

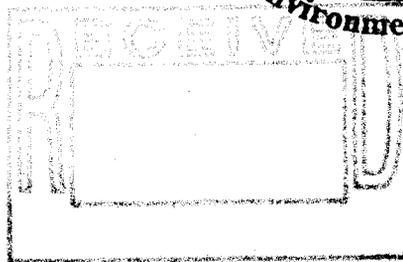
NOTICE

All drawings located at the end of the document.



**Data Summary Report
for IHSS Group 400-1**

UBC 439 – Radiological Survey



August 2004

ADMIN RECORD

IA-A-002273

Y
35

**Data Summary Report
for IHSS Group 400-1**

UBC 439 – Radiological Survey

August 2004

**Data Summary Report
for IHSS Group 400-1**

UBC 439 – Radiological Survey

Approval received from the Colorado Department of Public Health and Environment

(August 23, 2004)

Approval letter contained in the Administrative Record.

August 2004

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	SITE CHARACTERIZATION.....	1
2.1	Historic Information and Data	4
2.2	Accelerated Action Characterization Data.....	4
2.3	Accelerated Action Exceedances	4
2.4	Sum of Ratios.....	11
2.5	Summary Statistics.....	11
3.0	RCRA UNIT CLOSURE.....	12
4.0	SUBSURFACE SOIL RISK SCREEN	12
5.0	NO FURTHER ACCELERATED ACTION SUMMARY	13
6.0	DATA QUALITY ASSESSMENT	13
6.1	Data Quality Assessment Process.....	13
6.2	Verification and Validation of Results	14
6.2.1	Accuracy	15
6.2.2	Precision.....	21
6.2.3	Completeness	25
6.2.4	Sensitivity	25
6.3	Summary of Data Quality	25
7.0	PROJECT CONCLUSIONS.....	26
8.0	REFERENCES	26

LIST OF FIGURES

Figure 1	IHSS Group 400-1 UBC 439 General Location.....	2
Figure 2	IHSS Group 400-1 UBC 439 Detailed Location.....	3
Figure 3	IHSS Group 400-1 UBC 439 Accelerated Action Surface Soil Sampling Locations With Results Greater Than Background Means Plus Two Standard Deviations or Reporting Limits.....	5
Figure 4	IHSS Group 400-1 UBC 439 Accelerated Action Subsurface Soil Sampling Locations With Results Greater Than Background Means Plus Two Standard Deviation or Reporting Limits	6

LIST OF TABLES

Table 1	IHSS Group 400-1 Accelerated Action Characterization Specifications and Sampling Deviations	7
Table 2	IHSS Group 400-1 Accelerated Action Sampling and Analysis Summary.....	9
Table 3	IHSS Group 400-1 Accelerated Action Characterization Data Greater Than Background Means Plus Two Standard Deviations or Reporting Limits	10

Table 4 RFCA Radionuclide Soil SORs.....	11
Table 5 IHSS Group 400-1 Surface Soil Summary Statistics.....	11
Table 6 IHSS Group 400-1 Subsurface Soil Summary Statistics.....	12
Table 7 LCS Summary.....	16
Table 8 LCS Evaluation Summary.....	17
Table 9 Surrogate Recovery Summary.....	18
Table 10 Field Blank Summary.....	19
Table 11 Sample MS Evaluation Summary.....	19
Table 12 Sample MSD Evaluation Summary.....	21
Table 13 Field Duplicate Sample Frequency Summary.....	23
Table 14 RPD Evaluation Summary.....	24
Table 15 V&V Summary.....	25

ENCLOSURE

CD Containing Complete Data Set

IHSS Group 400-1
UBC 439 – Radiological Survey
Accelerated Action Data

ACRONYMS

AAESE	Accelerated Action Ecological Screening Evaluation
AL	action level
AR	Administrative Record
ASD	Analytical Services Division
CAS	Chemical Abstracts Service
CD	compact disc
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
CRA	Comprehensive Risk Assessment
DOE	U.S. Department of Energy
DQA	Data Quality Assessment
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ER RSOP	Environmental Restoration RFCA Standard Operating Protocol
ft	foot
FY	Fiscal Year
HPGe	high-purity germanium
HRR	Historical Release Report
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action
K-H	Kaiser-Hill Company, L.L.C.
LCS	laboratory control sample
µg/kg	micrograms per kilogram (may be found as ug/kg)
mg/kg	milligrams per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
NFAA	No Further Accelerated Action
OPWL	Original Process Waste Lines

PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
pCi/g	picocuries per gram
PCOC	potential contaminant of concern
POE	Point of Evaluation
PU&D	Property Utilization and Disposal
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS (or Site)	Rocky Flats Environmental Technology Site
RIN	report identification number
RL	reporting limit
RPD	relative percent difference
RSOP	RFCA Standard Operating Protocol
SAP	Sampling and Analysis Plan
SOR	sum of ratios
SSRS	Subsurface Soil Risk Screen
SWD	Soil Water Database
UBC	Under Building Contamination
V&V	verification and validation
VOC	volatile organic compound
WRW	wildlife refuge worker

1.0 INTRODUCTION

This Data Summary Report summarizes accelerated action characterization activities conducted at Individual Hazardous Substance Site (IHSS) Group 400-1, which consists of the Building 439 Under Building Contamination (UBC) Site (referred to as UBC 439) at the Rocky Flats Environmental Technology Site (RFETS or Site) in Golden, Colorado. Characterization activities were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP) (IASAP) (DOE 2001) and IASAP Addendum #IA-04-08 (DOE 2003a). The IASAP Addendum was approved by the Colorado Department of Public Health and Environment (CDPHE) on December 16, 2003. Ecological effects will be evaluated in the Accelerated Action Ecological Screening Evaluation (AAESE) and the ecological risk assessment portion of the Sitewide Comprehensive Risk Assessment (CRA).

Approval of this Data Summary Report constitutes regulatory agency concurrence that UBC 439 is a No Further Accelerated Action (NFAA) site. This information and NFAA determination will be documented in the Fiscal Year (FY) 2004 (04) Historical Release Report (HRR).

2.0 SITE CHARACTERIZATION

IHSS Group 400-1 consists of the UBC 439 – Radiological Survey beneath Building 439. The general location of UBC 439 at RFETS is shown on Figure 1; a more detailed location is shown on Figure 2.

IHSS Group 400-1, UBC 439, also lies within the boundary of IHSS Group 400-6 (IHSS 400-157.2 [Radioactive Site South Area]), as shown on Figure 2. A separate Data Summary Report is currently being prepared for IHSS Group 400-6. Other IHSS Groups adjacent to 400-1 include IHSS Groups 400-2 (UBC 440), 400-3 (UBC 444), and 400-10.

No sampling locations were proposed outside UBC 439 (in IHSS 400-157.2), because the area has been sufficiently characterized as part of IHSS Group 400-6 (DOE 2003b).

UBC 439 characterization information consists of historical knowledge, previously collected analytical data, and accelerated action analytical data. Existing information and data for UBC 439 are available in Appendix C of the IASAP (DOE 2001), the IA Data Summary Report (DOE 2000), and the HRRs (DOE 1992-2003). These data are discussed in Section 2.1.

Accelerated action analytical data for UBC 439 are summarized in Section 2.2. The enclosed compact disc (CD) contains the real and quality control (QC) accelerated action data for this project. The CD contains a data set in which analyte names, Chemical Abstracts Services (CAS) numbers, and units are standardized, and derived analytes are provided.

2.1 Historic Information and Data

IHSS Group 400-1 contains UBC 439, which is approximately 100 feet (ft) by 50 ft. Building 439 is a sheet metal structure built on an at-grade concrete slab. The structure was a maintenance building, and was later used for Property Utilization and Disposition (PU&D) operations. Building 439 was used to receive, process, and ship surplus equipment and materials released by Site custodians, and housed small portable counters to monitor alpha, beta, and gamma radiation. Sources were controlled through Site accountability procedures. Smear samples collected throughout RFETS were brought to Building 439 for counting. The building is currently being used as the break area for Building 440 operations personnel.

There are no process lines or foundation drains under the building. There is one floor drain that is tied to the sanitary sewer system. The sewer line exits the building near the northwestern corner (Figure 2).

No characterization of soil beneath the Building 439 foundation slab had been conducted prior to accelerated action activities. Previously collected analytical data from existing soil samples as shown in SAP Addendum #IA-04-08 were collected from outside the footprint of the building (DOE 2003a).

2.2 Accelerated Action Characterization Data

Based on historical sample results from around UBC 439, the potential contaminants of concern (PCOCs) for the UBC Site were radionuclides, metals, and volatile organic compounds (VOCs) (DOE 2003a).

Accelerated action analytical data for UBC 439 were collected in accordance with IASAP Addendum #IA-04-08 (DOE 2003a). Sampling specifications, including PCOCs, are presented in Table 1. Deviations from the IASAP Addendum are also presented and explained in Table 1. Table 2 presents a summary of accelerated action sampling and analyses. The sampling locations and analytical results greater than background means plus two standard deviations or reporting limits (RLs), including wildlife refuge worker (WRW) action level (AL) exceedances, are shown on Figures 3 and 4 and listed in Table 3. Figure 3 contains the analytical data from surface soil below the slab, and Figure 4 contains data from the subsurface soil.

2.3 Accelerated Action Exceedances

All contaminant of concern (COC) concentrations in UBC 439 were less than WRW ALs; therefore, soil remediation was not required.

Table 1
IHSS Group 400-1 Accelerated Action Characterization Specifications and Sampling Deviations

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
BX35-028	2082317.785	748424.337	2082317.785	748424.337	Surface Soil	0.0-0.5	Radionuclides, Metals, and VOCs	Biased; to target sewer line in northwestern corner of building; no significant difference in interval and location.
BX35-028	2082317.785	748424.337	2082317.785	748424.337	Subsurface Soil	0.5-1.5	Radionuclides, Metals, and VOCs	Biased; to target sewer line in northwestern corner of building; interval shortened because of refusal from 1.5 to 2.5 ft; no significant difference in location.
BX35-029	2082329.262	748382.084	2082329.262	748382.084	Surface Soil	0.0-0.5	Radionuclides, Metals, and VOCs	Biased; to augment statistical sampling locations; no significant difference in interval and location.
BX35-029	2082329.262	748382.084	2082329.262	748382.084	Subsurface Soil	0.5-0.9	Radionuclides, Metals, and VOCs	Biased; to augment statistical sampling locations; interval shortened because of refusal from 0.9 to 2.5 ft; no significant difference in location.
BY35-028	2082342.206	748407.067	2082342.206	748407.067	Surface Soil	0.0-0.5	Radionuclides, Metals, and VOCs	Statistical; no significant difference in interval and location.
BY35-028	2082342.206	748407.067	2082342.206	748407.067	Subsurface Soil	0.5-0.9	Radionuclides, Metals, and VOCs	Statistical; interval shortened because of refusal from 0.9 to 2.5 ft; no significant difference in location.
BY35-029	2082378.192	748408.059	2082378.192	748408.059	Surface Soil	0.0-0.5	Radionuclides, Metals, and VOCs	Statistical; no significant difference in interval and location.

15
 Data Summary Report for IHSS Group 400-1

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
BY35-029	2082378.192	748408.059	2082378.192	748408.059	Subsurface Soil	0.5-0.8	Radionuclides, Metals, and VOCs	Statistical; interval shortened because of refusal from 0.8 to 2.5 ft; no significant difference in location.
BY35-030	2082397.044	748377.390	2082397.044	748377.390	Surface Soil	0.0-0.5	Radionuclides, Metals, and VOCs	Statistical; no significant difference in interval and location.
BY35-030	2082397.044	748377.390	2082397.044	748377.390	Subsurface Soil	0.5-1.5	Radionuclides, Metals, and VOCs	Statistical; interval shortened because of refusal from 1.5 to 2.5 ft; no significant difference in location.

Table 2
IHSS Group 400-1 Accelerated Action Sampling and Analysis Summary

Criteria	Number
Number of Sampling Locations	5
Number of Samples	10
Number of Radionuclide Analyses	10
Number of Metal Analyses	10
Number of VOC Analyses	10

16

Table 3
IHSS Group 400-1 Accelerated Action Characterization Data Greater Than Background Means
Plus Two Standard Deviations or Reporting Limits

Location	Easting	Northing	Analyte	Result	Reporting Limit	WRW AL	Background Mean + 2 Standard Deviations	Unit	Start Depth (ft)	End Depth (ft)
BX35-028	2082317.785	748424.337	Uranium-234	4.803	NA	300	2.253	pCi/g	0.0	0.5
BX35-028	2082317.785	748424.337	Uranium-235	0.269	NA	8	0.094	pCi/g	0.0	0.5
BX35-028	2082317.785	748424.337	Uranium-238	4.803	NA	351	2.000	pCi/g	0.0	0.5
BX35-028	2082317.785	748424.337	Uranium-234	4.358	NA	300	2.640	pCi/g	0.5	1.5
BX35-028	2082317.785	748424.337	Uranium-235	0.163	NA	8	0.120	pCi/g	0.5	1.5
BX35-028	2082317.785	748424.337	Uranium-238	4.358	NA	351	1.490	pCi/g	0.5	1.5
BX35-029	2082329.262	748382.084	Uranium-238	1.524	NA	351	1.490	pCi/g	0.5	0.9
BY35-028	2082342.206	748407.067	Acetone	24.000	4.900	102000000	NA	µg/kg	0.0	0.5
BY35-028	2082342.206	748407.067	Copper	21.000	NA	40900	18.060	mg/kg	0.0	0.5
BY35-028	2082342.206	748407.067	Acetone	9.400	5.100	102000000	NA	µg/kg	0.5	0.9
BY35-029	2082378.192	748408.059	Uranium-238	1.983	NA	351	1.490	pCi/g	0.5	0.8
BY35-030	2082397.044	748377.390	Uranium-234	4.051	NA	300	2.253	pCi/g	0.0	0.5
BY35-030	2082397.044	748377.390	Uranium-235	0.205	NA	8	0.094	pCi/g	0.0	0.5
BY35-030	2082397.044	748377.390	Uranium-238	4.051	NA	351	2.000	pCi/g	0.0	0.5
BY35-030	2082397.044	748377.390	Uranium-234	3.995	NA	300	2.640	pCi/g	0.5	1.5
BY35-030	2082397.044	748377.390	Uranium-235	0.160	NA	8	0.120	pCi/g	0.5	1.5
BY35-030	2082397.044	748377.390	Uranium-238	3.995	NA	351	1.490	pCi/g	0.5	1.5

pCi/g = picocuries per gram

µg/kg = micrograms per kilogram (may be found as ug/kg)

mg/kg = milligrams per kilogram

NA = not applicable

Italic font denotes result derived by calculation based on another analysis.

2.4 Sum of Ratios

Rocky Flats Cleanup Agreement (RFCA) sums of ratios (SORs) for radionuclides were calculated for UBC 439 sampling locations based on the accelerated action analytical data for the COCs and WRW ALs. Radionuclide SORs were calculated for all locations with analytical results greater than background means plus two standard deviations for americium-241, plutonium-239/240, uranium-234, uranium-235, and uranium-238. Plutonium-239/240 activities are derived from americium-241 activities (that is, plutonium-239/240 activity = americium-241 gamma spectroscopy activity x 5.7) where high-purity germanium (HPGe) detection was used for analysis. Table 4 presents the SORs for surface and subsurface soil (0 to 3 ft). All SORs for radionuclides in soil are less than 1.

Table 4
RFCA Radionuclide Soil SORs

Location	Start Depth (ft)	End Depth (ft)	SOR to WRW
BX35-028	0	0.5	0.063
BX35-028	0.5	1.5	0.047
BX35-029	0.5	0.9	0.004
BY35-029	0.5	0.8	0.006
BY35-030	0	0.5	0.051
BY35-030	0.5	1.5	0.045

Surface soil SORs for non-radionuclide COCs were not calculated for IHSS Group 400-1 because analytical results were less than 10 percent of WRW ALs.

2.5 Summary Statistics

Summary statistics, by analyte, were calculated for the UBC 439 sampling locations, as presented in Tables 5 and 6. These summaries are based on detections only. Because many metal and VOC analytes were not detected, they are not represented here.

Table 5
IHSS Group 400-1 Surface Soil Summary Statistics

Analyte	Number of Samples Analyzed	Detection Frequency	Mean Concentration	Maximum Concentration	Background Mean Plus 2 Standard Deviations	WRW AL	Unit
Acetone	5	20.00%	24.000	24.000	NA	102000000	µg/kg
Copper	5	20.00%	21.000	21.000	18.06	40900	mg/kg
Uranium-234	5	40.00%	4.427	4.803	2.25	300	pCi/g
Uranium-235	5	40.00%	0.237	0.269	0.09	8	pCi/g
Uranium-238	5	40.00%	4.427	4.803	2.00	351	pCi/g

**Table 6
IHSS Group 400-1 Subsurface Soil Summary Statistics**

Analyte	Number of Samples Analyzed	Detection Frequency	Mean Concentration	Maximum Concentration	Background Mean Plus 2 Standard Deviations	WRW AL	Unit
Acetone	5	20.00%	9.400	9.400	NA	102000000	µg/kg
Uranium-234	5	40.00%	4.177	4.358	2.64	300	pCi/g
Uranium-235	5	40.00%	0.161	0.163	0.12	8	pCi/g
Uranium-238	5	80.00%	2.965	4.358	1.49	351	pCi/g

3.0 RCRA UNIT CLOSURE

Not applicable. There were no Resource Conservation and Recovery Act (RCRA) units to be closed.

4.0 SUBSURFACE SOIL RISK SCREEN

The Subsurface Soil Risk Screen (SSRS) follows the steps identified on Figure 3 of Attachment 5 of RFCA (DOE et al. 2003). The SSRS is conducted if plutonium and americium are present below 3 feet in depth or if uranium or non-radionuclides are present below 6 inches in depth. In this case the SSRS was performed because of the presence of uranium and non-radionuclides at levels greater than background below 6 inches in depth.

Screen 1 – Are the COC concentrations below RFCA Table 3 WRW soil ALs?

Yes. As shown in Table 3 (this document), all IHSS Group 400-1 subsurface soil results greater than background means plus two standard deviations or RLs were less than RFCA WRW ALs.

Screen 4 – Is there an environmental pathway and sufficient quantity of COCs that would cause an exceedance of the surface water standards?

No. Contaminant migration via erosion and groundwater are two possible pathways whereby surface water could become contaminated by soil from UBC 439. UBC 439 is not located in an area subject to erosion as identified on Figure 1 of RFCA. Currently, runoff from UBC 439 is monitored at surface water monitoring location GS57. Downstream from GS57, surface water monitoring location GS10 is the RFCA surface water Point of Evaluation (POE). Although exceedances of surface water ALs have been detected at GS10, this station receives water from a large part of the IA. Therefore, surface water quality at GS10 is not attributable to any single IHSS Group such as 400-1 (DOE 2002a, 2003c). The RFETS Automated Surface-Water Monitoring Report - Water Year 2002 (DOE 2003c) indicates that GS57 contributed less than 1 percent of the americium-241 and plutonium-239/240 load measured at GS10 between March 2002 and November 2003. Because americium and plutonium were below background in UBC 439 samples, they are not COCs, and soil from UBC 439 should not pose a danger to surface water. In general, surface water issues will be addressed in the CRA.

19

Groundwater in the vicinity of UBC 439 is monitored at well locations 40299, 41299, P416789, and P419689. The following VOCs have been or are present in groundwater at concentrations above Tier II ALs in at least one of these wells: 1,1-dichloroethene, tetrachloroethene, and trichloroethene. The 2001 RFCA Annual Groundwater Monitoring Report (DOE 2002b) concluded that the VOC contamination in the UBC 439 area, for the analytes above, is part of the IA Plume. The 2001 Annual Report indicates that well 41299 is in the center of an area of higher tetrachloroethene concentrations north and northeast of IHSS Group 400-1. The 2001 Annual Report also indicates well 41299 is located on the edge of an area of elevated trichloroethene concentrations centered on well 40299 northwest of UBC 439 (DOE 2002b, Figure 8-4). All 1,1-dichloroethene, tetrachloroethene, and trichloroethene results from the IHSS Group 400-1 accelerated action soil sampling were non-detections. Groundwater issues will be addressed in the groundwater Interim Measure/Interim Remedial Action (IM/IRA).

5.0 NO FURTHER ACCELERATED ACTION SUMMARY

Given the analytical results and the SSRS, action is not required for UBC 439. The NFAA determination is justified for IHSS Group 400-1, UBC 439 based on the following:

- Contaminant concentrations were below WRW ALs.
- Migration of contaminants to surface water through erosion is unlikely because the area is not prone to landslides or erosion.
- Migration of contaminants in groundwater will not likely impact surface water because of the low levels of soil contamination found in IHSS Group 400-1. Groundwater in this area is considered part of the IA Plume, which will be further evaluated in the groundwater IM/IRA.

6.0 DATA QUALITY ASSESSMENT

The data quality objectives (DQOs) for this project are described in the IASAP (DOE 2001). All DQOs for this project were achieved based on the following:

- Regulatory agency-approved sampling program design: IASAP Addendum #IA-04-08 (DOE 2003a) and Environmental Restoration (ER) RFCA Standard Operating Protocol (RSOP) (ER RSOP) for Routine Soil Remediation Notification #04-08 (DOE 2003d);
- Samples collected in accordance with the IASAP (DOE 2001); and
- The Data Quality Assessment (DQA), conducted as documented in the following sections.

6.1 Data Quality Assessment Process

The DQA process ensures that the type, quantity, and quality of environmental data used in decision making are defensible, and is based on the following guidance and requirements:

- U.S. Environmental Protection Agency (EPA), 1994a, Guidance for the Data Quality Objective Process, QA/G-4;
- EPA, 1998, Guidance for the Data Quality Assessment Process; Practical Methods for Data Analysis, QA/G-9; and
- U.S. Department of Energy (DOE), 1999, Quality Assurance, Order 414.1A.

Verification and validation (V&V) of the data are the primary components of the DQA. The final data are compared with original project DQOs and evaluated with respect to project decisions; uncertainty within the decisions; and quality criteria required for the data, specifically precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS). Validation criteria are consistent with the following RFETS-specific documents and industry guidelines:

- EPA, 1994b, U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, 540/R-94/012;
- EPA, 1994c, U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, 540/R-94/013;
- Kaiser-Hill Company, L.L.C. (K-H) V&V Guidelines:
 - General Guidelines for Data Verification and Validation, DA-GR01-v2, 2002a
 - V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v2, 2002b
 - V&V Guidelines for Volatile Organics, DA-SS01-v3, 2002c
 - V&V Guidelines for Semivolatile Organics, DA-SS02-v3, 2002d
 - V&V Guidelines for Metals, DA-SS05-v3, 2002e; and
- Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5.

This report will be submitted to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Administrative Record (AR) for permanent storage 30 days after being provided to CDPHE and/or EPA.

6.2 Verification and Validation of Results

Verification ensures that data produced and used by the project are documented and traceable in accordance with quality requirements. Validation consists of a technical review of all data that directly support project decisions so that any limitations of the data relative to project goals are delineated and the associated data are qualified accordingly. The V&V process defines the criteria that constitute data quality, namely PARCCS parameters. Data traceability and archival are also addressed. V&V criteria include the following:

- Chain-of-custody;
- Preservation and hold times;

2/

- Instrument calibrations;
- Preparation blanks;
- Interference check samples (metals);
- Matrix spikes/matrix spike duplicates (MS/MSDs);
- Laboratory control samples (LCSs);
- Field duplicate measurements;
- Chemical yield (radiochemistry);
- Required quantitation limits/minimum detectable activities (sensitivity of chemical and radiochemical measurements, respectively); and
- Sample analysis and preparation methods.

Evaluation of V&V criteria ensures that PARCCS parameters are satisfactory (that is, within tolerances acceptable to the project). Satisfactory V&V of laboratory quality controls are captured through application of validation “flags” or qualifiers to individual records.

Raw, hard-copy data (for example, individual analytical data packages) are currently filed by report identification number (RIN) and maintained by K-H Analytical Services Division (ASD); older hard copies may reside in the Federal Center in Lakewood, Colorado. Electronic data are stored in the RFETS Soil Water Database (SWD). The data sets addressed in this report are included on the enclosed CD in Microsoft Access 2000 format.

6.2.1 Accuracy

The following measures of accuracy were evaluated:

- LCSs;
- Surrogates;
- Field blanks; and
- Sample MSs.

Results are compared to method requirements and project goals. The results of these comparisons are summarized for RFCA COCs where the result could impact project decisions. Particular attention is paid to those values near ALs when QC results could indicate unacceptable levels of uncertainty for decision-making purposes.

Laboratory Control Sample Evaluation

The frequency of LCS measurements is presented in Table 7. As indicated, LCS analyses were run for alpha spectrometry, SW-846 6010 (metal), and SW-846 8260 (VOC) methods. The on-site laboratories are not required to provide gamma spectroscopy LCS analyses.

**Table 7
LCS Summary**

Test Method	Laboratory Batch	Laboratory Control Standards
Alpha Spectroscopy	4163583	Yes
Alpha Spectroscopy	4163584	Yes
Alpha Spectroscopy	4163589	Yes
SW-846 6010	4161660	Yes
SW-846 6010	4162322	Yes
SW-846 6010	4163156	Yes
SW-846 6010	4166284	Yes
SW-846 8260	4162481	Yes
SW-846 8260	MS1 VOA_040608A	Yes
SW-846 8260	MS2 VOA_040607A	Yes

Minimum and maximum LCS results are tabulated by chemical for the entire project in Table 8. LCS results that were outside of tolerances were reviewed to determine whether a potential bias might be indicated. LCS recoveries are not indicative of matrix effects because they are not prepared using Site samples. LCS results do indicate whether the laboratory may be introducing a bias in the results. Recoveries reported above the upper limit may indicate the actual sample results are less than reported. Because this is environmentally conservative, no further action is needed.

Low LCS recoveries were evaluated as described here. If the maximum sample result divided by the lowest LCS recovery for that analyte is less than the WRW AL, no further action is taken because any indicated bias is not great enough to affect project decisions. All metal and VOC LCS recoveries for IHSS Group 400-1 passed the criterion; therefore, LCS recoveries did not impact project decisions.

Any qualifications of individual results because of LCS performance exceeding upper or lower tolerance limits are also captured in the V&V flags, described in Section 6.2.3.

23

Table 8
LCS Evaluation Summary

Test Method	CAS No.	Analyte	Minimum Result	Maximum Result	Unit
SW-846 6010	7429-90-5	Aluminum	97	99	%REC
SW-846 6010	7440-36-0	Antimony	93	96	%REC
SW-846 6010	7440-38-2	Arsenic	92	97	%REC
SW-846 6010	7440-39-3	Barium	99	101	%REC
SW-846 6010	7440-41-7	Beryllium	97	99	%REC
SW-846 6010	7440-43-9	Cadmium	91	97	%REC
SW-846 6010	7440-47-3	Chromium	93	101	%REC
SW-846 6010	7440-48-4	Cobalt	91	98	%REC
SW-846 6010	7440-50-8	Copper	96	98	%REC
SW-846 6010	7439-89-6	Iron	98	98	%REC
SW-846 6010	7439-92-1	Lead	93	98	%REC
SW-846 6010	7439-93-2	Lithium	91	95	%REC
SW-846 6010	7439-96-5	Manganese	94	101	%REC
SW-846 6010	7439-97-6	Mercury	101	105	%REC
SW-846 6010	7439-98-7	Molybdenum	91	97	%REC
SW-846 6010	7440-02-0	Nickel	94	99	%REC
SW-846 6010	7782-49-2	Selenium	95	98	%REC
SW-846 6010	7440-22-4	Silver	97	105	%REC
SW-846 6010	7440-24-6	Strontium	97	100	%REC
SW-846 6010	7440-31-5	Tin	86	91	%REC
SW-846 6010	11-09-6	Uranium, Total	97	99	%REC
SW-846 6010	7440-62-2	Vanadium	93	100	%REC
SW-846 6010	7440-66-6	Zinc	92	93	%REC
SW-846 8260	71-55-6	1,1,1-Trichloroethane	91.64	111	%REC
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	85	101.7	%REC
SW-846 8260	79-00-5	1,1,2-Trichloroethane	91	101.5	%REC
SW-846 8260	75-34-3	1,1-Dichloroethane	96.19	112	%REC
SW-846 8260	75-35-4	1,1-Dichloroethene	95.6	113	%REC
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	84	98.46	%REC
SW-846 8260	95-50-1	1,2-Dichlorobenzene	89	101.1	%REC
SW-846 8260	107-06-2	1,2-Dichloroethane	97.92	109	%REC
SW-846 8260	78-87-5	1,2-Dichloropropane	97.81	109	%REC
SW-846 8260	106-46-7	1,4-Dichlorobenzene	90	99.64	%REC
SW-846 8260	78-93-3	2-Butanone	84.39	87.76	%REC
SW-846 8260	108-10-1	4-Methyl-2-pentanone	84	94.97	%REC
SW-846 8260	67-64-1	Acetone	74.82	80.52	%REC
SW-846 8260	71-43-2	Benzene	96.73	114	%REC
SW-846 8260	75-27-4	Bromodichloromethane	96.51	108	%REC
SW-846 8260	75-25-2	Bromofom	91.32	93	%REC
SW-846 8260	74-83-9	Bromomethane	66.93	91.95	%REC

Test Method	CAS No.	Analyte	Minimum Result	Maximum Result	Unit
SW-846 8260	75-15-0	Carbon disulfide	87	119.5	%REC
SW-846 8260	56-23-5	Carbon tetrachloride	92.82	114	%REC
SW-846 8260	108-90-7	Chlorobenzene	95.97	101.5	%REC
SW-846 8260	75-00-3	Chloroethane	89	99.58	%REC
SW-846 8260	67-66-3	Chloroform	95.95	110	%REC
SW-846 8260	74-87-3	Chloromethane	74	96.6	%REC
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	96.19	109	%REC
SW-846 8260	124-48-1	Dibromochloromethane	95	101.2	%REC
SW-846 8260	100-41-4	Ethylbenzene	96.21	102	%REC
SW-846 8260	87-68-3	Hexachlorobutadiene	86	97.56	%REC
SW-846 8260	75-09-2	Methylene chloride	96.56	113	%REC
SW-846 8260	91-20-3	Naphthalene	76	97.16	%REC
SW-846 8260	100-42-5	Styrene	96	101.3	%REC
SW-846 8260	127-18-4	Tetrachloroethene	92.03	105	%REC
SW-846 8260	108-88-3	Toluene	98.97	102.2	%REC
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	94	109.5	%REC
SW-846 8260	79-01-6	Trichloroethene	93.18	112	%REC
SW-846 8260	75-01-4	Vinyl chloride	90	102.9	%REC
SW-846 8260	1330-20-7	Xylene	97	100.1	%REC

Surrogate Evaluation

The frequency of surrogate measurements, relative to each laboratory batch, is given in Table 9. The minimum and maximum surrogate results are also tabulated, by chemical, for the entire project. Surrogates are added to every VOC sample, and, therefore, surrogate recoveries only impact individual samples. Unacceptable surrogate recoveries can indicate potential matrix effects. Surrogate recoveries reported above 100 percent may indicate the actual sample results are less than reported. Because this is environmentally conservative, no further action is needed. Therefore, only the lowest recoveries were evaluated. If the maximum sample result divided by the lowest surrogate recovery is less than the WRW AL for that analyte, no further action is taken because any indicated bias is not great enough to affect project decisions. All VOC analytes passed this criterion. Therefore, surrogate recoveries did not impact project decisions for IHSS Group 400-1.

Table 9
Surrogate Recovery Summary

Volatile Organic Compounds					
Number of Samples	CAS No.	Analyte	Minimum Result	Maximum Result	Unit
10	460-00-4	4-Bromofluorobenzene	82.95	111	%REC
10	17060-07-0	Deuterated 1,2-dichloroethane	100.2	118	%REC
10	2037-26-5	Deuterated toluene	89.03	96.09	%REC

25

Field Blank Evaluation

Results of the field blank analyses are provided in Table 10. Detectable (non-“U” laboratory qualified) amounts of contaminants within the blanks, which could indicate possible cross-contamination of samples, are evaluated if the same contaminant is detected in the associated real samples. Evaluation consists of multiplying the field blank results by 10 (for laboratory contaminants) or 5 (for non-laboratory contaminants) and comparing them to the WRW ALs. To be conservative, a factor of 10 is used in this evaluation. When the corrected field blank result is less than the WRW AL, the associated real results are considered acceptable. For the IHSS Group 400-1 data, none of the field blank results multiplied by 10 exceeded their WRW ALs. Therefore, blank contamination did not adversely impact project decisions.

**Table 10
Field Blank Summary**

Sample QC Code	Laboratory	CAS No.	Analyte	Detected Result	Unit
EB	URS	15117-96-1	Uranium-235	0.153	pCi/g
FB	URS	15117-96-1	Uranium-235	0.203	pCi/g
RNS	URS	15117-96-1	Uranium-235	0.153	pCi/g
EB	URS	7440-61-1	Uranium-238	2.12	pCi/g
FB	URS	7440-61-1	Uranium-238	3.08	pCi/g
RNS	URS	7440-61-1	Uranium-238	2.6	pCi/g

Field blank (EB = equipment, field = FB, rinse = RNS, trip = TB) results greater than detection limits (not “U” qualified)

Sample Matrix Spike Evaluation

Table 11 provides a summary of the minimum and maximum MS results by chemical for the project. According to the EPA data validation guidelines (1994b), if organic MS recoveries are low, the LCS recovery should be checked. If the recovery is acceptable, no action is taken. LCS recoveries for organic analyses with potentially low, unacceptable MS recoveries were reviewed. For this project, these checks indicate no decisions were impacted for organic analytes with low MS recoveries (refer to previous section).

**Table 11
Sample MS Evaluation Summary**

Test Method	CAS No.	Analyte	Minimum Result	Maximum Result	Unit	Number of MS Samples	Number of Lab Batches
SW-846 6010	7429-90-5	Aluminum	1950	1950	%REC	1	1
SW-846 6010	7440-36-0	Antimony	60	60	%REC	1	1
SW-846 6010	7440-38-2	Arsenic	93	93	%REC	1	1
SW-846 6010	7440-39-3	Barium	95	95	%REC	1	1
SW-846 6010	7440-41-7	Beryllium	96	96	%REC	1	1
SW-846 6010	7440-43-9	Cadmium	92	92	%REC	1	1
SW-846 6010	7440-47-3	Chromium	103	103	%REC	1	1

26

Data Summary Report for IHSS Group 400-1

Test Method	CAS No.	Analyte	Minimum Result	Maximum Result	Unit	Number of MS Samples	Number of Lab Batches
SW-846 6010	7440-48-4	Cobalt	92	92	%REC	1	1
SW-846 6010	7440-50-8	Copper	93	93	%REC	1	1
SW-846 6010	7439-89-6	Iron	566	566	%REC	1	1
SW-846 6010	7439-92-1	Lead	92	92	%REC	1	1
SW-846 6010	7439-93-2	Lithium	93	93	%REC	1	1
SW-846 6010	7439-96-5	Manganese	61	61	%REC	1	1
SW-846 6010	7439-97-6	Mercury	98	98	%REC	1	1
SW-846 6010	7439-98-7	Molybdenum	89	89	%REC	1	1
SW-846 6010	7440-02-0	Nickel	95	95	%REC	1	1
SW-846 6010	7782-49-2	Selenium	95	95	%REC	1	1
SW-846 6010	7440-22-4	Silver	97	97	%REC	1	1
SW-846 6010	7440-24-6	Strontium	92	92	%REC	1	1
SW-846 6010	7440-31-5	Tin	84	84	%REC	1	1
SW-846 6010	11-09-6	Uranium, Total	90	90	%REC	1	1
SW-846 6010	7440-62-2	Vanadium	100	100	%REC	1	1
SW-846 6010	7440-66-6	Zinc	91	91	%REC	1	1
SW-846 8260	71-55-6	1,1,1-Trichloroethane	98.75	98.75	%REC	1	1
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	91.57	91.57	%REC	1	1
SW-846 8260	79-00-5	1,1,2-Trichloroethane	96.11	96.11	%REC	1	1
SW-846 8260	75-34-3	1,1-Dichloroethane	98.62	98.62	%REC	1	1
SW-846 8260	75-35-4	1,1-Dichloroethene	94.75	94.75	%REC	1	1
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	88.55	88.55	%REC	1	1
SW-846 8260	95-50-1	1,2-Dichlorobenzene	92.18	92.18	%REC	1	1
SW-846 8260	107-06-2	1,2-Dichloroethane	98.09	98.09	%REC	1	1
SW-846 8260	78-87-5	1,2-Dichloropropane	96.28	96.28	%REC	1	1
SW-846 8260	106-46-7	1,4-Dichlorobenzene	93.52	93.52	%REC	1	1
SW-846 8260	78-93-3	2-Butanone	104.2	104.2	%REC	1	1
SW-846 8260	108-10-1	4-Methyl-2-pentanone	95.42	95.42	%REC	1	1
SW-846 8260	67-64-1	Acetone	109.2	109.2	%REC	1	1
SW-846 8260	71-43-2	Benzene	95.58	95.58	%REC	1	1
SW-846 8260	75-27-4	Bromodichloromethane	101.1	101.1	%REC	1	1
SW-846 8260	75-25-2	Bromoform	101.3	101.3	%REC	1	1
SW-846 8260	74-83-9	Bromomethane	110.8	110.8	%REC	1	1
SW-846 8260	75-15-0	Carbon disulfide	75.77	75.77	%REC	1	1
SW-846 8260	56-23-5	Carbon tetrachloride	99.17	99.17	%REC	1	1
SW-846 8260	108-90-7	Chlorobenzene	95.6	95.6	%REC	1	1
SW-846 8260	75-00-3	Chloroethane	97.2	97.2	%REC	1	1
SW-846 8260	67-66-3	Chloroform	99.91	99.91	%REC	1	1
SW-846 8260	74-87-3	Chloromethane	97.39	97.39	%REC	1	1
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	97.94	97.94	%REC	1	1
SW-846 8260	124-48-1	Dibromochloromethane	94.99	94.99	%REC	1	1
SW-846 8260	100-41-4	Ethylbenzene	93.03	93.03	%REC	1	1
SW-846 8260	87-68-3	Hexachlorobutadiene	85.3	85.3	%REC	1	1

27

Test Method	CAS No.	Analyte	Minimum Result	Maximum Result	Unit	Number of MS Samples	Number of Lab Batches
SW-846 8260	75-09-2	Methylene chloride	95.5	95.5	%REC	1	1
SW-846 8260	91-20-3	Naphthalene	92.12	92.12	%REC	1	1
SW-846 8260	100-42-5	Styrene	92.39	92.39	%REC	1	1
SW-846 8260	127-18-4	Tetrachloroethene	92.86	92.86	%REC	1	1
SW-846 8260	108-88-3	Toluene	94.33	94.33	%REC	1	1
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	88.48	88.48	%REC	1	1
SW-846 8260	79-01-6	Trichloroethene	99.07	99.07	%REC	1	1
SW-846 8260	75-01-4	Vinyl chloride	88.7	88.7	%REC	1	1
SW-846 8260	1330-20-7	Xylene	93.83	93.83	%REC	1	1

For inorganics with MS recoveries greater than zero, the maximum sample results were divided by the lowest percent recovery for each analyte. If the resulting number was less than the WRW AL, decisions were not impacted. For this project, all inorganic recoveries were greater than zero. In all cases the maximum sample result divided by the minimum MS percent recovery was less than the WRW AL. Therefore, MS percent recoveries for inorganics did not affect project decisions.

6.2.2 Precision

Precision is measured by evaluating both MSDs and field duplicates, as described in the following sections.

Matrix Spike Duplicate Evaluation

Laboratory precision is measured through the use of MSDs, as summarized in Table 12. Analytes with the highest relative percent differences (RPDs) (greater than 35 percent) were reviewed by comparing the highest sample result to the WRW AL. For analytes with RPDs greater than 35 percent, if the highest sample results were sufficiently below the ALs, no further action was needed.

Table 12
Sample MSD Evaluation Summary

Test Method	CAS No.	Analyte	Maximum RPD
SW-846 6010	7429-90-5	Aluminum	4.72
SW-846 6010	7440-36-0	Antimony	3.28
SW-846 6010	7440-38-2	Arsenic	2.13
SW-846 6010	7440-39-3	Barium	7.11
SW-846 6010	7440-41-7	Beryllium	2.06
SW-846 6010	7440-43-9	Cadmium	2.15
SW-846 6010	7440-47-3	Chromium	0.97
SW-846 6010	7440-48-4	Cobalt	3.21
SW-846 6010	7440-50-8	Copper	15.84
SW-846 6010	7439-89-6	Iron	96.43

Test Method	CAS No.	Analyte	Maximum RPD
SW-846 6010	7439-92-1	Lead	2.15
SW-846 6010	7439-93-2	Lithium	2.13
SW-846 6010	7439-96-5	Manganese	120.00
SW-846 6010	7439-97-6	Mercury	4.17
SW-846 6010	7439-98-7	Molybdenum	2.22
SW-846 6010	7440-02-0	Nickel	1.05
SW-846 6010	7782-49-2	Selenium	3.11
SW-846 6010	7440-22-4	Silver	1.03
SW-846 6010	7440-24-6	Strontium	5.29
SW-846 6010	7440-31-5	Tin	2.35
SW-846 6010	11-09-6	Uranium, Total	3.28
SW-846 6010	7440-62-2	Vanadium	0.00
SW-846 6010	7440-66-6	Zinc	10.42
SW-846 8260	71-55-6	1,1,1-Trichloroethane	1.29
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	5.69
SW-846 8260	79-00-5	1,1,2-Trichloroethane	4.07
SW-846 8260	75-34-3	1,1-Dichloroethane	0.36
SW-846 8260	75-35-4	1,1-Dichloroethene	2.19
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	3.40
SW-846 8260	95-50-1	1,2-Dichlorobenzene	3.61
SW-846 8260	107-06-2	1,2-Dichloroethane	2.43
SW-846 8260	78-87-5	1,2-Dichloropropane	2.21
SW-846 8260	106-46-7	1,4-Dichlorobenzene	1.14
SW-846 8260	78-93-3	2-Butanone	13.76
SW-846 8260	108-10-1	4-Methyl-2-pentanone	12.92
SW-846 8260	67-64-1	Acetone	12.21
SW-846 8260	71-43-2	Benzene	0.72
SW-846 8260	75-27-4	Bromodichloromethane	1.38
SW-846 8260	75-25-2	Bromoform	6.77
SW-846 8260	74-83-9	Bromomethane	0.81
SW-846 8260	75-15-0	Carbon disulfide	1.42
SW-846 8260	56-23-5	Carbon tetrachloride	2.08
SW-846 8260	108-90-7	Chlorobenzene	1.77
SW-846 8260	75-00-3	Chloroethane	0.99
SW-846 8260	67-66-3	Chloroform	0.39
SW-846 8260	74-87-3	Chloromethane	0.02
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	2.18
SW-846 8260	124-48-1	Dibromochloromethane	3.95
SW-846 8260	100-41-4	Ethylbenzene	2.01
SW-846 8260	87-68-3	Hexachlorobutadiene	0.39
SW-846 8260	75-09-2	Methylene chloride	1.77
SW-846 8260	91-20-3	Naphthalene	10.86
SW-846 8260	100-42-5	Styrene	0.12
SW-846 8260	127-18-4	Tetrachloroethene	3.85

29

Test Method	CAS No.	Analyte	Maximum RPD
SW-846 8260	108-88-3	Toluene	4.32
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	0.78
SW-846 8260	79-01-6	Trichloroethene	1.43
SW-846 8260	75-01-4	Vinyl chloride	1.46
SW-846 8260	1330-20-7	Xylene	2.42

Iron and manganese had RPDs greater than 35 percent. The maximum analytical result for iron is less than 8 percent of the WRW AL, and for manganese it is less than 17 percent of the WRW AL. Iron and manganese MSD results did not impact project decisions.

Field Duplicate Evaluation

Field duplicate results reflect sampling precision, or overall repeatability of the sampling process. The frequency of field duplicate collection should exceed 1 field duplicate per 20 real samples, or 5 percent. Table 13 indicates that sampling frequencies were adequate with respect to all analytical methods.

**Table 13
Field Duplicate Sample Frequency Summary**

Test Method	No. of Real Samples	No. of Duplicate Samples	% Duplicate Samples
Alpha Spectroscopy	2	2	100.00%
Gamma Spectroscopy	10	2	20.00%
SW-846 6010	10	2	20.00%
SW-846 8260	10	2	20.00%

Duplicate sample RPDs indicate how much variation exists in the field duplicate analyses; duplicate sample RPDs are provided in Table 14. The EPA data validation guidelines state that “there are no required review criteria for field duplicate analyses comparability” (EPA 1994b). For the DQA, the highest maximum RPDs (greater than 35 percent) are normally reviewed. For IHSS Group 400-1, metal RPD results were greater than 35 percent for aluminum, chromium, manganese, nickel, and vanadium. Analytes with the highest maximum RPDs are further evaluated by comparing maximum analytical results with the WRW AL. If the highest sample concentration is sufficiently below the AL (less than 10 percent), no further action is required. Because the maximum analytical result divided by the WRW AL for chromium, nickel, and vanadium are less than 10 percent of the WRW AL, no further action with respect to these analytes is required. RPDs for these analytes did not affect project decisions.

30

Table 14
RPD Evaluation Summary

Laboratory Code	Test Method	Analyte	Maximum RPD (%)
ESTLDEN	SW-846 6010	Aluminum	42.42
ESTLDEN	SW-846 6010	Barium	6.59
ESTLDEN	SW-846 6010	Beryllium	26.36
ESTLDEN	SW-846 6010	Chromium	37.84
ESTLDEN	SW-846 6010	Cobalt	30.30
ESTLDEN	SW-846 6010	Copper	6.90
ESTLDEN	SW-846 6010	Iron	23.35
ESTLDEN	SW-846 6010	Lead	11.32
ESTLDEN	SW-846 6010	Lithium	16.77
ESTLDEN	SW-846 6010	Manganese	62.07
ESTLDEN	SW-846 6010	Nickel	42.31
ESTLDEN	SW-846 6010	Strontium	30.77
ESTLDEN	SW-846 6010	Vanadium	45.16
ESTLDEN	SW-846 6010	Zinc	7.69
ESTLDEN	SW-846 8260	1,1,1-Trichloroethane	1.80
ESTLDEN	SW-846 8260	1,1-Dichloroethane	1.80
ESTLDEN	SW-846 8260	1,2,4-Trichlorobenzene	1.80
ESTLDEN	SW-846 8260	1,2-Dichloroethane	1.80
ESTLDEN	SW-846 8260	4-Methyl-2-pentanone	0.00
ESTLDEN	SW-846 8260	Benzene	1.80
ESTLDEN	SW-846 8260	Bromodichloromethane	1.80
ESTLDEN	SW-846 8260	Bromoform	1.80
ESTLDEN	SW-846 8260	Carbon disulfide	1.80
ESTLDEN	SW-846 8260	Chlorobenzene	1.80
ESTLDEN	SW-846 8260	Chloroform	1.80
ESTLDEN	SW-846 8260	cis-1,3-Dichloropropene	1.80
ESTLDEN	SW-846 8260	Dibromochloromethane	1.80
ESTLDEN	SW-846 8260	Methylene chloride	1.80
ESTLDEN	SW-846 8260	Naphthalene	1.80
ESTLDEN	SW-846 8260	Styrene	1.80
ESTLDEN	SW-846 8260	Tetrachloroethene	1.80
ESTLDEN	SW-846 8260	Toluene	1.80
ESTLDEN	SW-846 8260	trans-1,3-Dichloropropene	1.80
ESTLDEN	SW-846 8260	Trichloroethene	1.80

The maximum analytical result for aluminum is 13.2 percent of the WRW AL, and for manganese it is 16.1 percent. However, corrections for LCS and MS recoveries do not significantly alter the values and project decisions were not impacted by maximum RPD values. In addition, the decision whether to remediate is based not only on the AL comparison, but also the results of the SSRS.

6.2.3 Completeness

Based on the original program DQOs, a minimum of 25 percent of ER Program analytical (and radiological) results must be formally verified and validated. Of that percentage, no more than 10 percent of the results may be rejected, which ensures that analytical laboratory practices are consistent with quality requirements. Table 15 presents the number and percentage of validated records (codes without "1") (in this case no records were validated), the number and percentage of verified records (codes with "1"), and the percentage of rejected records (none for the IHSS Group 400-1 project) for each analyte group. While no records were validated for this project the frequency of verification and lack of rejected records are within project quality requirements. In addition, association with previous and subsequent validated records indicates that project data are adequate.

**Table 15
V&V Summary**

Validation Qualifier Code	Total of CAS Number	Alpha Spectroscopy	Gamma Spectroscopy	SW-846 6010	SW-846 8260
J1	57	0	0	55	2
JB1	1	0	0	0	1
UJ1	18	0	0	14	4
V1	626	10	30	161	425
Total	702	10	30	230	432
Verified	702	10	30	230	432
% Verified	100.00%	100.00%	100.00%	100.00%	100.00%

Validation qualifiers: J = Estimated, JB = Estimated with possible laboratory contamination, R = Rejected, UJ = Estimated detection limit, V = Validated

Verification qualifiers: J1 = Estimated, JB1 = Estimated with possible laboratory contamination, R1 = Rejected, UJ1 = Estimated detection limit, V1 = Verified

6.2.4 Sensitivity

RLs, in units of micrograms per kilogram ($\mu\text{g}/\text{kg}$) for organics, milligrams per kilogram (mg/kg) for metals, and picocuries per gram (pCi/g) for radionuclides, were compared with RFCA ALs. Adequate sensitivities of analytical methods were attained for all COCs that affect project decisions. "Adequate" sensitivity is defined as an RL less than an analyte's associated AL, typically less than one-half the AL.

6.3 Summary of Data Quality

LCS corrections of maximum results indicate no project decisions were impacted. Surrogate recoveries and field blank analyses are acceptable. Corrections for LCS, MS, and MSD recoveries indicate that results did not impact project decisions.

The frequency of field duplicates is adequate. No records were rejected. Compliance with the project quality requirements and RFETS validation and verification goals for analytical records were met indicating these data are adequate.

Data collected and used for IHSS Group 400-1 are adequate for decision making.

29

7.0 PROJECT CONCLUSIONS

Results of the accelerated action justify an NFAA determination for IHSS Group 400-1. This justification is based on the following:

- Accelerated action sampling results were less than WRW ALs.
- NFAA is appropriate based on the SSRS.

8.0 REFERENCES

DOE, 1992-2003, Historical Release Reports for the Rocky Flats Plant, Golden, Colorado.

DOE, 1999, U.S. Department of Energy, Quality Assurance, Order 414.1A.

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

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

DOE, 2002a, Rocky Flats Environmental Technology Site Automated Surface-Water Monitoring Report - Water Years 1997-2000, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002b, Final 2001 Annual Rocky Flats Cleanup Agreement (RFCA) Groundwater Monitoring Report for the Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-04-08, IHSS Group 400-1, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

DOE, 2003b, Industrial Area Sampling and Analysis Plan Addendum #IA-03-14, IHSS Groups 400-5 and 400-6, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003c, Rocky Flats Environmental Technology Site Automated Surface-Water Monitoring Report - Water Year 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003d, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY04 Notification #04-08, IHSS Group 400-1, Rocky Flats Environmental Technology Site, Golden, Colorado, December.

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.

EPA, 1994a, Guidance for the Data Quality Objective Process, QA/G-4.

EPA, 1994b, U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, 540/R-94/012.

EPA, 1994c, U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, 540/R-94/013.

EPA, 1998, Guidance for the Data Quality Assessment Process; Practical Methods for Data Analysis, QA/G-9.

K-H, 2002a, General Guidelines for Data Verification and Validation, DA-GR01-v2, October.

K-H, 2002b, V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v2, October.

K-H, 2002c, V&V Guidelines for Volatile Organics, DA-SS01-v3, October.

K-H, 2002d, V&V Guidelines for Semivolatile Organics, DA-SS02-v3, October.

K-H, 2002e, V&V Guidelines for Metals, DA-SS05-v3, October.

Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5.

ENCLOSURE

Compact Disc Containing Complete Data Set

IHSS Group 400-1
UBC 439 – Radiological Survey
Accelerated Action Data

35/35

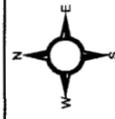
FIGURE 1

IHSS Group 400-1
UBC 439

General Location

KEY

	UBC 439
	Building demolished
	Building standing
	Pond
	Paved road
	Dirt road
	Surface water drainage



250 0 250 500 750 1000 1250 Feet

Scale = 1:10,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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

Prepared for:



Prepared by:



File: W:\Projects\Fy2004\400-1\400-1_dsr_rpk.apr Date: 8/19/04

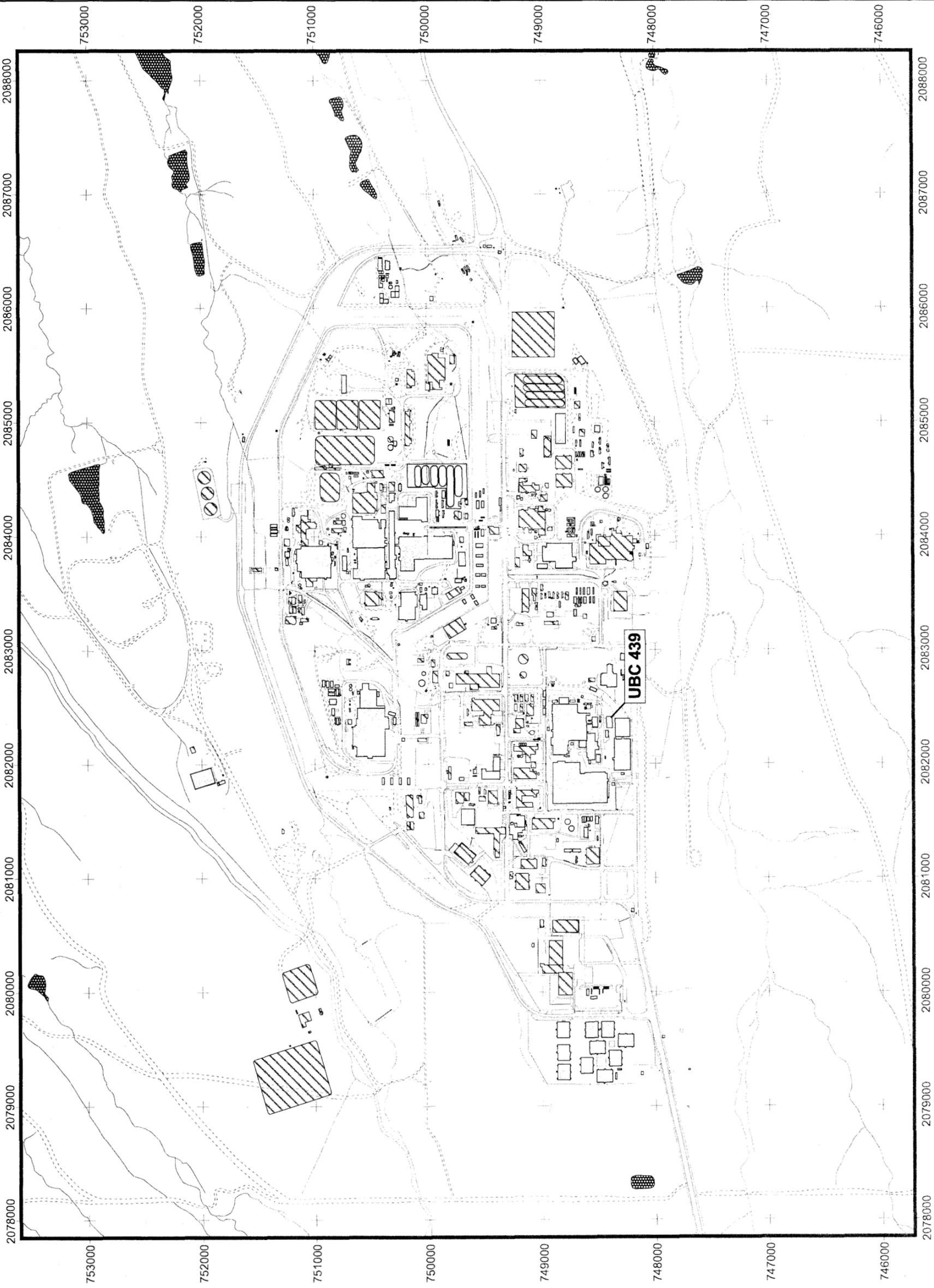


FIGURE 3
IHSS Group 400-1
UBC 439
Accelerated Action Surface Soil
Sampling Locations with Results
Greater Than Background Means
Plus Two Standard Deviations
or Reporting Limits

KEY

- Surface soil sampling location with result greater than background means plus two standard deviations or reporting limits
- Surface soil sampling location with result less than than background means plus two standard deviations or reporting limits
- ▭ UBC 439
- ▭ PAC
- ▭ IHSS
- ▨ Building demolished
- ▭ Building standing
- Paved road
- - - Dirt road
- Surface water drainage
- - - Sewer line

Scale = 1:500

State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD 27

Prepared for:
 U.S. Department of Energy
 Rocky Flats Environmental Technology Site

Prepared by:

KAISER-HILL
 COMPANY

RADMS

File: W:\Projects\FY2004\400-1\400-1_dsr_rpk.apr
 Date: 8/19/04

