D&D,

Buildings 442L, 442W, 444, 452, 452A, 452B, 452C, 452D, 452E, 452F, 452G

- Completed D&D stabilization and hazard reduction,

Buildings 662, 663, T690N

- Completed D&D,

Buildings 828, 850, 864, 865, 875, 880, 886, T886A, T886B, T886C, T891D, T891E, T891F, T891G, T891O, T891P, T891R, T891V, T893A, T893B, 888A, 888

- Completed D&D, and
- Completed D&D of approximately 75 percent of the 865 complex.

4.2.3 Decontamination and Decommissioning Forecast

D&D activities forecast for FY03 that will have a significant impact on the advancement of ER in the IA include the following:

Building 559

- Remove all equipment in Building 528 including two tanks (D522 and 523),
- Remove the glove box line in Room 103 (11 boxes),
- Remove 12 glove box lines in Room 102 (41 boxes) as well as 4 hoods, and
- Remove 4 glove box lines in Room 101 (12 boxes);

Building 707

- Complete the D&D of 20 Work Sets;

Buildings 771/774

- Remove and package all remaining process piping, gloveboxes (4), tanks (30), and filter plenums (6),
- Dismantle and package remaining walls, electrical, piping, cold equipment, and asbestos,
- Decontaminate the B771 first floor structure (floors, walls, ceilings), and

- Begin final surveys on decontaminated areas;

Buildings 776/777

- Complete the D&D of seven Work Sets;

900 Area

Tank 207

- Complete shipping sludge to storage (paperwork, inspections, etc.),
- Demolish tank,

Cargo Containers

- Remove 18 additional cargo containers,

Building 910

- Complete dismantlement, pre-demolition survey (PDS), and demolition,

Building 991 Tunnel

- Complete D&D,

Building 991

- Initiate D&D,
- Complete dismantlement,
- Start asbestos abatement,

Buildings 987, 992, and 993, and the 308 Tanks

- Complete demolition; and

Southside

Buildings 112, 223, 280, 334, 335, 441, T441A, 443, 444, 551, 666, 865 Complex, 881 Complex, and 884

- Complete D&D, and

Tents 7, 8, 9, 10, 11

- Complete removal.

4.3 Risk and Dose Assessment Methodology

Activities were initiated to update the risk and dose assessment methodologies and supporting documentation. Risk and dose assessment methodology updates are described below.

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4.3.1 Risk and Dose Assessment Methodology

Human health and ecological receptor activities completed in FY02 include the following:

- Development of ecological based action levels (ALs) for various receptors;
- Development of a contaminant of concern (COC) screening process for sitewide contaminants;
- Development of a subsurface risk screening process; and
- Development of an ecological risk screening process.

4.3.2 Comprehensive Risk Assessment

A draft CRA Work Plan was prepared in FY02 that details the activities that will be necessary to perform the final closure CRA for the Site. The draft CRA Work Plan replaces the draft CRA Methodology that was released in September 2000. The draft CRA Work Plan incorporates the draft CRA Methodology and in addition, represents a major revision to this document. The draft CRA Work Plan will be finalized in FY03.

The CRA Work Plan addresses the following topics:

- Data quality objectives (DQOs);
- Site Conceptual Model, including exposure scenarios, exposure pathways, and receptors;
- Final list of COCs following statistical evaluation and preliminary screening;
- Reasonably foreseeable anticipated land use and use restrictions for the Site;
- Background concentrations for COCs;
- Established detection limits for COCs;
- COC physical and chemical characteristics;
- Methods for conducting the exposure assessment, toxicity assessment, and risk characterization;
- Fate and transport models used to predict exposure point concentrations; and
- Calculated Preliminary Remediation Goals (PRGs) for surface soils, sediments, and groundwater from a human health and ecological perspective.

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Contributing Studies

Contributing studies that affect the IA strategy are described below.

Actinide Migration Evaluation

The Actinide Migration Evaluation (AME) Program was initiated in 1996 to address how radioactive elements move in the environment. Specifically, the AME focused on issues of actinide behavior and mobility in surface water, groundwater, air, soil, and biota at RFETS. For the purposes of the study, an actinide refers to the radioactive elements uranium, plutonium, or americium. To address issues of actinide migration, the AME Program brought together personnel with a broad range of relevant expertise in technical investigations, project management, and external advisory roles. This effort, funded by DOE, involved identification of research investigations and approaches that can be used to solve short- and long-term issues related to actinide migration at the Site. Findings of the AME Program are presented in the AME Pathway Analysis Report (DOE 2002d).

The report consists of a Summary Report, a condensed review of the study's major topics and findings, and a Technical Appendix that provides detailed discussions, calculations, and literature references to support subjects discussed in the summary report. The ultimate objective of the pathway study is to compare and quantitatively rank the various pathways in terms of total actinide loads transported offsite for a given time period.

The report concludes that quantified analyses of RFETS actinide pathways generally support the conceptual model, which identified soil and sediment transport processes as the primary mechanisms for plutonium and americium transport. Measured and modeled data confirm that wind and water erosion are the dominant plutonium and americium transport pathways, although the magnitude of airborne transport is larger than previously suggested in the qualitative conceptual model study. Modeled data also support the conceptual model in terms of shallow groundwater transport being a relatively minor pathway for plutonium and americium because of the low solubility and strong soil sorption characteristics of these actinides. Data also support the conceptual model regarding the importance of subsurface uranium transport, due to its higher solubility. Analyses indicate most of the uranium in shallow groundwater is from natural sources. Uranium loads transported offsite in shallow groundwater are small compared to surface water. However, discharges of shallow groundwater to the surface contribute a major fraction of the surface water uranium load in specific stream channels.

Knowledge garnered through the AME Program is being used to characterize current RFETS environmental conditions and recommend a path forward for long-term protection of surface water quality during closure and long-term stewardship of the Site. Findings of the AME Program will support the CRA for the Site.

Site-Wide Water Balance

The primary objective of the Site-Wide Water Balance (SWWB) study was to create a decision tool to quantitatively assess the integrated hydrologic conditions at RFETS. To this end, an integrated model was designed to simulate important drainage basin-scale processes that control RFETS hydrology. The model was developed so that its input and

output could be used to facilitate contaminant transport evaluations or engineering design calculations. Specifically, this integrated model was used to (1) comprehend and simulate current Site hydrologic conditions, and (2) assess the hydrologic impacts caused by hypothetical modifications to the current Site configuration. Model calibration and findings are presented in the Site-Wide Water Balance Modeling Report (DOE 2002e).

The complex surface water-groundwater interactions within the RFETS hydrologic flow system required using a fully integrated computer code to create a flexible, yet comprehensive, management tool. In a detailed comparison of available integrated models, the MIKE SHE computer code was selected for the SWWB modeling. This model provides transient simulations of important RFETS hydrologic processes and their complex interactions.

After completing the numerical model design, the fully integrated model was calibrated. Calibration was achieved by adjusting model parameters until the simulated model results compared well with observed data. The calibration data set period was from October 1, 1999, through September 30, 2000 (Water Year [WY] 2000).

Model simulations were conducted for two hypothetical future Site scenarios to evaluate changes based on WY2000 hydrologic conditions. In the first scenario, the No Imported Water Scenario, imported water from offsite was discontinued. (The Site currently purchases an average of approximately 420,000 cubic meters [110 million gallons or 340 acre-feet] of water annually from the Denver Water Board.) The second scenario, the Land Configuration Scenario, also discontinued imported water and included hypothetical regraded topography in the IA, Present Landfill, and Original Landfill. In the second scenario, IA changes included removing buildings, pavement, and subsurface utilities.

Modeling results suggested that significant impacts to the Site's hydrologic system will occur for the hypothetical scenarios. These modeling results provide valuable insight into Site hydrology that will influence the RFETS closure strategy and long-term stewardship. Implications based on the simulated scenario results include:

- Surface and subsurface flows in Woman Creek will be largely unaffected. Therefore, vegetation along Woman Creek will generally not be affected by the Site reconfiguration. An exception to this may occur in the area south of the Original Landfill. This area may experience some localized diminished flows from hypothetical covers and cutoff walls.

- Surface and subsurface flows in Walnut Creek, in contrast to Woman Creek, will be substantially reduced. As a result of the diminished surface flows, future hydrologic conditions in Walnut Creek downstream of the IA will be dominated by pond operating protocols and any pond routing or structural modifications. An additional effect of reduced flows in Walnut Creek is the possible impact to vegetation downstream of the ponds caused by lower groundwater levels along the stream channel.

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Land Configuration Design Basis

ER issued a strategic report titled Land Configuration Design Basis-Preliminary (K-H 2002a), which includes an initial conceptual design showing the general site topography at closure and provides a useful platform to discuss the final land configuration with stakeholders. This initial design includes a grading and drainage plan developed for the IA and provides the first set of integrated land contours and ground elevations after building demolition and environmental restoration. The report will be used as a starting point for development of detailed designs, and to assess the impacts of closure on ecology, and groundwater/surface water.

4.3.3 Data Quality Objectives

There are no updates to DQOs.

4.4 Characterization Approach

There are no updates to the characterization approach. The characterization approach was implemented at RFETS during FY02.

4.4.1 Industrial Area Sampling and Analysis Plan

IASAP (DOE 2001a) confirmation sampling methodology is being discussed with the regulatory agencies. A confirmation sampling methodology modification will be submitted to the agencies in FY03.

IASAP FY02 activities are discussed below.

IASAP Addenda

Seven IASAP Addenda were developed during FY02. The IASAP Addenda contain maps of existing sampling locations and data, where available, and tables and maps describing proposed new sampling locations. The FY02 IASAP Addenda are listed in Table 2.

Table 2
FY02 IASAP Addenda

IASAP Addendum Number	IHSS Groups Included in Addendum	Date Approved
IA-02-01	100-4 – UBC 123, IHSS 148, and PAC 100-611 100-5 – PAC 100-609 300-1 – IHSSs 128, 134(N), and 171 300-6 – PAC 300-702 400-10 – IHSS 120.2, IHSS 161, and PAC 400-807 500-4 – IHSS 117.2 500-6 – PAC 500-906 500-7 – PAC 500-907 600-1 – PAC 600-1001 600-6 – PAC 600-1005 700-12 – PAC 700-1106 800-6 – UBC 889, IHSS 164.3, and portions of IHSS	November 2, 2001

IASAP Addendum Number	IHSS Groups Included in Addendum	Date Approved
	121 – OPWL	
IA-02-02	900-4&5 – IHSS 175	February 6, 2002
IA-02-03	800-4 – UBC 886, IHSS 164.2, and portions of IHSS 121 – OPWL	March 26, 2002
IA-02-04	800-2 – UBC 881, PAC 800-1205, PAC 800-1212, and portions of IHSS 121 – OPWL 800-5 – UBC 887 and IHSS 177	April 15, 2002
IA-02-05	400-7 – UBC 442, IHSS 157.1, IHSS 129, and IHSS 187	April 15, 2002
IA-02-06	600-2 – PAC 400-804	June 9, 2002
IA-02-07	000-1 – SEP AOC, PAC 900-1310, Potential Leaking OPWL and RCRA Units 21 and 48	August 1, 2002
IA-02-08	700-3 – UBC776 and UBC 777	September 10 2002

4.4.2 Buffer Zone Sampling and Analysis Plan

The BZSAP (DOE 2002a) was approved by EPA in April 2002.

BZSAP Addendum

The FY02 BZSAP Addendum #BZ-02-01 (DOE 2002f) was approved on April 10, 2002, and includes sampling and analysis specifications for the IHSSs and PACs listed in Table 3.

Table 3
FY02 BZSAP Addendum

BZ Group	IHSS/PAC Description
900-2	IHSS 153 – Oil Burn Pit No. 2
	IHSS 154 – Pallet Burn Site
NE/NW	IHSS 216.2 – East Spray Field-Center Area
	IHSS 216.3 – East Spray Field-South Area
	NE-1412 – Trench T-12
	NE-1413 – Trench T-13
	NE-1407 – OU 2 Treatment Facility
	IHSS 174a – Property Utilization And Disposal (PU&D) Yard - Drum Storage Area

FY02 IASAP Characterizations

During FY02, 15 IHSSs, 14 PACs, and 6 UBC sites in 18 IHSS Groups were characterized. These characterizations are briefly described below.

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IASAP Addendum #IA-02-01

IHSS Group 100-4 – PAC 100-611, Building 123 Scrubber Solution Spill, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in April 2002. Potential contaminants of concern (PCOCs) at this site included hydrochloric acid, hydrofluoric acid, and nitric acid. Five surface soil samples were collected and analyzed for pH. The pH results ranged from 8.4 to 8.8. This PAC was proposed as an NFA site.

IHSS Group 100-5 – PAC 100-609, Building 121 Security Incinerator, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in March 2002. PCOCs at this site included polychlorinated biphenyls (PCBs), dioxin, and furan. All PCB results were less than detection limits. Dioxin and furan results were compared to suggested EPA cleanup levels, as well as a wildlife refuge worker toxicity equivalent (TEQ) of 9 determined by CDPHE. All results were less than the suggested EPA cleanup levels. All summed dioxin and furan TEQs were below the CDPHE value. This PAC was proposed as an NFA site.

IHSS Group 300-1 – IHSS 128, Oil Burn Pit #1, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in September 2002. PCOCs at this site included radionuclides and volatile organic compounds (VOCs). Additional sampling is required at this site. Results will be available in FY03.

IHSS Group 300-1 – IHSS 134(N), Lithium Metal Site, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in September 2002. PCOCs at this site included radionuclides, metals, and VOCs. Results will be available in FY03.

IHSS Group 300-1 – IHSS 171 Solvent Burning Grounds, was partially characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in September 2002. The remainder of the site will be characterized after Building 335 is removed. PCOCs at this site included radionuclides, metals, and VOCs. Results will be available in FY03.

IHSS Group 400-10 – IHSS 120.2, Fiberglass Area West of Building 664, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in May 2002. PCOCs at this site included radionuclides, metals, and VOCs. All results were less than background means plus two standard deviations or method detection limits (MDLs). This IHSS was proposed as an NFA site.

IHSS Group 400-10 – IHSS 161, Radioactive Site West of Building 664, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in May 2002. PCOCs at this site included radionuclides, metals, and VOCs. Arsenic concentrations were greater than the RFCA Tier II AL at eight locations from 2.5 to 8 feet in depth. All other results were less than RFCA Tier II ALs.

IHSS Group 400-10 – PAC 400-807, Sandblasting Area Northwest of Building 664, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in May 2002. PCOC at this site included radionuclides, metals, and semivolatile organic compounds (SVOCs). All radionuclides and metals results were less than background

means plus two standard deviations or MDLs. SVOC results were less than RFCA Tier II ALs. This PAC was proposed as an NFA site.

IHSS Group 500-6 – PAC 500-906, Asphalt Surface Near Building 559, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in April 2002. PCOCs at this site included VOCs. All results were less than RFCA Tier II ALs. This PAC was proposed as an NFA site.

IHSS Group 500-7 – PAC 500-907, Tanker Truck Release of Hazardous Waste from Tank 231B, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in July 2002. PCOCs at this site included radionuclides, metals, VOCs, SVOCs, PCBs, and pH. Results will be available in FY03.

IHSS Group 600-1 – PAC 600-1001, Temporary Waste Storage – Building 663, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in September 2002. PCOCs at this site included radionuclides, VOCs, and SVOCs. Sampling results will be available during first quarter FY03.

IHSS Group 600-6 – PAC 600-1005, Former Pesticide Storage Area, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in April 2002. PCOCs at this site included pesticides. Two surface samples were collected and analyzed for pesticides. Pesticides were not detected at concentrations greater than MDLs. This PAC was proposed as an NFA site.

IHSS Group 700-12 – PAC 700-1106, Process Waste Spill – Portal 1, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in April 2002. PCOCs at this site included radionuclides. Two surface samples were collected and analyzed for americium-241, plutonium-239/240, uranium-234, uranium-235, and uranium-238. Uranium-235 was detected in one sample at an activity above background mean plus two standard deviations but below RFCA Tier II ALs in surface soil. This was the only result above background mean plus two standard deviations. This IHSS was proposed as an NFA site.

IHSS Group 800-6 – UBC 889, Decontamination and Waste Reduction, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in July 2002. PCOCs at this site included radionuclides, metals, SVOCs, and VOCs. Radionuclides were detected in surface soil at activities above background means plus two standard deviations but below RFCA Tier II ALs. Radionuclides, SVOCs, and VOCs were detected at concentrations above background means plus two standard deviations or MDLs but below RFCA Tier II ALs in subsurface soil. This site was proposed as an NFA site. Results are described in the Draft Closeout Report for IHSS Group 800-6 (DOE 2002g).

IHSS Group 800-6 – IHSS 164.3, Radioactive Site, 800 Area Site #2 Building 889 Storage Pad, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in July 2002. PCOCs at this site included radionuclides, metals, SVOCs, and VOCs. Radionuclides were detected in surface soil at activities above background means

plus two standard deviations but below RFCA Tier II ALs. Radionuclides, SVOCs, and VOCs were detected at concentrations above background means plus two standard deviations or MDLs but below RFCA Tier II ALs in subsurface soil. Additional sampling is required. Results will be described in a closeout report.

IHSS Group 800-6 – IHSS 121, Original Process Waste Lines (OPWL) Tank 28, Two 1,000-Gallon Concrete Sumps, was characterized in accordance with IASAP Addendum #IA-02-01 (DOE 2001b) in July 2002. PCOCs at this site included radionuclides, metals, SVOCs, and VOCs. This IHSS was proposed as an NFA site. These results will be described in a closeout report.

IASAP Addendum #IA-02-02

IHSS Group 900-4&5 – IHSS 175, S&W Building 980 Container Storage Facility, was characterized in accordance with IASAP Addendum #IA-02-02 (DOE 2002h) in April 2002. PCOCs at this site included radionuclides, metals, inorganics, and SVOCs. Methylene chloride and beryllium were detected at concentrations greater than RFCA Tier II ALs. These results will be available in FY03.

IASAP Addendum #IA-02-03

IHSS Group 800-4 – UBC 886, Critical Mass Laboratory, was characterized in accordance with IASAP Addendum #IA-02-03 (DOE 2002i) in June 2002. PCOCs at this site included radionuclides, metals, and VOCs. Results indicate residual contamination at UBC 886 consists of beryllium, arsenic, 1,2-dichloroethane, and methylene chloride in surface and subsurface soil at concentrations greater than RFCA Tier II ALs but less than RFCA Tier I ALs. Tier II sum of ratios (SORs) for nonradionuclides exceeded the threshold value of 1 at 15 locations in surface and subsurface soil.

IHSS Group 800-4 – IHSS 164.2, Radioactive Site #2, 800 Area Building 866 Spill, was characterized in accordance with IASAP Addendum #IA-02-03 (DOE 2002i) in June 2002. PCOCs at this site included radionuclides, metals, SVOCs, and VOCs. Results indicate residual contamination at IHSS 264.2 consists of beryllium, arsenic, 1,2-dichloroethane, and methylene chloride in surface and subsurface soil at concentrations greater than RFCA Tier II ALs but less than RFCA Tier I ALs. However, Tier II SORs for nonradionuclides exceeded the threshold value of 1 at 15 locations in surface and subsurface soil.

IHSS Group 800-4 – IHSS 121, OPWL 250-Gallon Sump, was characterized in accordance with IASAP Addendum #IA-02-03 (DOE 2002i) in June 2002. PCOCs at this site included radionuclides, metals, SVOCs, and VOCs. Results indicate residual contamination consists of 1,2-dichloroethane in subsurface soil at concentrations greater than RFCA Tier II ALs but less than RFCA Tier I ALs. The 95% Upper Confidence Level (UCL) for 1,2-dichloroethane across the AOC is less than the Tier II AL.

IHSS Group 800-4 – IHSS 121, OPWL Two 250-Gallon Steel Tanks, was characterized in accordance with IASAP Addendum #IA-02-03 (DOE 2002i) in June 2002. PCOCs at this site included radionuclides, metals, and organics. Results indicate residual

contamination consists of 1,2-dichloroethane in subsurface soil at concentrations greater than RFCA Tier II ALs but less than RFCA Tier I ALs. The 95% UCL for 1,2-dichloroethane across the AOC is less than the Tier II AL.

IHSS Group 800-4 – IHSS 121, OPWL 500-Gallon Steel Tanks, was characterized in accordance with IASAP Addendum #IA-02-03 (DOE 2002i) in June 2002. PCOCs at this site included radionuclides, metals, and organics. Results indicate residual concentrations are less than Tier II RFCA ALs.

IASAP Addendum #IA-02-04

IHSS Group 800-2 – UBC 881, Laboratory and Office, was characterized in accordance with IASAP Addendum #IA-02-04 (DOE 2002j) in August 2002. PCOCs at this site included radionuclides, metals, SVOCs, PCBs, and VOCs. Sampling results will be available during the first quarter FY03.

IHSS Group 800-2 – PAC 800-1205, Building 881 East Dock, was characterized in accordance with IASAP Addendum #IA-02-04 (DOE 2002j) in August 2002. PCOCs at this site included radionuclides and metals. Sampling results will be available during the first quarter FY03.

IHSS Group 800-2 – IHSS 121 OPWL Tank 39, Four 250-Gallon Steel Process Waste Tanks was characterized in accordance with IASAP Addendum #IA-02-04 (DOE 2002j) in August 2002. PCOCs at this site included radionuclides, metals, SVOCs, and VOCs. Sampling results will be available during the first quarter FY03.

Addendum #IA-02-05

IHSS Group 400-7 – UBC 442, Filter Test Facility was characterized in accordance with IASAP Addendum #IA-02-05 (DOE 2002k) in August 2002. PCOCs at this site included radionuclides, metals, SVOCs, and VOCs. Sampling results will be available during the first quarter of FY03.

IHSS Group 400-7 – IHSS 157.1, Radioactive Site North Area, was characterized in accordance with IASAP Addendum #IA-02-05 (DOE 2002k) in August 2002. PCOCs at this site included radionuclides, metals, SVOCs, and VOCs. Sampling results will be available during the first quarter of FY03.

IHSS Group 400-7 – IHSS 187, Sulfuric Acid Spill Building 443, was characterized in accordance with IASAP Addendum #IA-02-05 (DOE 2002k) in August 2002. PCOCs at this site included radionuclides and pH. Sampling results will be available during the first quarter of FY03.

IHSS Group 400-7 – PAC IHSS 129, Building 443 Oil Leak, was not characterized because of infrastructure constraints. This IHSS will be characterized in accordance with IASAP Addendum #IA-02-05 (DOE 2002k) in FY03.

Addendum #IA-02-06

IHSS Group 600-2 – PAC 400-804, Storage Shed South of Building 334 was characterized in accordance with IASAP Addendum #IA-02-06 (DOE 2002l) in August 2002. PCOCs at this site included radionuclides, metals, VOCs, and SVOCs. Sampling results will be available during the first quarter FY03.

Addendum #IA-02-07

IHSS Group 000-1 – SEP AOC, OPWL Valve Vaults, were characterized in accordance with IASAP Addendum #IA-02-07 (DOE 2002m) in September 2002. PCOCs at this site included radionuclides, metals, and nitrates. Sampling results will be available during the first quarter FY03.

IHSS Group 000-1 – PAC 900-1310 Interceptor Trench System Water Spill, was characterized in accordance with IASAP Addendum #IA-02-07 (DOE 2002m) in September 2002. PCOCs at this site included radionuclides, metals, and nitrates. Sampling results will be available during the first quarter FY03.

IHSS Group 000-1 – Potential Leaking OPWL, was characterized in accordance with IASAP Addendum #IA-02-07 (DOE 2002m) in September 2002. PCOCs at this site included radionuclides, metals, and nitrates. Sampling results will be available during the first quarter of FY03.

IHSS Group 000-1 – RCRA Units 21 and 48, were characterized in accordance with IASAP Addendum #IA-02-07 (DOE 2002m) in September 2002. PCOCs at this site included radionuclides, metals, and nitrates. Sampling results will be available during the first quarter of FY03.

IASAP Addendum #IA-02-08

IHSS Group 700-3 – UBC 776 and UBC 777 will be characterized in accordance with IASAP Addendum #IA-02-08 (DOE 2002n) in FY03. PCOCs at this site include radionuclides, metals, and VOCs.

BZSAP Addendum Characterizations

Addendum #BZ-02-01

IHSS Group 900-2 – IHSS 153, Oil Burn Pit No. 2, was characterized in accordance with BZSAP Addendum #BZ-02-01 (DOE 2002f) in August 2002. PCOCs at this site included radionuclides, metals, SVOCs, VOCs, pesticides, and PCBs. Sampling results indicated concentrations of VOCs in subsurface soil were greater than RFCA Tier I ALs. Additional samples were collected. These results will be available during first quarter FY03.

IHSS Group 900-2 – IHSS 154, Pallet Burn Site, was characterized in accordance with BZSAP Addendum #BZ-02-01 (DOE 2002f) in June 2002. PCOCs at this site included radionuclides, metals, SVOCs, VOCs, pesticides, and PCBs. Sampling results indicated arsenic and beryllium were present at concentrations greater than RFCA Tier II ALs. This IHSS will be evaluated to determine whether an NFA is justified.

IHSS Group NE/NW – IHSS 216.2, East Spray Field – Center Area, was characterized in accordance with BZSAP Addendum #BZ-02-01 (DOE 2002f) in June 2002. PCOCs at this site included radionuclides, metals, SVOCs, pesticides, and PCBs. Radionuclides, SVOCs, and VOCs were detected at concentrations above background means plus two standard deviations or MDLs but below RFCA Tier II ALs in surface and subsurface soil. These results will be available during first quarter FY03.

IHSS Group NE/NW – IHSS 216.3, East Spray Field – South Area, was characterized in accordance with BZSAP Addendum #BZ-02-01 (DOE 2002f) in June 2002. PCOCs at this site included radionuclides, metals, VOCs, SVOCs, pesticides, and PCBs. Sampling results will be available during the first quarter FY03.

IHSS Group NE/NW – NE-1412, Trench T-12 Located at Operable Unit (OU) 2 East Trenches, was characterized in accordance with BZSAP Addendum #BZ-02-01 (DOE 2002f) in June 2002. PCOCs at this site included radionuclides, metals, VOCs, SVOCs, and PCBs. Sampling results will be available during the first quarter FY03.

IHSS Group NE/NW – NE-1413, Trench T-13 Located at OU2 East Trenches, was characterized in accordance with BZSAP Addendum #BZ-02-01 (DOE 2002f) in June 2002. PCOCs at this site included radionuclides, metals, VOCs, and PCBs. Sampling results will be available during the first quarter FY03.

IHSS Group NE/NW – NE-1407, OU2 Treatment Facility, was characterized in accordance with BZSAP Addendum #BZ-02-01 (DOE 2002f) in June 2002. PCOCs at this site included metals and VOCs. Sampling results will be available during the first quarter FY03.

IHSS Group NE/NW – IHSS 174a, Property Utilization and Disposal Yard (PU&D) - Drum Storage Area, was characterized in accordance with BZSAP Addendum #BZ-02-01 (DOE 2002f) in June 2002. PCOCs at this site included radionuclides, metals, VOCs, SVOCs, pesticides, and PCBs. Sampling results will be available during the first quarter FY03.

4.4.3 No Further Action

CDPHE and EPA provided comments on 118 proposed NFAs and 61 PICs in FY02. These comments and data are incorporated in the 2002 Annual Update to the Historical Release Report (HRR) (DOE 2002o). To date, 150 sites have been accepted as NFA recommended sites, 180 sites require additional action, and 29 sites are pending regulatory agency comment.

4.4.4 Removal and Offsite Disposition

There are no updates to the removal and offsite disposition strategy.

4.4.5 Caps and Covers

A RCRA Subtitle C cap was initially considered for the SEP and Site landfills; however, recent and ongoing studies are showing that barrier covers are susceptible to failure, especially under the arid and semiarid environmental conditions typical in the western United States. Clay barrier layers, which require the clay to be installed at or above optimum moisture to meet the permeability requirements, are prone to desiccation and cracking in drier environments. After this layer cracks, there is a flow path for precipitation into the landfill. Subtitle C caps require performance monitoring to verify that contaminants are not migrating from the landfill; however, there are no requirements for performance monitoring within the cap to verify its effectiveness after construction. Also, RCRA Subtitle C caps are more expensive and difficult to construct than alternative covers.

Evapotranspiration (ET) covers generally consist of a uniform, monolithic soil layer, which achieves infiltration reduction performance by storing soil moisture until it is removed through the natural processes of evaporation and plant transpiration. Establishment of sustainable vegetative communities is promoted, thereby minimizing wind and storm water erosion from the cover surface. The primary functional component of an ET cover is the soil-rooting medium. An erosion-protection soil layer covering the soil-rooting medium is used to promote the establishment of vegetation and prevent erosion. These combined soil layers function together as a thick soil-rooting medium, to store soil moisture and allow vegetation to use and remove the moisture, thereby preventing percolation.

A conceptual design prepared during Calendar Year (CY) 2001 proposed an ET cover for the Present Landfill. The Conceptual Design Report (CDR) for the Present Landfill (K-H 2002b) was distributed for consideration by EPA, CDPHE, the Service, and other stakeholders in April 2002. During further development of the design, two formal reviews will be conducted: a 60 percent review and a 90 percent review. At a minimum, the 60 percent review will include a final determination regarding the need for a gas venting layer; an evaluation of borrow source material; a narrative description of the cover design; design specifications and drawings; costs; and a detailed schedule. The 90 percent review will include all information necessary for construction of the cover. The final design will be developed based on consideration of final comments from the lead regulatory agency (LRA), after informal public review and comment. Cover construction will begin upon completion of the final design and approval of the IM/IRA by the LRA.

An ET cover is no longer under consideration for the SEP; however an ET cover is being considered for the Original Landfill. This option will be compared to other remedial alternatives in a separate IM/IRA decision document, which is currently under development. Considerations for the Original Landfill include slope stability, presence of nearby Preble's meadow jumping mouse habitat, location within the Woman Creek drainage, worker safety, waste generation, and waste disposal costs.

4.4.6 Plume Remediation

A plume of VOC contaminated groundwater is associated with a contaminant source located in the PU&D Yard at RFETS. Investigation results indicate subsurface VOC contamination is present in only a few locations and the primary contaminant is tetrachloroethene (K-H 2001).

A treatability study is in progress to evaluate the effectiveness of Hydrogen Release Compound® (HRC®) for enhancing natural attenuation of the VOCs in groundwater and soil at the PU&D Yard Plume. HRC® is a proprietary, environmentally safe, food-quality polylactate ester formulated for slow release of lactic acid upon hydration. The preliminary results indicate the HRC® has been effective in degrading the chlorinated VOCs found in groundwater and soil at this location, most likely by making low concentrations of hydrogen available to the resident microbes to use for dechlorination. Groundwater and subsurface soil samples collected in this area indicate the HRC® has been effective in reducing the contaminant concentrations.

The groundwater plume map that illustrates the extent of VOC and nitrate plumes in the IA has been revised and is presented in the 2001 Annual RFCA Groundwater Monitoring Report (DOE 2001c).

4.4.7 Groundwater and Surface Water

There are no updates to the groundwater and surface water strategy.

4.4.8 Decision Documents

Several decision documents were developed during FY02 and are described in the following sections.

RSOP for Routine Soil Remediation

The ER RSOP was developed during FY01 and approved by CDPHE on January 11, 2002. The ER RSOP describes the decisions and approach for excavation and disposal of contaminated soil and debris at IHSSs, PACs, and UBC Sites in the IA and BZ. Routine remediation of contaminated soil and debris will primarily consist of excavation and offsite disposal, although treatment of VOCs to meet regulatory or disposal site requirements may be necessary. The ER RSOP also includes remediation and closure of RCRA units, underground storage tanks, foundation drains, and miscellaneous building slabs. The ER RSOP provides a consistent approach to accelerated action decisions and remediation activities, streamlines the decisionmaking process by relying on one decision document instead of many, and accelerates remediation schedules by eliminating numerous review cycles.

DOE notifies the LRA prior to implementing the ER RSOP through a Notification. The Notification may address one or more IHSS Groups in accordance with prior agreement through the consultative process. An ER RSOP Notification is submitted to the LRA, and to both LRAs if the Notification covers IHSS Groups in both the IA and BZ OUs, for review at least 14 calendar days prior to the start of the accelerated action. For IHSS

Groups with RCRA units, the 30-day RCRA review period begins when DOE informs the LRA through the consultative process that a RCRA unit will be closed.

ER RSOP Notifications

Ten ER RSOP Notifications were developed during FY02. The ER RSOP Notifications contain maps of existing sampling locations and data where available, maps presenting potential accelerated action locations, and nearby potential contaminant sources. The FY02 ER RSOP Notifications are listed in Table 4.

Table 4
FY02 ER RSOP Notifications

ER RSOP Notification	IHSS Groups	Date Approved
02-01	100-4 – UBC 123, IHSS 148, PAC 100-611 100-5 – PAC 100-609	January 16, 2002
02-02	400-10 – IHSS 120.2, IHSS 161, and PAC 400-807 800-6 – UBC 889, IHSS 164.3, and portions of IHSS 121 – OPWL	March 13, 2002
02-03	800-4 – UBC 886, IHSS 164.2, and portions of IHSS 121 – OPWL	March 26, 2002
02-04	300-6 – PAC 300-702 500-7 – PAC 500-907 600-1 – PAC 600-1001	June 19, 2002
02-05	800-2 – UBC 881, PAC 800-1205, and portions of IHSS 121 - OPWL 800-5 – UBC 887 and IHSS 177	April 15, 2002
02-06	400-7 – UBC 442, IHSS 157.1, IHSS 129, IHSS 187	May 21, 2002
02-07	600-2 – PAC 400-804	July 9, 2002
02-08	Solar Evaporation Ponds Area of Concern	July 30, 2002
02-09	900-11 – IHSS 112	FY03
02-10	300-1 – IHSS 128, 134(N), and 171	FY03

ER RSOP Accelerated Actions

During FY02 accelerated actions were conducted at three IHSS, two PACs, four UBCs, and associated slabs, tanks, sumps, and pipeline segments in seven IHSS Groups. These accelerated actions are briefly described below.

IHSS Group 000-1

Facility components and contaminated soil associated with facility components were removed from IHSS Group 000-1 in accordance with ER RSOP Notification #02-08 (DOE 2002p). These components included concrete slabs, above grade lines, segments of below grade lines, valve vaults, collection sumps, manholes, electrical control conduit and other utilities, associated support racks, concrete ramps, and barriers.

IHSS Group 100-4

At UBC 123 and IHSS 148, three sumps, two manholes, portions of RCRA Unit 40, and approximately 1,300 linear feet of process waste line were excavated in accordance with ER RSOP Notification #02-01 (DOE 2002q) in March and April 2002. All residual contamination at this site is below RFCA Tier II ALs except for beryllium, which was reported above the RFCA Tier II AL, but is below the MDL. Several pre-accelerated action sampling results indicated the presence of methylene chloride; however, it is considered a laboratory contaminant at this site.

IHSS Group 400-7

A sewer line (PAC 000-500) running from the Building 442 "Laundry" (L) slab to the west to the manhole on 5th Street was excavated along with radionuclide-contaminated soil, to a depth of 6 feet, at UBC 442. Both ends of the sewer line section were grouted. Some small sections of the line could not be filled because of obstructions in the lines or safety concerns. Approximately 18 cubic feet of SVOC-contaminated soil was removed from an area in the northern portion of IHSS 157.1. Residual beryllium concentrations are greater than RFCA Tier II ALs at a depth of 6 feet. The accelerated action at IHSS Group 400-7 was approved through ER RSOP Notification #02-06 (DOE 2002r).

IHSS Group 600-1

The Building 662 and 663 slabs were removed at PAC 600-1001 in accordance with ER RSOP Notification #02-04 (DOE 2002s). Radionuclide contamination was identified in the soil beneath a crack at the southeastern corner of the Building 663 slab. The slab and contaminated soil were removed. Confirmation samples were collected and results will be available in FY03.

IHSS Group 600-2

Slabs associated with the T452 Trailers were removed and dispositioned in accordance with ER RSOP Notification #02-07 (DOE 2002t). A small portion of the southern slab was contaminated with radionuclides. The contaminated sections of the south slab were cut out and removed for offsite disposal. Analytical results of soil beneath the contaminated portion of the slab indicated that radionuclide activity was less than RFCA Tier II ALs.

IHSS Group 800-4

The Building 886 slab and the sump at Building 828, along with associated pipelines were removed by D&D in accordance with the IM/IRA Plan for the 886 Cluster (RMRS 1998). Residual contamination at IHSS Group 800-6 consists of beryllium and arsenic in surface soil at concentrations greater than RFCA Tier II ALs.

IHSS Group 800-6

The Building 889 slab was removed, as well as the footer walls, footers, and portions of the concrete pillars. Tank 40, two Tank 28 sumps (exhaust pits), trough connecting all

the sumps, and transite ducts were excavated. The parts of line P-10 (OPWL) under the Building 889 slab, the portion going to Tank 40, and the portion going to an area southwest of Valve Vault 4 were removed. The remaining end was filled with grout. Analytical results indicate that all contaminant concentrations were less than RFCA Tier II ALs. These activities were conducted in accordance with ER RSOP Notification #02-02 (DOE 2002u).

Closeout and Data Summary Reports

Closeout reports for ER RSOP accelerated actions were developed for four IHSS Groups and Data Summary Reports were developed for an additional four IHSS Groups. The purpose of closeout is to document the accelerated action activities. The closeout report summarizes characterization data, the action taken, demarcation of excavation, confirmation sampling results, remediation waste volume and disposition, any changes in remediation approach and the rationale behind the change, near-term stewardship requirements and long-term stewardship recommendations, and the demarcation of residual contamination left in place on an IHSS or IHSS Group basis. The purpose of the Data Summary Report is to summarize characterization data for those IHSS Groups where an accelerated action is not necessary. Table 5 lists the Closeout and Data Summary Reports completed during FY02.

Table 5
FY02 Closeout and Data Summary Reports

IHSS Groups	Status
Closeout Report	
100-4 - UBC 123, IHSS 148, PAC 100-611	Resolving agency comments
100-5 - PAC 100-609	Resolving agency comments
800-4 – UBC 886, IHSS 164.2, and portions of IHSS 121 – OPWL	At agencies for review
800-6 – UBC 889, IHSS 164.3, and portions of IHSS 121 – OPWL	At agencies for review
Data Summary Report	
400-10 – IHSS 120.2, IHSS 161, and PAC 400-807	Delivered to DOE
500-6 – PAC 500-906	Delivered to DOE
600-6 – PAC 600-1005	Delivered to DOE
700-12 – 700-1106	Delivered to DOE

4.4.9 Interim Measures/Interim Remedial Actions

A draft IM/IRA decision document for the Present Landfill was distributed for formal public comment on August 8, 2002. The IM/IRA provides detailed background information on the history of the Present Landfill; describes the project approach, including RCRA unit closure and post-closure care; analyzes the environmental consequences of the proposed action; discusses long-term stewardship considerations; and defines the applicable or relevant and appropriate requirements (ARARs).

4.4.10 Proposed Action Memoranda

A draft PAM for the RCRA closure of the SEP was initiated in FY02. The PAM is the decision document for closing the SEP under alternative RCRA Interim Status closure requirements. This alternative approach allows all of the units within this area to be evaluated as one AOC, focusing on the contamination present in the area regardless of the unit where the release may have occurred. To ensure protection of human health and the environment, a risk assessment was performed based on identified COCs within the AOC.

The risk assessment included an evaluation of existing soil and pond liner material analytical data, which were collected during previous field investigations and Sitewide sampling programs. The data were screened, and COCs were selected and evaluated to determine the risk to future wildlife refuge workers. It is anticipated the risk assessment will indicate that risk from the SEP AOC is less than 1E-06 from RCRA constituents and 3E-06 from radionuclides (primarily americium-241 and uranium-238).

Facility components and contaminated soil associated with the other units in the SEP AOC were removed as a separate action under ER RSOP Notification #02-08 (DOE 2002p). These components included the removal of concrete slabs, abovegrade lines, segments of belowgrade lines, valve vaults, collection sumps, manholes, electrical control conduit and other utilities, associated support racks, concrete ramps, and barriers. Characterization was conducted to determine whether contamination was present at specific locations where soil or component removal was anticipated, in accordance with IASAP Addendum #IA-02-07 (DOE 2002m). Soil with contaminant concentrations greater than RFCA Tier I ALs and associated debris were removed in accordance with ER RSOP Notification #02-08 (DOE 2002p). Soil with contaminant concentrations less than RFCA Tier I ALs is being evaluated in the risk assessment. In addition, lysimeters and no longer necessary groundwater monitoring wells were abandoned.

If the risk from RCRA constituents is below 1E-05 for a wildlife refuge worker and ER RSOP Notification #02-08 removal actions are completed, the SEP will meet the alternative closure requirements. Additionally, if residual radionuclides in soil are below RFCA Tier I ALs and the risk from the radionuclides is less than 1E-05, an NFA for the SEP AOC will be proposed in the PAM. Upon approval of the PAM, the berms will be pushed into the ponds, clean fill soil will be brought in, and the area will be regraded and vegetated as a best management practice.

4.4.11 RCRA Facility Investigation/Remedial Investigation

The first tasks to be performed in preparation of the Remedial Investigation/Feasibility Study (RI/FS) for the Site is the preparation of a series of TMs that formally document the expected final Site remedial action objectives (RAOs) (cleanup goals), and the key factors that influence how completion of accelerated actions will be consistent with these expected objectives or goals. Four TMs are in preparation that focus on the following items:

- ARARs;
- Surface Soil RAOs;
- Subsurface Soil and Groundwater RAO; and
- Surface Water RAOs.

The first three TMs are under internal review and are expected to be approved by the regulatory agencies in first quarter FY03. Agency approval of the last TM is imminent. A summary of the TMs is provided below.

ARARs TM

This TM identifies the ARARs for Site closure. Although ARARs are not final until a final remedy has been selected in the Corrective Action Decision/Record of Decision (CAD/ROD), it is anticipated that this TM will identify the ARARs that will support the regulatory agencies' ultimate ARARs decision. Approval of the TM will allow accelerated actions and the FS to be completed in accordance with the identified ARARs, to the extent practicable.

Surface Soil RAOs TM

This TM identifies surface soil RAOs for the Site, including the rationale for new soil ALs based on protection of a wildlife refuge worker. It also identifies the soil COCs for the Site.

Subsurface Soil and Groundwater RAOs TM

This TM identifies subsurface soil and groundwater RAOs, and includes the rationale for new subsurface soil ALs based on protection of a wildlife refuge worker. It also identifies the groundwater COCs for the Site.

Surface Water RAOs TM

This TM defines water quality parameters and standards to be met, points of compliance, and how compliance is to be demonstrated.

4.5 Characterization and Remediation Challenges

There were several FY02 characterization and remediation challenges as described in the following sections.

4.5.1 Underground Pipeline Systems

Underground pipeline systems including OPWL, New Process Waste Lines (NPWL), and sanitary sewers were removed in conjunction with UBC slab removal at UBC Sites 123, 442, 886, and 889. A map showing the status of the underground pipeline system is being developed.

4.5.2 Under Building Contamination

Four UBC Sites (442, 886, 889, and 881) were characterized during FY02. Accelerated actions were conducted at three UBC Sites (123, 442, and 889).

UBC 123

An accelerated action at IHSS Group 100-4 was conducted in accordance with ER RSOP Notification #02-01 (DOE 2002q) and included removal of the concrete building slab, and excavation of building footers, underground pipelines (OPWL [IHSS 121] and NPWL[PAC 000-504]), RCRA Unit 40 components, source pits, sumps, manholes, and other pipes and structures. Confirmation sampling results indicate all surface and subsurface soil contaminant concentrations were less than RFCA Tier II ALs. Portions of two pipelines could not be removed because of infrastructure constraints. A description of the accelerated action and results of confirmation sampling are presented in the Draft Closeout Report for IHSS Groups 100-4 and 100-5 (DOE 2002v).

UBC 442

UBC 442 was characterized during the accelerated action in accordance with IASAP Addendum #IA-02-05 (DOE 2002k). Characterization results indicate all surface and subsurface soil contaminant concentrations are less than RFCA Tier II ALs, except around the western sewer line. These data will be presented in the closeout report for IHSS Group 400-7.

An accelerated action at IHSS Group 400-7 was conducted in accordance with ER RSOP Notification #02-06 (DOE 2002r) and included the excavation of the western sewer line. The sewer line and associated soil were removed to a depth of 6 feet below the surface. Confirmation sampling results indicate beryllium concentrations were greater than the RFCA Tier II AL at a depth of 6 feet.

UBC 886

UBC 886 was characterized in accordance with IASAP Addendum #IA-02-03 (DOE 2002i). Results indicate all surface and subsurface soil contaminant concentrations are less than RFCA Tier II ALs. These data are presented in the Draft Closeout Report for IHSS Group 800-4 (DOE 2002w). The building slab, underground structures, pipeline, and an associated sump (Building 828) were removed by the Remediation, Industrial D&D, and Site Services D&D (RISS) staff.

UBC 889

UBC 889 was characterized during the accelerated action in accordance with IASAP Addendum #IA-02-01 (DOE 2001b). Results indicate all surface and subsurface soil contaminant concentrations were less than RFCA Tier II ALs. These data are presented in the Draft Closeout Report for IHSS Group 800-6 (DOE 2002g).

The accelerated action at IHSS Group 800-6 included the excavation of Tank 40 (IHSS 121). During excavation, free product was encountered near the eastern side of the tank. The material was collected, removed, and sampled. Analytical results indicate the presence of various polyaromatic hydrocarbons that may be diesel fuel or a similar

meterial. No RFCA contaminants were present at concentrations greater than RFCA Tier II ALs.

UBCs 776/777

Characterization planning for the Buildings 776/777 Phase 1 UBC sampling was completed in FY02. Sampling will be in accordance with IASAP Addendum #IA-02-08 (2002n). The preliminary sampling will be performed at six locations within the building to evaluate whether soil beneath the building foundation is contaminated. Results will be used to assist the Building 776/777 Decommissioning Project in developing a demolition strategy.

Phase 2 characterization sampling, to address the remainder of the potential Building 777 UBC, Building 776 UBC, and all associated IHSSs and PACs in the 700-3 Group, will be conducted when decommissioning starts. Phase 2 sampling activities are planned for completion in FY04.

The Phase 1 characterization sampling locations were selected in areas of known or suspected releases and areas with foundation cracks. Soil samples will be collected beneath the foundation slab from two depth intervals at each sampling location. Discrete samples will be collected from the 0-to-0.5-foot and 0.5-to 2.5-foot depth intervals beneath the foundation using a hand auger. Results will be available in FY03.

4.5.3 903 Drum Storage Area and 903 Lip Area

The 903 Drum Storage Area (903Pad) (IHSS 112) is an approximately 3.4-acre site where past waste releases are considered the primary source of radiological contamination in soil in this part of RFETS. Drums that contained hydraulic fluids and lathe coolant contaminated with plutonium and uranium were stored at this location from summer 1958 to January 1967. Approximately three-fourths of the drums contained liquids contaminated with plutonium, while most of the remaining drums contained liquids contaminated with uranium. Of the drums containing plutonium, the liquid was primarily lathe coolant and carbon tetrachloride in varying proportions. Vacuum pump oils, trichloroethene, tetrachloroethene, silicone oils, and acetone still bottoms were also stored in the drums were (DOE 1995).

Leaking drums were noted in 1964 during routine handling operations. The contents of the leaking drums were transferred to new drums, and the area was fenced to restrict access. When cleanup operations began in 1967, a total of 5,237 drums were at the drum storage site. Approximately 420 drums leaked to some degree. Of these, an estimated 50 drums leaked their entire contents. The total amount of leaked material was estimated to be approximately 5,000 gallons of contaminated liquid containing approximately 86 grams of plutonium (DOE 1995). Characterization activities indicate approximately 2.5 acres and 2,575 cubic yards of soil and artificial fill beneath the 903 Pad are contaminated above RFCA Tier II ALs. Approximately 1.5 acres and 1,268 cubic yards of this soil material exceed RFCA Tier I ALs. An additional 10,876 cubic yards of soil is contaminated with chlorinated solvents above RFCA Tier II ALs, of which 4,063 cubic yards exceeds RFCA Tier I ALs (K-H 2000).

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ER RSOP Notification #02-09 (DOE 2002x) was developed for the removal of radionuclide-contaminated soil from the 903 Pad area. The Notification includes removal and disposal of the asphalt pad, underlying gravel and artificial fill, and the top 12 inches of native soil. It is anticipated that after the top 12 inches of soil is removed, the remaining radionuclide contamination will be below 50 picoCuries per gram (pCi/g) This Notification was released for public comment in August 2002. The public comments have been addressed. Regulatory agency approval of Notification #02-09 is expected in early FY03.

The 903 Pad Lip Area, a large area with surface and subsurface soil radiological contamination east and southeast of the 903 Pad, presents numerous remediation challenges. These challenges include minimizing the environmental impact to the short grass prairie ecosystem and maintaining Site surface water standards while meeting agreed-upon cleanup levels. The scope of the cleanup effort is undetermined due to the current reevaluation of RSALs. However, the Site is evaluating a surface soil remedial technology that appears promising after initial field tests.

An ER RSOP notification for routine soil removal in the western portion of the 903 Pad Lip Area will be developed in FY03. Additionally, an IM/IRA for the remaining 903 Pad Lip Area will be developed. The IM/IRA will include remedial options for groundwater beneath the 903 Pad and Lip Areas.

A Phase I treatability test was conducted in June 2001 at an offsite location to evaluate the effectiveness of using compressed air to dislocate the fine-grained portion of topsoil and then collect the displaced soil using vacuum techniques. Initial testing of field equipment indicated that vegetation prevented the air stream from reaching surface soil. Therefore, the 50-foot by 50-foot test plot was mowed and the cuttings were discharged to the ground surface prior to further testing. Subsequent modifications to the equipment and testing resulted in an increased area of excavation.

Overall the technical feasibility was judged to be partially successful in meeting the listed performance criteria of precise excavation of the fine-grained soil fraction, while leaving the coarse-grained fraction and a viable vegetative cover in place. The equipment was successful in dislodging the fine-grained soil fraction of the surface soil to an average depth of 1.5 to 2.5 inches while leaving cobbles and larger rocks in place. Quantitative surveys of the plant community within the test plot showed no substantial differences in plant cover, litter cover, rocks, or soil before and after testing of the vacuum treatment for soil. Improvements are required to increase the volume of dislodged soil recovered during the vacuum process. Recovery rates for excavated soil were estimated to between 60 and 70 percent.

A Phase II demonstration will be conducted offsite using full-scale equipment in FY03. The full-scale equipment includes a redesigned vacuum system to increase recovery rates of excavated soil, containment of soil in a soft-sided waste container, and high-efficiency particulate air (HEPA) filtration of the vacuum system exhaust. The offsite demonstration will be conducted over a 150-foot by 150-foot test plot.

4.6 Data Management

Data management activities for FY02 included the following:

- RADMS FDCM was implemented (Section 4.6.4).
- New data were collected at 45 IHSSs, PACs, and UBC Sites in 19 IHSS Groups (Section 4.6.3).

4.6.1 Existing Data

Existing data from a number of sources were identified and added to the Soil Water Database (SWD) (Section 4.6.4). These additional data records will be evaluated through the Data Quality Filter and added to the RADMS database.

4.6.2 Comprehensive Data Compilation

New FY02 sampling data (Section 4.6.3), as well as existing data recovered during FY02 (Section 4.6.4), will be added to the RADMS database.

4.6.3 New Data

New data were generated by several sampling and accelerated action programs during FY02. Environmental data were collected at the UBC Sites, IHSSs, and PACs presented in Table 6.

Table 6
New Environmental Data

IHSS Group	IHSS/PAC/UBC Site	Description
000-1	IHSS 101	SEP
	IHSS 149.1	Effluent Line
	IHSS 149.2	Effluent Line
	PAC 900-1310	Interceptor Trench System Water Spill
100-4	UBC 123	Health Physics Laboratory
	IHSS 148	Waste Leaks
	PAC 100-611	Building 123 Scrubber Solution Spill
100-5	PAC 100-609	Building 121 Security Incinerator
300-1	IHSS 128	Oil Burn Pit #1
	IHSS134(N)	Lithium Metal Site
	IHSS 171	Lithium Metal Destruction Site
400-7	UBC 442	Filter Test Facility
	IHSS 157.1	Radioactive Site North Area
	IHSS 187	Sulfuric Acid Spill
400-10	IHSS 120.2	Fiberglass Area West of Building 664
	IHSS 161	Radioactive Site West of Building 66f4
	PAC 400-807	Sandblasting Area
500-4	IHSS 117.2	Middle Site Chemical Storage
500-6	PAC 500-906	Asphalt Surface Near Building 559
500-7	PAC 500-907	Tanker Truck Release of Hazardous Waste From Tank 231B

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IHSS Group	IHSS/PAC/UBC Site	Description
600-1	PAC 600-1001	Temporary Waste Storage – Building 663
600-2	PAC 400-804	Storage Shed South of Building 334
600-6	PAC 600-1005	Former Pesticide Storage Shed
700-3	UBC 776	Original Plutonium Foundry
	UBC 777	General Plutonium Research and Development
700-12	PAC 700-1106	Process Waste Spill - Portal 1
800-2	UBC 881	Laboratory and Office
	PAC 800-1205	Building 881 East Dock
800-4	UBC 886	Critical Mass Laboratory
	IHSS 164.2	Radioactive Site #2 800 Area, Building 886 Spill
	IHSS 121	OPWL Tanks 21, 22, and 27
800-6	UBC 889	Decontamination and Waste Reduction
	IHSS 164.3	Radioactive Site #2 800 Area, Building 889 Storage Pad
	IHSS 121	OPWL Tanks 28 and 40
900-4&5	IHSS 175	S&W Building 980 Contractor Storage Facility
900-2	IHSS 153	Oil Burn Pit No. 2
	IHSS 154	Pallet Burn Site
NE/NW	IHSS 216.2	East Spray Field-Center Area
	IHSS 216.3	East Spray Field-South Area
	NE-1412	Trench T-12
	NE-1413	Trench T-13
	NE-1407	OU 2 Treatment Facility
	IHSS 174a	PU&D Yard - Drum Storage Area

4.6.4 Data Management Challenges

Effective management of environmental data is critical to the success of IA and BZ IHSS and PAC closure. Quality data are required for remedial decisions and use in the CRA.

Remedial Action Decision Management System

RADMS was implemented on the Site development server in early FY02 and the FDCM was installed on the Site Production server during the fourth quarter FY02. The Geospatial, Data Quality Objectives, Verification and Validation, and Risk Assessment Modules will be fully implemented in FY03.

RADMS FY02 accomplishments include the following:

- Successfully passed Kaiser-Hill Company, L.L.C. (K-H)
- K-H Information Technology software verification and validation (V&V) for the Geospatial Module and FDCM;
- Successfully passed initial SVOC and VOC Verification and Validation Module independent software validation by Tetra Tech;

- Developed and implemented procedures to integrate RADMS data with the Analytical Services Toolkit and SWD systems;
- Developed sampling locations through RADMS for all FY02 IASAP addenda and additional field samples;
- Developed maps for FY02 closeout reports and data summaries;
- Produced maps of planned and actual sampling locations through the Geospatial Module;
- Developed maps and data tables to support the SEP AOC risk assessment;
- Developed maps and data tables to support the Sitewide ecological and human health risk assessments;
- Performed statistical calculations to determine Sitewide COCs;
- Successfully implemented a training program for all RADMS users; and
- Established a file management system for Geographic Information System (GIS) and database files to support multiple user and data dissemination.

RADMS incorporates database, statistical, geostatistical, GIS, and risk tools to provide an integrated system for planning and managing all phases of ER characterization and remediation activities.

Industrial Area and Buffer Zone Data Summaries

Characterization data collected during FY02 were evaluated using the Data Quality Filter. Approximately 195,000 analytical records were added to the data set.

Soil Water Database

Several tasks that improved data quality and accommodated the needs of IA characterization and remediation, and eventual CRA analysis, were completed through the cooperative efforts of the ER and Analytical Services Division (ASD) staff. These accomplishments include the following:

- Added missing field data for environmental sampling projects (IHSS 119.1) to link location code and field event sample data to electronic analytical data.
- Performed annual review of location codes. Worked with Site subject matter experts to review and update, as necessary, sampling event location codes and coordinates.
- Added missing analytical data for environmental sampling projects from hard copy into electronic analytical data. Uploaded over 10,000 surface water and groundwater analytical data records from 1997 and 1998. Uploaded missing

analytical data from IHSS 119.1 and PU&D Yard pre-remedial investigations conducted in 1997, SEP data collected in 1993 and 1995, and Trench 7 data collected in 1995.

- Fixed analytical result data packages. Cleaned up analytical result data packages in SWD that were incorrectly loaded during the receipt of electronic data deliverables (EDDs) during 1997 and 1998.

- Updated the NLR (No Longer Representative) field. Coded analytical sample result data that are "no longer representative" of site conditions (soil removed or remediated during accelerated cleanup projects such as Ryans Pit, OU 1 hot spot removal, Trenches T-3/T-4, Trench 1, and the Mound Site).

- Conducted RADMS integration activities. Worked with the RISS ER staff to integrate system operations between RADMS and SWD to support Site closure.

4.7 Work Controls

There are no changes to the work control process.

5.0 PROJECT INTERFACES

ER staff interfaces with many Site organizations. Key interfaces are described below.

5.1 Health and Safety

Continued health and safety integration is ongoing.

5.2 Waste Management Program

A new process for encapsulating material for disposition at the Nevada Test Site (NTS) was developed and used on sumps from UBC 889. This two-part process combines a shrink wrap with, a sprayable polyurea coating - Instacote. The Instacote process has proven technically feasible, acceptable to NTS, and cost-effective. Instacote is used for very large, dimensionally tall or wide objects that are not amenable to standard-size shipping containers. The shrink wrap/Instacote process produces a strong tight waste shipping package and eliminates size reduction efforts. After an object is coated, it is loaded onto a flatbed truck for shipping. This process reduces cost and scheduling as well as eliminates risk to personnel associated with size reduction.

5.3 Analytical Services Division

During FY02, ER staff used a combination of offsite and onsite laboratories for characterization and remediation sample analyses. A new contract for quick turn-around analyses to support the ER strategy was awarded during FY02. ER and ASD interfaced throughout FY02 on several issues that affect IA characterization activities as follows:

- Quality assurance (QA) for field and onsite laboratory analytical instruments;

- Data management; and
- Offsite analytical laboratory use.

5.4 Procurement

One major procurement for offsite laboratory support to ER was completed during FY02.

5.5 Resource Strategies

There are no updates to resource strategies

5.6 Project Communication

ER staff communicate with a variety of Site organizations on both ongoing and as-needed bases. ER interaction with the decommissioning organization is described in Section 4.2.

6.0 REFERENCES

DOE, 1995, Final Phase II RFI/RI Report, 903 Pad, Mound, and East Trenches Area, Operable Unit No. 2, U.S. Department of Energy, Rocky Flats Plant, Golden, Colorado.

DOE, 1999, Industrial Area Characterization and Remediation Strategy, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

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

DOE, 2001b, Industrial Area Sampling and Analysis Plan Fiscal Year 2002 Addendum #02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001c, Annual RFCA Groundwater Monitoring Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002a, Buffer Zone Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

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

DOE, 2002c, Minor modification to the Solar Evaporation Ponds Decision Document

DOE 2002d, AME Pathway Analysis Report, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002e, Site-Wide Water Balance Modeling Report for the Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2002f, Buffer Zone Sampling and Analysis Plan Addendum #IA-02-01 (IHSS Groups 900-2 and NE/NW), Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2002g, Draft Closeout Report for IHSS Group 800-6, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002h, Industrial Area Sampling and Analysis Plan Addendum #IA-02-02 (IHSS Group 800-6 and 900-4&5), Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2002i, Industrial Area Sampling and Analysis Plan Addendum #IA-02-03 (IHSS Group 800-4), Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2002j, Industrial Area Sampling and Analysis Plan Addendum #IA-02-04 (IHSS Groups 800-2 and 800-5), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002k, Industrial Area Sampling and Analysis Plan Addendum #IA-02-05(IHSS Group 400-7), Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2002l, Industrial Area Sampling and Analysis Plan Addendum #IA-02-06 (IHSS Group 600-2), Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2002m, Industrial Area Sampling and Analysis Plan Addendum #IA-02-07 (SEP AOC) Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2002n, Industrial Area Sampling and Analysis Plan Addendum #IA-02-08 (UBCs 776/777), Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002o, Annual Update to the Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002p, Environmental Restoration Rocky Flats Cleanup Agreement Standard Operating Protocol for Routine Soil Remediation Notification #02-08 (SEP AOC), Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2002q, Environmental Restoration Rocky Flats Cleanup Agreement Standard Operating Protocol for Routine Soil Remediation Notification #02-01 (IHSS Groups 100-4 and 100-5), Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2002r, Environmental Restoration Rocky Flats Cleanup Agreement Standard Operating Protocol for Routine Soil Remediation Notification #02-06 (IHSS Group 400-7), Rocky Flats Environmental Technology Site, Golden, Colorado, June.

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DOE, 2002s, Environmental Restoration Rocky Flats Cleanup Agreement Standard Operating Protocol for Routine Soil Remediation Notification #02-04 (IHSS Group 600-1), Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2002t, Environmental Restoration Rocky Flats Cleanup Agreement Standard Operating Protocol for Routine Soil Remediation Notification #02-07 (IHSS Group 600-2), Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2002u, Environmental Restoration Rocky Flats Cleanup Agreement Standard Operating Protocol for Routine Soil Remediation Notification #02-02 (IHSS Groups 400-10 and 800-6), Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002v, Draft Closeout Report for IHSS Groups 100-4 and 100-5, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, 2002w, Draft Closeout Report for IHSS Group 800-4, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002x, Environmental Restoration Rocky Flats Cleanup Agreement Standard Operating Protocol for Routine Soil Remediation Notification #02-09 (903 Pad), Rocky Flats Environmental Technology Site, Golden, Colorado, June.

Kaiser-Hill Company, L.L.C., 2000, Characterization Report for the 903 Drum Storage Area, 903 Lip Area, and Americium Zone, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

Kaiser-Hill Company, L.L.C., 2001, PU&D Yard Plume Enhanced Natural Attenuation Treatability Study Work Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

Kaiser-Hill Company, L.L.C., 2002a, Land Configuration Design Basis, Preliminary, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

Kaiser-Hill Company, L.L.C., 2002b, Conceptual Design for the Present Landfill Cover, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

RMRS, 1998, Interim Measure/Interim Remedial Action for the 886 Cluster, Rocky Flats Environmental Technology Site, Golden, Colorado, July

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