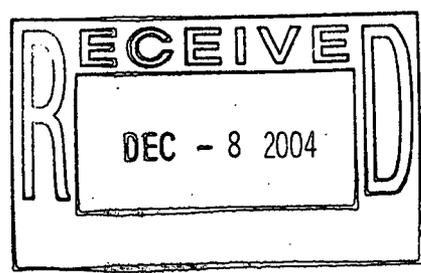




**Draft Data Summary Report  
for IHSS Group 100-1  
UBC 122 (Medical Facility)  
and IHSS 000-121 Tank T-1 (OPWL)**



**December 2004**

**ADMIN RECORD  
IA-A-002454**

1/31

**Draft Data Summary Report  
for IHSS Group 100-1  
UBC 122 (Medical Facility)  
and IHSS 000-121 Tank T-1 (OPWL)**

Approval received from the Colorado Department of Public Health and Environment

( )  
Approval letter contained in the Administrative Record.

**December 2004**

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Appendix A – Correspondence

**ENCLOSURE**

Complete Data Set Compact Disc – Accelerated Action Data

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## ACRONYMS

AAESE	Accelerated Action Ecological Screening Evaluation
AL	action level
AR	Administrative Record
ASD	Analytical Services Division
bgs	below ground surface
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
DCGL	Derived Concentration Guidance Levels
DOE	U.S. Department of Energy
DQA	Data Quality Assessment
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
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
LLMW	Low Level Mixed Waste
ug/100 cm <sup>2</sup>	micrograms per 100 squared centimeters
ug/kg	micrograms per kilogram (may be found as ug/kg)
mg/kg	milligrams per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NFAA	No Further Accelerated Action
NLR	No Longer Representative
NPWL	New Process Waste Line
OPWL	Original Process Waste Line
PAC	Potential Area of Concern
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
PCOC	potential contaminant of concern
PDS	Pre-Demolition Survey
POE	Point of Evaluation

QC	quality control
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS or Site	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RIN	report identification number
RISS	Remediation, Industrial Decommissioning and Demolition, and Site Services
RL	reporting limit
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SOR	sum of ratios
SSRS	Subsurface Soil Risk Screen
SVOC	semivolatile organic compound
SWD	Soil Water Database
TSCA	Toxic Substances Control Act
UBC	Under Building Contamination
VOC	volatile organic compound
V&V	verification and validation
WRW	wildlife refuge worker

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## **1.0 INTRODUCTION**

This Data Summary Report summarizes accelerated action characterization activities conducted at Individual Hazardous Substance Site (IHSS) Group 100-1, which consists of the Building 122 Under Building Contamination (UBC) site (referred to as UBC 122) and IHSS 000-121 Tank T-1 (Original Process Waste Line [OPWL]) 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-04-04 (DOE 2003a). The IASAP Addendum was approved by the Colorado Department of Public Health and Environment (CDPHE) on November 20, 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 IHSS Group 100-1 is a No Further Accelerated Action (NFAA) site. This information and NFAA determination will be documented in the Fiscal Year (FY) 2005 (05) Historical Release Report (HRR).

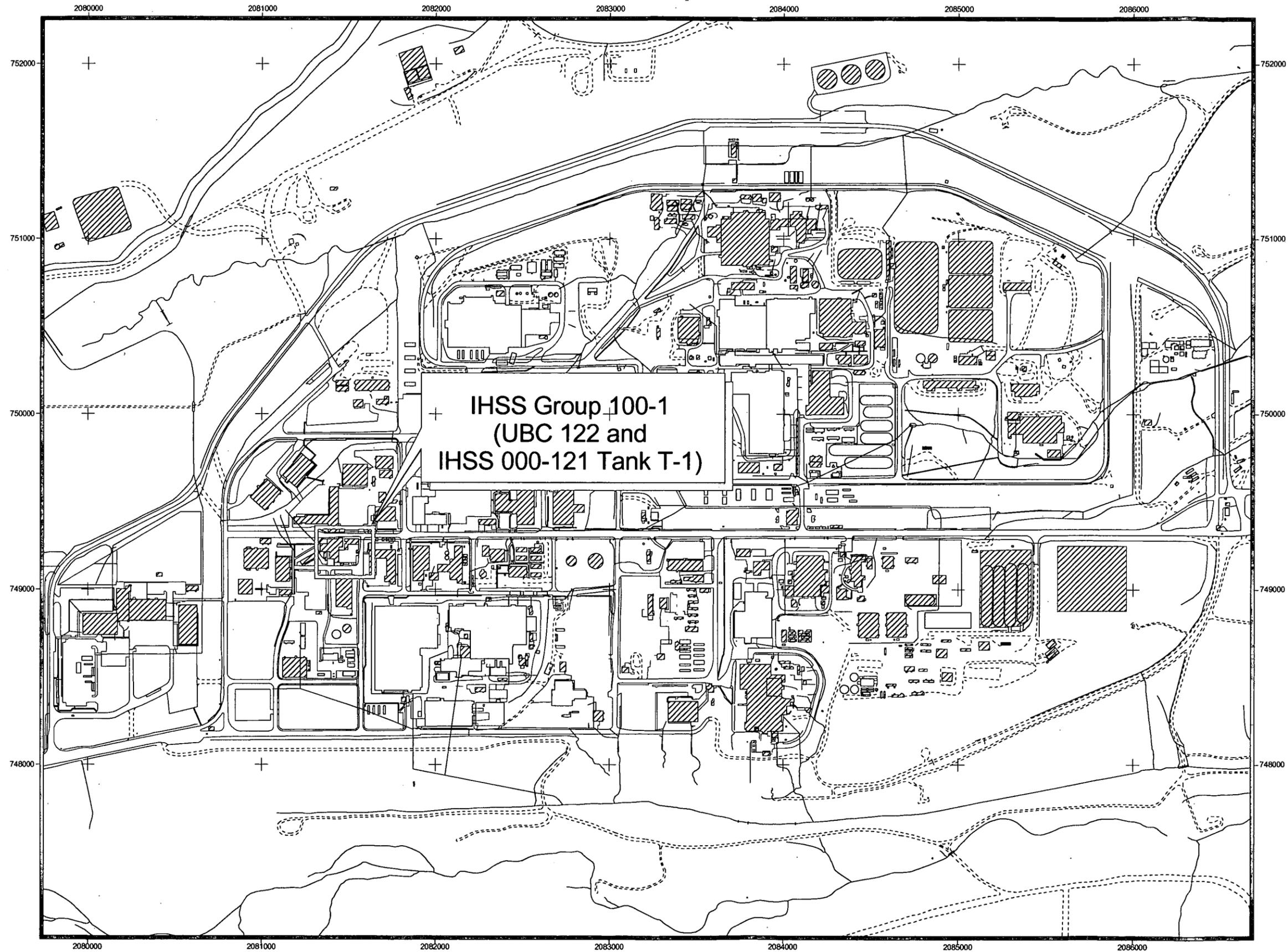
## **2.0 SITE CHARACTERIZATION**

IHSS Group 100-1 consists of UBC 122, which underlies the southern two-thirds of Building 122, and IHSS 000-121 Tank T-1, which originally laid just outside the southeastern corner of Building 122. The general location of IHSS Group 100-1 at the Site is shown on Figure 1, and a more detailed location is shown on Figure 2.

Adjacent to IHSS Group 100-1 lie two UBCs and two Potential Areas of Concern (PACs). IHSS Group 100-2, consisting of UBC 125 (Building 125 Standards Laboratory), lies approximately 65 feet (ft) south of IHSS Group 100-1. This IHSS was granted NFAA status in 2002 (CDPHE 2002a). UBC 123 (Building 123 Health Physics Laboratory), a member of IHSS Group 100-4, lies approximately 60 ft east of IHSS Group 100-1. PAC 100-609 (Building 121 Security Incinerator), the only constituent of IHSS Group 100-5, lies about 34 ft west of IHSS Group 100-1, just south of Building 121. UBC 123 and PAC 100-609 were granted NFAA status by CDPHE on April 22, 2003 (CDPHE 2003b, DOE 2003b). PAC 100-601 (Building 123 Phosphoric Acid Spill) lies about 33 ft southeast of the southeastern corner of Tank T-1 and was granted NFAA status in 2002 (CDPHE 2002b). PAC 100-601 is not associated with an IHSS Group. All four of these areas are shown on Figure 2.

Group 100-1 characterization information consists of historical knowledge, previously collected analytical data, and accelerated action analytical data. Existing information and data for UBC 122 and IHSS 000-121 Tank T-1 are available in Appendix C of the IASAP (DOE 2001), the IA Data Summary Report (DOE 2000), the Historical Release Reports (HRR) (DOE 1992-2003), and IASAP Addendum #IA-04-04 (DOE 2003a).

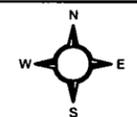
**Figure 1  
IHSS Group 100-1  
General Location Map**



**KEY**

- UBC 122
- Tank T-1
- Paved road
- Dirt road
- Stream
- Structure**
- Demolished
- Standing

DRAFT



500 0 500 Feet

Scale = 1:7,000

State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD 27

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

Prepared by:



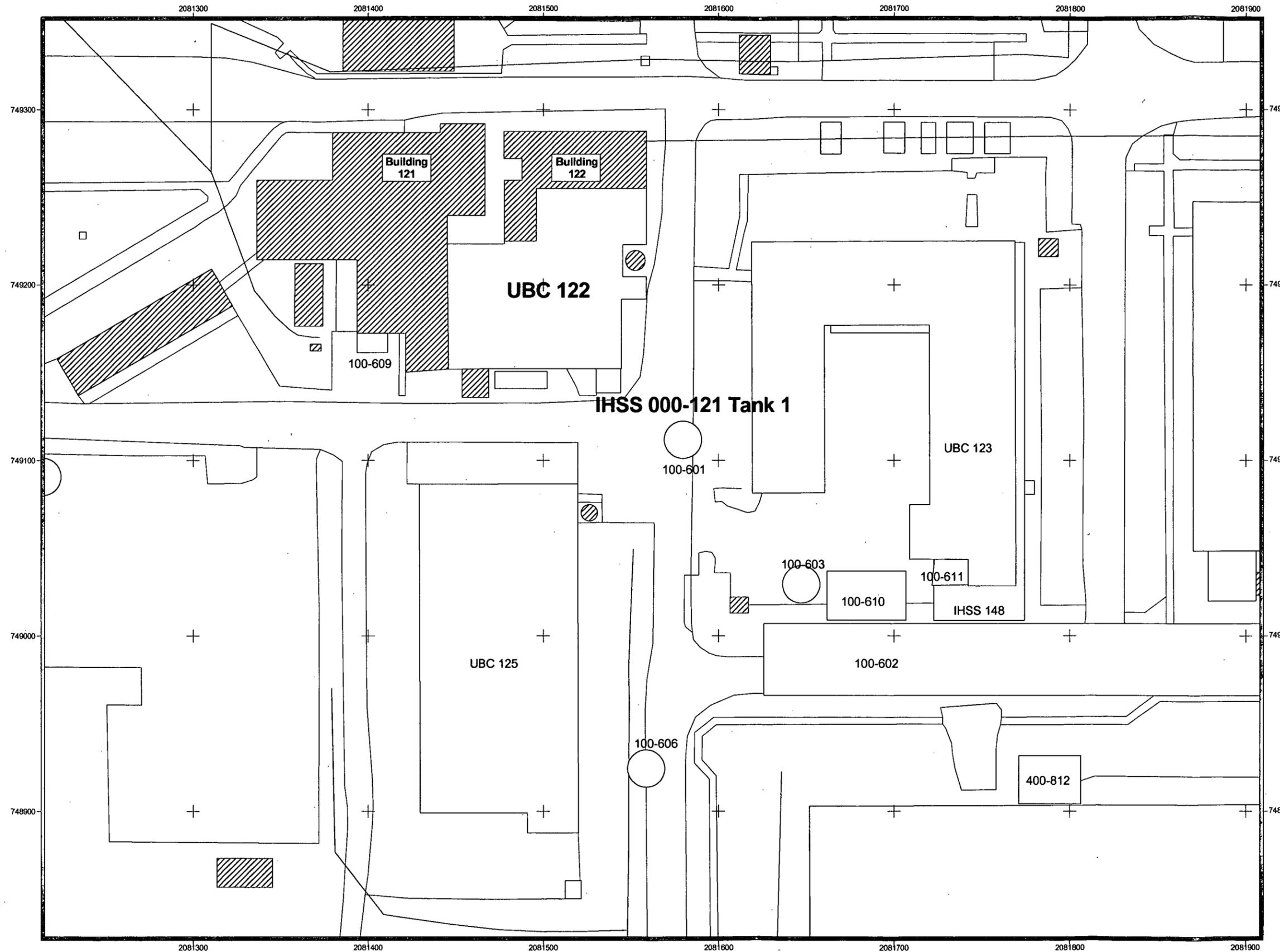
Prepared for:



Date: 112504

File: w:\projects\2009100-1\100-1\_data\_sum\_110104.apr

**Figure 2**  
**IHSS Group 100-1**  
**Detailed Location Map**



**KEY**

- PAC
- UBC
- IHSS
- Tank
- Paved road
- Dirt road
- Stream
- Structure**
- Demolished
- Standing

DRAFT

Scale = 1:700  
 State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD 27

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

Prepared by:



Prepared for:



Date: 112504

File: w:\projects\2009\100-1\100-1\_data\_sum\_110104.apr

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Accelerated action characterization data for IHSS Group 100-1 are summarized in Section 2.2. A compact disc (CD) is enclosed, which 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 Service (CAS) numbers, and units are standardized, and derived analytes are provided.

## **2.1 Historic Information and Data**

This summary is taken from IASAP Addendum #IA-04-04 (DOE 2003a).

Building 122 housed (until September 2004) the on-site medical facilities of the Plant and the occupational health and internal dosimetry organizations. Emergency medical services, diagnosis, decontamination, first aid, x-ray, minor surgical treatment, and ambulatory activities were carried out in this building. The building also contained clinical facilities to support routine employee and subcontractor physical examinations. Body counting, to measure radioactive material in the body, was also conducted. The facility contained three general areas: administration, internal dosimetry, and medical/health.

Building 122 went into service in 1953. Major additions were made in approximately 1967, 1969, and 1989. Other smaller additions and internal modifications were also made during the building's service life.

Very few chemicals were used in Building 122, and only small volumes of chemical wastes were generated. Chemicals used in Building 122 were principally related to development of x-ray film (e.g., fixers and developers) and decontamination of workers (e.g., water, Clorox, soap, and hydrogen peroxide). Fixers and developers consisted of inorganic chemicals, with silver being the long-term contaminant of concern. Most of the film development work and related chemical storage occurred in Room 109. Starting in the mid-1980s, spent fixers were stored in a satellite accumulation area in Room 109. Developers and associated water were discharged into the sanitary sewer system. Decontamination fluids originally drained to Tank T-1. After the tank was removed, the building was connected to the new process waste line (NPWL) system. No records were found indicating that x-ray chemicals or decontamination fluids either spilled or leaked within the building.

The Historical Release Report discusses research studies related to beryllium, plutonium, americium, and uranium (DOE 1992-2003). No records have been found indicating the exact location of these studies within Building 122, nor is there indication that spills or releases to the environment occurred.

A radiological and chemical characterization was conducted as part of a Pre-Demolition Survey (PDS) (DOE 2004a) to define the nature and extent of radioactive and materials and chemical contamination prior to demolition of Building 122. The contaminants of concern (COCs) for the chemical characterization were asbestos, beryllium, volatile organic compounds (VOCs), metals, and polychlorinated biphenyls (PCBs). Radiological sampling results indicated a number of painted surfaces with elevated activity above the transuranic Derived Concentration Guidance Levels (DCGLs). All areas containing elevated paint activity were decontaminated (physically removed) prior to demolition. All areas with survey results less than DCGLs were left in place for

demolition. Friable asbestos containing materials were abated prior to demolition. Numerous beryllium smear samples were collected on the interior and exterior surfaces of the building. All smear sample results for Building 122 were less than the investigative limit of 0.1 micrograms per 100 square centimeters ( $\mu\text{g}/100\text{ cm}^2$ ). Building 122 did not store or use significant quantities of materials containing VOCs and metals but did contain walls with lead shielding. The lead-lined walls were removed and managed as Low Level Mixed Waste (LLMW). Based on above historical and process knowledge, PCB sampling was not performed as part of the PDS. All paints were assumed to contain PCBs and all painted surfaces were managed as PCB Bulk Product Waste. PCB ballasts were removed and managed as Toxic Substances Control Act (TSCA) waste.

Tank T-1 was an 800-gallon stainless steel storage tank used to collect wastewater streams from Building 122, the Medical Facility. The Historical Site Assessment (DOE 2003c) states that the tank was located above ground. Other reports and available diagrams indicate it was located below ground (DOE 1992, 1994, Dow 1959). Waste drained from the building to the tank. When the tank was full, waste was pumped out to a tank truck and then discharged to the OPWL system. Waste included trace radionuclides, bleach, soap, blood, and hydrogen peroxide. The Phase I RFI/RI Work Plan for Operable Unit 9 reports that tank T-1 was removed in January 1984 (DOE 1992). During demolition of Building 122, the area the tank formerly occupied was excavated, and the tank was not found.

## **2.2 Accelerated Action Characterization Data**

Accelerated action analytical data for IHSS Group 100-1 were collected in accordance with IASAP Addendum #IA-04-04 (DOE 2003a). Sampling specifications, including potential contaminants of concern (PCOCs) and media, 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 locations of samples and analytical results greater than background means plus two standard deviations or reporting limits (RLs), including Rocky Flats Cleanup Agreement (RFCA) (DOE et al. 2003) Wildlife Refuge Worker (WRW) Action Level (AL) exceedances, are shown on Figure 3 and listed in Table 3. Figure 3 presents the analytical data for both surface soil and subsurface soil data. WRW exceedances are shown in bold font on Table 3 and in red on Figure 3.

## **2.3 Accelerated Action Exceedances**

A total of 8 sampling locations were planned for IHSS Group 100-1. Data indicate that all contaminant activities and concentrations are less than RFCA WRW ALs except for arsenic. Arsenic was detected at sampling location BT39-007 (2.5 to 4.5 ft below ground surface [bgs]) at a concentration of 25 milligrams per kilogram (mg/kg), which is slightly greater than the WRW AL of 22.2 mg/kg. This COC was not detected in any other samples for this IHSS group. Subsurface soil results are evaluated as part of the Subsurface Soil Risk Screen (SSRS) in Section 6.0.

**Table 1**  
**IHSS Group 100-1 Accelerated Action Characterization Specifications and Sampling Deviations**

IHSS/PAC/ UBC Site	Location	Proposed Northing	Proposed Easting	Actual Northing	Actual Easting	Actual Media	Actual Depth (ft)	Actual Analyte	Comments
IHSS 000-121	BT38-001-01	749139.535	2081531.718	749143.127	2081530.395	Surface Soil	0-0.5	Radionuclides, Metals	Biased. Location code renamed from BT38-001 to BT38-001-01 due to duplicate location code. Sample moved 3 feet northwest of proposed location due to abandoned water line. No other deviations from the planned specifications.
IHSS 000-121	BT38-001-01	749139.535	2081531.718	749143.127	2081530.395	Subsurface Soil	0.5-2.5	Radionuclides, Metals	Biased. Location code renamed from BT38-001 to BT38-001-01 due to duplicate location code. Sample moved 3 feet northwest of proposed location due to abandoned water line. No other deviations from the planned specifications.
IHSS 000-121	BT38-001-01	749139.535	2081531.718	749143.127	2081530.395	Subsurface Soil	2.5-4.5	Radionuclides, Metals	Biased. Location code renamed from BT38-001 to BT38-001-01 due to duplicate location code. Sample moved 3 feet northwest of proposed location due to abandoned water line. No other deviations from the planned specifications.
IHSS 000-121	BT38-001-01	749139.535	2081531.718	749143.127	2081530.395	Subsurface Soil	4.5-6.5	Radionuclides, Metals	Biased. Location code renamed from BT38-001 to BT38-001-01 due to duplicate location code. Sample moved 3 feet northwest of proposed location due to abandoned water line. No other deviations from the planned specifications.
IHSS 000-121	BT38-001-01	749139.535	2081531.718	749143.127	2081530.395	Subsurface Soil	6.5-8.5	Radionuclides, Metals	Biased. Location code renamed from BT38-001 to BT38-001-01 due to duplicate location code. Sample moved 3 feet northwest of proposed location due to abandoned water line. No other deviations from the planned specifications.
IHSS 000-121	BT38-001-01	749139.535	2081531.718	749143.127	2081530.395	Subsurface Soil	8.5-10.5	Radionuclides, Metals	Biased. Location code renamed from BT38-001 to BT38-001-01 due to duplicate location code. Sample moved 3 feet northwest of proposed location due to abandoned water line. No other deviations from the planned specifications.
IHSS 000-121	BT38-001-01	749139.535	2081531.718	749143.127	2081530.395	Subsurface Soil	10.5-12.5	Radionuclides, Metals	Biased. Location code renamed from BT38-001 to BT38-001-01 due to duplicate location code. Sample moved 3 feet northwest of proposed location due to abandoned water line. No other deviations from the planned specifications.
UBC 122	BT38-006	749157.934	2081533.367	749157.826	2081532.863	Surface Soil	0-0.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
UBC 122	BT38-006	749157.934	2081533.367	749157.826	2081532.863	Subsurface Soil	0.5-2.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
UBC 122	BT38-006	749157.934	2081533.367	749157.826	2081532.863	Subsurface Soil	2.5-4.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.

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## Draft Data Summary Report for IHSS Group 100-1

IHSS/PAC/ UBC Site	Location	Proposed Northing	Proposed Easting	Actual Northing	Actual Easting	Actual Media	Actual Depth (ft)	Actual Analyte	Comments
UBC 122	BT38-006	749157.934	2081533.367	749157.826	2081532.863	Subsurface Soil	4.5-6.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
UBC 122	BT39-007	749173.299	2081535.299	749170.191	2081534.020	Surface Soil	0-0.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
UBC 122	BT39-007	749173.299	2081535.299	749170.191	2081534.020	Subsurface Soil	0.5-2.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
UBC 122	BT39-007	749173.299	2081535.299	749170.191	2081534.020	Subsurface Soil	2.5-4.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
UBC 122	BT39-007	749173.299	2081535.299	749170.191	2081534.020	Subsurface Soil	4.5-6.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
UBC 122	BT39-008	749164.965	2081531.653	749165.689	2081533.860	Surface Soil	0-0.5	Radionuclides, Metals (Method 6010 Required)	Biased. Sample field located 2 feet east of planned location to target the actual location of the drain. No other deviations from the planned specifications.
UBC 122	BT39-008	749164.965	2081531.653	749165.689	2081533.860	Subsurface Soil	0.5-2.5	Radionuclides, Metals (Method 6010 Required)	Biased. Sample field located 2 feet east of planned location to target the actual location of the drain. No other deviations from the planned specifications.
UBC 122	BT39-008	749164.965	2081531.653	749165.689	2081533.860	Subsurface Soil	2.5-4.5	Radionuclides, Metals (Method 6010 Required)	Biased. Sample field located 2 feet east of planned location to target the actual location of the drain. No other deviations from the planned specifications.
UBC 122	BT39-008	749164.965	2081531.653	749165.689	2081533.860	Subsurface Soil	4.5-6.5	Radionuclides, Metals (Method 6010 Required)	Biased. Sample field located 2 feet east of planned location to target the actual location of the drain. No other deviations from the planned specifications.
UBC 122	BT39-009	749193.090	2081450.294	749193.103	2081450.255	Surface Soil	0-0.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
UBC 122	BT39-009	749193.090	2081450.294	749193.103	2081450.255	Subsurface Soil	0.5-2.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
UBC 122	BT39-009	749193.090	2081450.294	749193.103	2081450.255	Subsurface Soil	2.5-4.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
UBC 122	BT39-009	749193.090	2081450.294	749193.103	2081450.255	Subsurface Soil	4.5-6.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
UBC 122	BT39-010	749220.564	2081512.534	749217.462	2081512.529	Surface Soil	0-0.5	Radionuclides, Metals	Biased. Sample field located 3 feet south of planned location to target a crack in the floor. No other deviations from the planned specifications.
IHSS 000-121	BU38-018	749150.733	2081542.916	749150.770	2081542.910	Surface Soil	0-0.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
IHSS 000-121	BU38-018	749150.733	2081542.916	749150.770	2081542.910	Subsurface Soil	0.5-2.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
IHSS 000-121	BU38-018	749150.733	2081542.916	749150.770	2081542.910	Subsurface Soil	2.5-4.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
IHSS 000-121	BU38-018	749150.733	2081542.916	749150.770	2081542.910	Subsurface Soil	4.5-6.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.

IHSS/PAC/UBC Site	Location	Proposed Northing	Proposed Easting	Actual Northing	Actual Easting	Actual Media	Actual Depth (ft)	Actual Analyte	Comments
IHSS 000-121	BU38-018	749150.733	2081542.916	749150.770	2081542.910	Subsurface Soil	6.5-8.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
IHSS 000-121	BU38-018	749150.733	2081542.916	749150.770	2081542.910	Subsurface Soil	8.5-10.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
IHSS 000-121	BU38-018	749150.733	2081542.916	749150.770	2081542.910	Subsurface Soil	10.5-12.5	Radionuclides, Metals	Biased. No deviations from the planned specifications.
UBC 122	BU39-003-01	749198.559	2081539.617	749198.582	2081539.614	Surface Soil	0-0.5	Radionuclides, Metals	Biased. Location code renamed from BU39-001 to BU39-001-01 due to duplicate location code. No deviations from the planned specifications.

**Table 2**  
**IHSS Group 100-1 Accelerated Action Characterization Sampling and Analysis Summary**

Criteria	Planned Total	Actual Total
Number of Sampling Locations	8	8
Number of Samples	32	31
Number of Radionuclide Analyses	32	31
Number of Metal Analyses	32 (4 locations require Method 6010)	31

**Table 3**  
**IHSS Group 100-1 Accelerated Action Characterization Data Greater Than Background Means Plus Two Standard Deviations**

IHSS, PAC, or UBC Site	Location Code	Actual Northing	Actual Easting	Start Depth (ft)	End Depth (ft)	Analyte	Result	WRW AL	Background Means Plus Two Standard Deviations	Units
IHSS 000-121	BT38-001-01	749143.127	2081530.395	0	0.5	Antimony	0.630	409.0	0.470	mg/kg
IHSS 000-121	BT38-001-01	749143.127	2081530.395	0	0.5	Chromium	18.000	268.0	16.990	mg/kg
IHSS 000-121	BT38-001-01	749143.127	2081530.395	0	0.5	Copper	21.000	40900.0	18.060	mg/kg
IHSS 000-121	BT38-001-01	749143.127	2081530.395	0	0.5	Zinc	80.000	307000.0	73.760	mg/kg
IHSS 000-121	BT38-001-01	749143.127	2081530.395	0.5	2.5	Aluminum	50000.000	228000.0	35373.170	mg/kg

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IHSS, PAC, or UBC Site	Location Code	Actual Northing	Actual Easting	Start Depth (ft)	End Depth (ft)	Analyte	Result	WRW AL	Background Means Plus Two Standard Deviations	Units
IHSS 000-121	BT38-001-01	749143.127	2081530.395	0.5	2.5	Arsenic	20.000	22.2	13.140	mg/kg
IHSS 000-121	BT38-001-01	749143.127	2081530.395	0.5	2.5	Vanadium	94.000	7150.0	88.490	mg/kg
IHSS 000-121	BT38-001-01	749143.127	2081530.395	6.5	8.5	Uranium-235	0.185	8.0	0.120	pCi/g
IHSS 000-121	BU38-018	749150.770	2081542.910	0	0.5	Aluminum	17000.000	228000.0	16902.000	mg/kg
IHSS 000-121	BU38-018	749150.770	2081542.910	0	0.5	Antimony	0.640	409.0	0.470	mg/kg
IHSS 000-121	BU38-018	749150.770	2081542.910	0	0.5	Lithium	12.000	20400.0	11.550	mg/kg
IHSS 000-121	BU38-018	749150.770	2081542.910	0	0.5	Nickel	15.000	20400.0	14.910	mg/kg
IHSS 000-121	BU38-018	749150.770	2081542.910	0	0.5	Uranium-234	3.280	300.0	2.253	pCi/g
IHSS 000-121	BU38-018	749150.770	2081542.910	0	0.5	Uranium-235	0.235	8.0	0.094	pCi/g
IHSS 000-121	BU38-018	749150.770	2081542.910	0	0.5	Uranium-238	3.280	351.0	2.000	pCi/g
IHSS 000-121	BU38-018	749150.770	2081542.910	0.5	2.5	Uranium-234	3.823	300.0	2.640	pCi/g
IHSS 000-121	BU38-018	749150.770	2081542.910	0.5	2.5	Uranium-235	0.171	8.0	0.120	pCi/g
IHSS 000-121	BU38-018	749150.770	2081542.910	0.5	2.5	Uranium-238	3.823	351.0	1.490	pCi/g
IHSS 000-121	BU38-018	749150.770	2081542.910	4.5	6.5	Aluminum	42000.000	228000.0	35373.170	mg/kg
IHSS 000-121	BU38-018	749150.770	2081542.910	4.5	6.5	Arsenic	14.000	22.2	13.140	mg/kg
IHSS 000-121	BU38-018	749150.770	2081542.910	6.5	8.5	Uranium-235	0.135	8.0	0.120	pCi/g
IHSS 000-121	BU38-018	749150.770	2081542.910	6.5	8.5	Uranium-238	1.576	351.0	1.490	pCi/g
UBC 122	BT38-006	749157.826	2081532.863	0	0.5	Uranium-234	3.488	300.0	2.253	pCi/g
UBC 122	BT38-006	749157.826	2081532.863	0	0.5	Uranium-235	0.198	8.0	0.094	pCi/g
UBC 122	BT38-006	749157.826	2081532.863	0	0.5	Uranium-238	3.488	351.0	2.000	pCi/g
UBC 122	BT38-006	749157.826	2081532.863	0.5	2.5	Uranium-234	4.277	300.0	2.640	pCi/g
UBC 122	BT38-006	749157.826	2081532.863	0.5	2.5	Uranium-235	0.228	8.0	0.120	pCi/g
UBC 122	BT38-006	749157.826	2081532.863	0.5	2.5	Uranium-238	4.277	351.0	1.490	pCi/g
UBC 122	BT38-006	749157.826	2081532.863	2.5	4.5	Uranium-234	3.986	300.0	2.640	pCi/g
UBC 122	BT38-006	749157.826	2081532.863	2.5	4.5	Uranium-235	0.179	8.0	0.120	pCi/g
UBC 122	BT38-006	749157.826	2081532.863	2.5	4.5	Uranium-238	3.986	351.0	1.490	pCi/g
UBC 122	BT38-006	749157.826	2081532.863	4.5	6.5	Uranium-234	3.484	300.0	2.640	pCi/g
UBC 122	BT38-006	749157.826	2081532.863	4.5	6.5	Uranium-235	0.159	8.0	0.120	pCi/g

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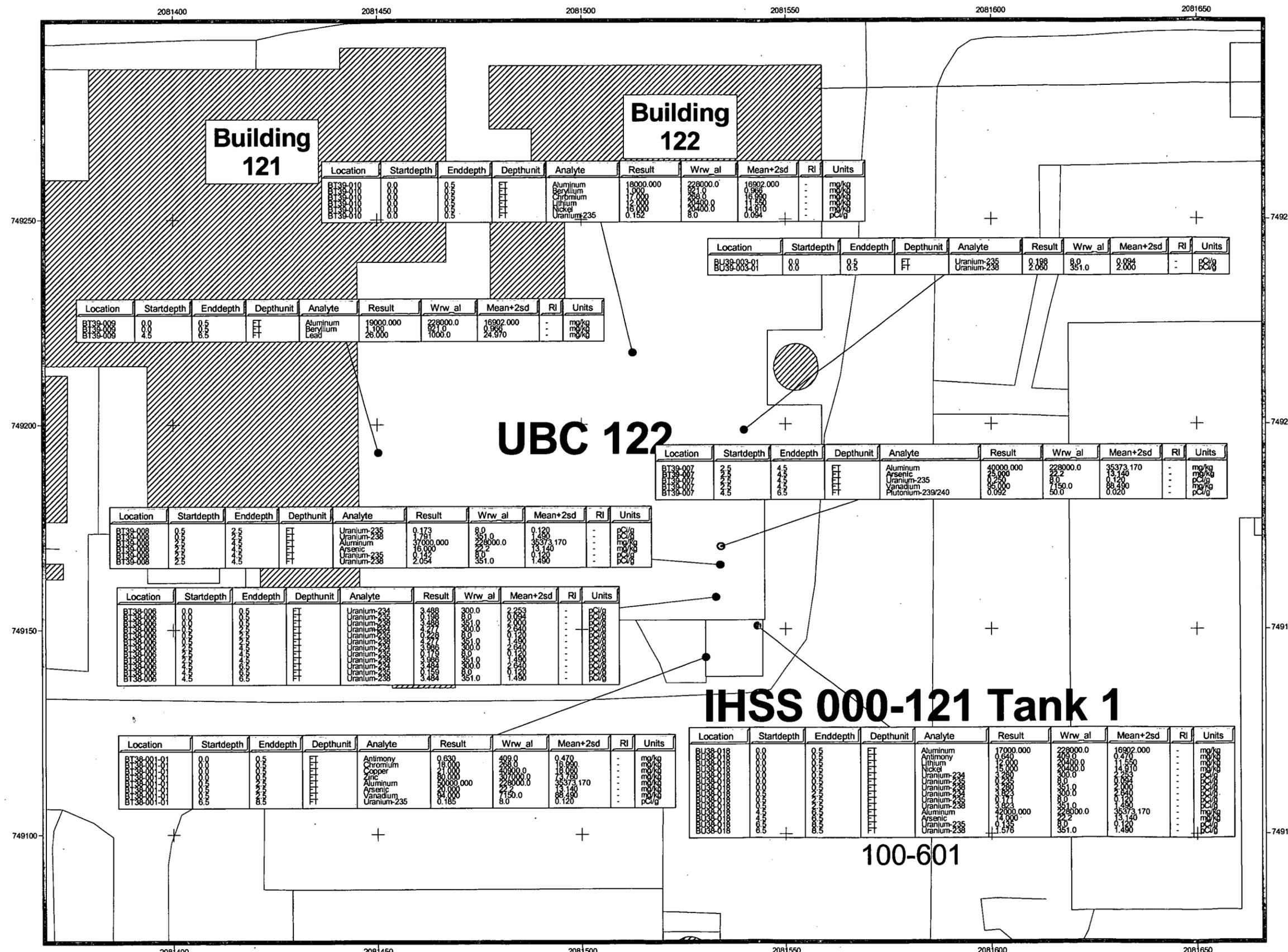
## Draft Data Summary Report for IHSS Group 100-1

IHSS, PAC, or UBC Site	Location Code	Actual Northing	Actual Easting	Start Depth (ft)	End Depth (ft)	Analyte	Result	WRW AL	Background Means Plus Two Standard Deviations	Units
UBC 122	BT38-006	749157.826	2081532.863	4.5	6.5	Uranium-238	3.484	351.0	1.490	pCi/g
UBC 122	BT39-007	749170.191	2081534.020	2.5	4.5	Aluminum	40000.000	228000.0	35373.170	mg/kg
UBC 122	BT39-007	749170.191	2081534.020	2.5	4.5	Arsenic	25.000	22.2	13.140	mg/kg
UBC 122	BT39-007	749170.191	2081534.020	2.5	4.5	Uranium-235	0.250	8.0	0.120	pCi/g
UBC 122	BT39-007	749170.191	2081534.020	2.5	4.5	Vanadium	95.000	7150.0	88.490	mg/kg
UBC 122	BT39-007	749170.191	2081534.020	4.5	6.5	Plutonium-239/240	0.092	50.0	0.020	pCi/g
UBC 122	BT39-008	749165.689	2081533.860	0.5	2.5	Uranium-235	0.173	8.0	0.120	pCi/g
UBC 122	BT39-008	749165.689	2081533.860	0.5	2.5	Uranium-238	1.791	351.0	1.490	pCi/g
UBC 122	BT39-008	749165.689	2081533.860	2.5	4.5	Aluminum	37000.000	228000.0	35373.170	mg/kg
UBC 122	BT39-008	749165.689	2081533.860	2.5	4.5	Arsenic	16.000	22.2	13.140	mg/kg
UBC 122	BT39-008	749165.689	2081533.860	2.5	4.5	Uranium-235	0.142	8.0	0.120	pCi/g
UBC 122	BT39-008	749165.689	2081533.860	2.5	4.5	Uranium-238	2.054	351.0	1.490	pCi/g
UBC 122	BT39-009	749193.103	2081450.255	0	0.5	Aluminum	19000.000	228000.0	16902.000	mg/kg
UBC 122	BT39-009	749193.103	2081450.255	0	0.5	Beryllium	1.100	921.0	0.966	mg/kg
UBC 122	BT39-009	749193.103	2081450.255	4.5	6.5	Lead	26.000	1000.0	24.970	mg/kg
UBC 122	BT39-010	749217.462	2081512.529	0	0.5	Aluminum	18000.000	228000.0	16902.000	mg/kg
UBC 122	BT39-010	749217.462	2081512.529	0	0.5	Beryllium	1.000	921.0	0.966	mg/kg
UBC 122	BT39-010	749217.462	2081512.529	0	0.5	Chromium	17.000	268.0	16.990	mg/kg
UBC 122	BT39-010	749217.462	2081512.529	0	0.5	Lithium	12.000	20400.0	11.550	mg/kg
UBC 122	BT39-010	749217.462	2081512.529	0	0.5	Nickel	16.000	20400.0	14.910	mg/kg
UBC 122	BT39-010	749217.462	2081512.529	0	0.5	Uranium-235	0.152	8.0	0.094	pCi/g
UBC 122	BU39-003-01	749198.582	2081539.614	0	0.5	Uranium-235	0.198	8.0	0.094	pCi/g
UBC 122	BU39-003-01	749198.582	2081539.614	0	0.5	Uranium-238	2.060	351.0	2.000	pCi/g

**Figure 3**  
**IHSS Group 100-1**  
**Soil Sampling Results Greater than**  
**Background Means Plus Two**  
**Standard Deviations**

**KEY**

- Sampling Location**
- Detected Greater than WRW AL
  - Detected Above Background Means Plus Two Standard Deviations
- Structure**
- PAC
  - UBC
  - IHSS
  - Tank
  - ▬ Paved road
  - ▬ Dirt road
  - ▬ Stream
  - ▨ Demolished
  - Standing



Location	Startdepth	Enddepth	Depthunit	Analyte	Result	Wrw al	Mean+2sd	RI	Units
BT39-010	0.0	0.5	FT	Aluminum	18000.000	228000.0	16902.000	-	mg/kg
BT39-010	0.0	0.5	FT	Beryllium	1.000	80.0	0.960	-	mg/kg
BT39-010	0.0	0.5	FT	Chromium	17.000	361.0	19.500	-	mg/kg
BT39-010	0.0	0.5	FT	Lithium	16.000	20200.0	14.870	-	mg/kg
BT39-010	0.0	0.5	FT	Nickel	16.000	20200.0	14.870	-	mg/kg
BT39-010	0.0	0.5	FT	Uranium-235	0.152	8.0	0.094	-	pCi/g

Location	Startdepth	Enddepth	Depthunit	Analyte	Result	Wrw al	Mean+2sd	RI	Units
BU39-003-01	0.0	0.5	FT	Uranium-235	0.188	8.0	0.084	-	pCi/g
BU39-003-01	0.0	0.5	FT	Uranium-238	2.080	351.0	2.000	-	pCi/g

Location	Startdepth	Enddepth	Depthunit	Analyte	Result	Wrw al	Mean+2sd	RI	Units
BT39-008	0.0	0.5	FT	Aluminum	19000.000	228000.0	16902.000	-	mg/kg
BT39-008	4.5	6.5	FT	Beryllium	1.000	80.0	0.960	-	mg/kg
BT39-008	4.5	6.5	FT	Lead	26.000	1600.0	24.970	-	mg/kg

Location	Startdepth	Enddepth	Depthunit	Analyte	Result	Wrw al	Mean+2sd	RI	Units
BT39-007	2.5	4.5	FT	Aluminum	40000.000	228000.0	35373.170	-	mg/kg
BT39-007	2.5	4.5	FT	Arsenic	25.000	23.2	13.140	-	mg/kg
BT39-007	2.5	4.5	FT	Uranium-235	0.500	8.0	0.120	-	pCi/g
BT39-007	2.5	4.5	FT	Vanadium	85.000	7150.0	88.490	-	mg/kg
BT39-007	4.5	6.5	FT	Plutonium-239/240	0.092	50.0	0.020	-	pCi/g

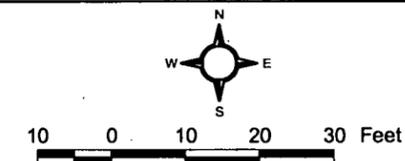
Location	Startdepth	Enddepth	Depthunit	Analyte	Result	Wrw al	Mean+2sd	RI	Units
BT39-008	0.5	2.5	FT	Uranium-235	0.173	8.0	0.120	-	pCi/g
BT39-008	0.5	2.5	FT	Uranium-238	1.791	251.0	1.480	-	pCi/g
BT39-008	2.5	4.5	FT	Aluminum	37000.000	228000.0	35373.170	-	mg/kg
BT39-008	2.5	4.5	FT	Arsenic	16.000	23.2	13.140	-	mg/kg
BT39-008	2.5	4.5	FT	Uranium-235	0.142	8.0	0.120	-	pCi/g
BT39-008	2.5	4.5	FT	Uranium-238	2.054	351.0	1.480	-	pCi/g

Location	Startdepth	Enddepth	Depthunit	Analyte	Result	Wrw al	Mean+2sd	RI	Units
BT39-008	0.0	0.5	FT	Uranium-234	3.488	300.0	2.253	-	pCi/g
BT39-008	0.0	0.5	FT	Uranium-235	1.289	8.0	0.120	-	pCi/g
BT39-008	0.0	0.5	FT	Uranium-238	2.277	351.0	1.480	-	pCi/g
BT39-008	0.0	0.5	FT	Uranium-235	0.229	8.0	0.120	-	pCi/g
BT39-008	0.0	0.5	FT	Uranium-238	0.765	351.0	1.480	-	pCi/g
BT39-008	0.0	0.5	FT	Uranium-235	0.028	8.0	0.120	-	pCi/g
BT39-008	0.0	0.5	FT	Uranium-238	0.092	50.0	0.020	-	pCi/g
BT39-008	0.0	0.5	FT	Uranium-235	0.152	8.0	0.120	-	pCi/g
BT39-008	0.0	0.5	FT	Uranium-238	1.484	251.0	1.480	-	pCi/g
BT39-008	4.5	6.5	FT	Uranium-235	0.152	8.0	0.120	-	pCi/g
BT39-008	4.5	6.5	FT	Uranium-238	1.484	351.0	1.480	-	pCi/g

Location	Startdepth	Enddepth	Depthunit	Analyte	Result	Wrw al	Mean+2sd	RI	Units
BT39-001-01	0.0	0.5	FT	Antimony	0.630	409.0	0.470	-	mg/kg
BT39-001-01	0.0	0.5	FT	Chromium	16.000	20200.0	14.870	-	mg/kg
BT39-001-01	0.0	0.5	FT	Copper	17.000	20200.0	14.870	-	mg/kg
BT39-001-01	0.0	0.5	FT	Nickel	20.000	20200.0	14.870	-	mg/kg
BT39-001-01	0.0	0.5	FT	Aluminum	20000.000	228000.0	35373.170	-	mg/kg
BT39-001-01	0.0	0.5	FT	Arsenic	20.000	23.2	13.140	-	mg/kg
BT39-001-01	0.0	0.5	FT	Vanadium	20.000	7150.0	88.490	-	mg/kg
BT39-001-01	0.0	0.5	FT	Uranium-235	0.185	8.0	0.120	-	pCi/g

Location	Startdepth	Enddepth	Depthunit	Analyte	Result	Wrw al	Mean+2sd	RI	Units
BU39-018	0.0	0.5	FT	Aluminum	17000.000	228000.0	16902.000	-	mg/kg
BU39-018	0.0	0.5	FT	Antimony	0.640	409.0	0.470	-	mg/kg
BU39-018	0.0	0.5	FT	Lithium	12.000	20200.0	14.870	-	mg/kg
BU39-018	0.0	0.5	FT	Nickel	15.000	20200.0	14.870	-	mg/kg
BU39-018	0.0	0.5	FT	Uranium-234	0.268	300.0	2.253	-	pCi/g
BU39-018	0.0	0.5	FT	Uranium-235	0.238	8.0	0.120	-	pCi/g
BU39-018	0.0	0.5	FT	Uranium-238	0.771	351.0	1.480	-	pCi/g
BU39-018	0.0	0.5	FT	Uranium-235	0.171	8.0	0.120	-	pCi/g
BU39-018	0.0	0.5	FT	Uranium-238	1.171	251.0	1.480	-	pCi/g
BU39-018	0.0	0.5	FT	Aluminum	22800.000	228000.0	35373.170	-	mg/kg
BU39-018	0.0	0.5	FT	Arsenic	22.2	23.2	13.140	-	mg/kg
BU39-018	0.0	0.5	FT	Uranium-235	0.195	8.0	0.120	-	pCi/g
BU39-018	0.0	0.5	FT	Uranium-238	1.576	351.0	1.480	-	pCi/g

DRAFT



Scale = 1:300  
 State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD 27

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

Prepared by:



Prepared for: Date: 112504



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### 3.0 SUM OF RATIOS

Radionuclide RFCA sums of ratios (SORs) were calculated for IHSS Group 100-1 sampling locations based on the accelerated action analytical data for the COCs and the 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 the 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
BT38-006	0	0.5	0.05
BT38-006	0.5	2.5	0.05
BT38-006	2.5	4.5	0.05
BT39-007	2.5	4.5	0.03
BT39-008	0.5	2.5	0.03
BT39-008	2.5	4.5	0.02
BT39-010	0	0.5	0.02
BU38-018	0	0.5	0.05
BU38-018	0.5	2.5	0.05
BU39-003-01	0	0.5	0.03

Non-radionuclide SORs are calculated for locations with analytical results greater than 10 percent of the WRW ALs. Surface soil SORs for non-radionuclide COCs were not calculated for IHSS Group 100-1 as there were no results greater than 10 percent of the WRW ALs. Subsurface soil SORs for non-radionuclides were not calculated because subsurface soil concentrations are evaluated as part of the SSRS in Section 6.0

### 4.0 SUMMARY STATISTICS

Summary statistics by analyte were calculated for the IHSS Group 100-1 sampling locations, as presented in Tables 5 and 6.

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**Table 5**  
**IHSS Group 100-1 Surface Soil Summary Statistics**

Analyte	Number of Samples Analyzed	Detection Frequency (Greater Than Background)	Average Concentration	Maximum Concentration	Background Mean Plus Two Standard Deviations	WRW AL	Unit
Aluminum	8	37.50%	18000.00	19000.00	16902.00	228000	mg/kg
Antimony	8	25.00%	0.64	0.64	0.47	409	mg/kg
Beryllium	8	25.00%	1.05	1.10	0.97	921	mg/kg
Chromium	8	25.00%	17.50	18.00	16.99	268	mg/kg
Copper	8	12.50%	21.00	21.00	18.06	40900	mg/kg
Lithium	8	25.00%	12.00	12.00	11.55	20400	mg/kg
Nickel	8	25.00%	15.50	16.00	14.91	20400	mg/kg
Uranium-234	8	25.00%	3.38	3.49	2.25	300	pCi/g
Uranium-235	8	50.00%	0.20	0.24	0.09	8	pCi/g
Uranium-238	8	37.50%	2.94	3.49	2.00	351	pCi/g
Zinc	8	12.50%	80.00	80.00	73.76	307000	mg/kg

**Table 6**  
**IHSS Group 100-1 Subsurface Soil Summary Statistics**

Analyte	Number of Samples Analyzed	Detection Frequency (Greater Than Background)	Average Concentration	Maximum Concentration	Background Mean Plus Two Standard Deviations	WRW AL	Unit
Aluminum	23	17.39%	42250.00	50000.00	35373.17	228000	mg/kg
Arsenic	23	17.39%	18.75	25.00	13.14	22.2	mg/kg
Lead	23	4.35%	26.00	26.00	24.97	1000	mg/kg
Plutonium-239/240	23	4.35%	0.09	0.09	0.02	50	pCi/g
Uranium-234	23	17.39%	3.89	4.28	2.64	300	pCi/g
Uranium-235	23	39.13%	0.18	0.25	0.12	8	pCi/g
Uranium-238	23	30.43%	3.00	4.28	1.49	351	pCi/g
Vanadium	23	8.70%	94.50	95.00	88.49	7150	mg/kg

## 5.0 RCRA UNIT CLOSURE

NPWL were connected to Building 122. This RCRA unit is part of IHSS Group 000-4 and is being closed under a Closure Decision Document (DOE 2004b). After building demolition, the NPWL were removed from this area. Specific information regarding this removal will be included in the RCRA Closure documentation and the IHSS 000-4 Closeout Report.

## 6.0 SUBSURFACE SOIL RISK SCREEN

The SSRS follows the steps identified in Figure 3 of Attachment 5 of the RFCA Modification (DOE et al. 2003).

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

No. All subsurface COC concentrations are less than the WRW ALs, except for subsurface soil arsenic concentration of 25 mg/kg at sampling location BT39-007 (2.5 to 4.5 ft bgs), which is only slightly higher than the WRW AL of 22.2 mg/kg.

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

No. Based upon Figure 1 of RFCA Attachment 5 (DOE et al. 2003), IHSS Group 100-1 is not located in an area considered prone to landslides or erosion.

### Screen 3 – Does subsurface soil radiological contamination exceed criteria in Section 5.3 and Attachment 14?

No. All radiological activities in IHSS Group 100-1 were below the criteria specified in Section 5.3 and Attachment 14.

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

No. Contaminant migration via erosion and groundwater are the two possible pathways whereby surface water could become contaminated by IHSS Group 100-1 COCs. Migration via erosion is unlikely because IHSS Group 100-1 is not located in an area prone to landslides or erosion.

Groundwater in this area flows east-northeast. Six groundwater monitoring wells are located to the east, surrounding UBC 123. These wells are part of the Integrated Monitoring Plan (IMP). Data from these wells show: Tier I and Tier II exceedances of uranium-238 and tetrachloroethene; and Tier II exceedances of methylene chloride, thallium, molybdenum, cadmium, barium, and cesium-137. Arsenic was not detected above background concentrations in any of these wells. These wells reflect groundwater conditions in this area of the IA. Groundwater quality at these locations may not be attributed to any single upgradient IHSS Group. Further groundwater evaluation will be part of the groundwater Interim Measure/Interim Remedial Action (IM/IRA).

## 7.0 NO LONGER REPRESENTATIVE SAMPLING LOCATIONS

Because no remediation activities occurred at IHSS Group 100-1, none of the accelerated action sampling locations are being designated as No Longer Representative (NLR).

## 8.0 NO FURTHER ACCELERATED ACTION SUMMARY

Based on analytical results and the SSRS, action is not required, and an NFAA determination is justified for IHSS Group 100-1 based on the following:

- Concentrations of COCs were not detected above RFCA WRW ALs except for arsenic, which was only slightly higher than the associated WRW AL.

- 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 100-1. Groundwater will be further evaluated in a future decision document.

Approval of this Data Summary Report constitutes regulatory agency concurrence that IHSS Group 100-1 is an NFAA Site. This information and the NFAA determination will be documented in the FY05 HRR. Ecological factors will be evaluated in the AAESE and the CRA.

## **9.0 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-04-04 (approval letter dated November 20, 2003 [CDPHE 2003]);

Samples collected in accordance with the IASAP (DOE 2001); and

Data Quality Assessment (DQA) conducted as documented in the following sections.

### **9.1 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 process. 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

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- 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.

## 9.2 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 the 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;
- 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 compact disc in Microsoft Access 2000 format.

### 9.2.1 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 in Table 7 LCS analyses were run for all methods except for gamma spectroscopy. The onsite laboratories are not required to provide this data.

**Table 7**  
**LCS Frequency Summary**

Test Method	Lab Batch	LCS
ALPHA SPEC	4293485	Yes
ALPHA SPEC	4293486	Yes
ALPHA SPEC	4293487	Yes
ALPHA SPEC	4294440	Yes
ALPHA SPEC	4294441	Yes
ALPHA SPEC	4294443	Yes
SW-846 6010	4288658	Yes
SW-846 6010	4289424	Yes
SW-846 6010	4293557	Yes
SW-846 6010	4299180	Yes
SW-846 6010	4299181	Yes

LCS results are summarized in Table 8. The minimum and maximum LCS recoveries are tabulated by chemical for the entire project. 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.

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**Table 8**  
**LCS Evaluation Summary**

Test Method	CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)
SW-846 6010	7429-90-5	Aluminum	94	99
SW-846 6010	7440-36-0	Antimony	92	92
SW-846 6010	7440-38-2	Arsenic	89	91
SW-846 6010	7440-39-3	Barium	94	97
SW-846 6010	7440-41-7	Beryllium	99	102
SW-846 6010	7440-43-9	Cadmium	91	94
SW-846 6010	7440-47-3	Chromium	94	96
SW-846 6010	7440-48-4	Cobalt	91	92
SW-846 6010	7440-50-8	Copper	93	95
SW-846 6010	7439-89-6	Iron	99	102
SW-846 6010	7439-92-1	Lead	93	94
SW-846 6010	7439-93-2	Lithium	97	97
SW-846 6010	7439-96-5	Manganese	95	99
SW-846 6010	7439-97-6	Mercury	91	97
SW-846 6010	7439-98-7	Molybdenum	93	94
SW-846 6010	7440-02-0	Nickel	93	94
SW-846 6010	7782-49-2	Selenium	89	92
SW-846 6010	7440-22-4	Silver	95	99
SW-846 6010	7440-24-6	Strontium	95	96
SW-846 6010	7440-31-5	Tin	91	93
SW-846 6010	11-09-6	Uranium, Total	94	96
SW-846 6010	7440-62-2	Vanadium	94	95
SW-846 6010	7440-66-6	Zinc	89	97

The analytes with potentially unacceptable low recoveries were evaluated in the following manner. 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. The one known WRW AL exceedance was excluded from the evaluation. All LCS recoveries were within tolerance.

#### *Surrogate Evaluation*

VOCs and semivolatile organic compounds (SVOCs) were not COCs for IHSS Group 100-1, and therefore no surrogate recovery evaluation was conducted.

#### *Field Blank Evaluation*

Results of the field blank analyses are provided in Table 9. Detectable 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.

For detections (non-"U" laboratory qualifiers), evaluation consists of multiplying the field blank results by 10 (for laboratory contaminants) or by 5 (for non-laboratory contaminants) and comparing them to the WRW ALs. In this case, to be conservative, the factor used was 10 in all cases. When the corrected field blank result is less than the WRW AL, the associated real results are considered acceptable.

**Table 9**  
**Field Blank Summary**

Laboratory	CAS No.	Analyte	Sample QC Code	Detected Value	Result Unit
URS	15117-96-1	Uranium-235	FB	0.144	pCi/g
URS	7440-61-1	Uranium-238	FB	2.23	pCi/g

FB = field blank, RNS = equipment rinse, EB = equipment blank, TB = trip blank

For the IHSS Group 100-1 data, none of the results from blank analyses exceeded the associated WRW AL when multiplied by 10. Therefore, blank contamination did not adversely impact project decisions. Any qualification of results due to field blank results are also captured in the V&V flags, described in Section 9.2.3.

**Sample Matrix Spike Evaluation**

Table 10 provides a summary of the minimum and maximum MS results by chemical for the project. According to the EPA data validation guidelines (EPA 1994b), if organic MS recoveries are low, then the LCS recovery should be checked. If the recovery is acceptable, no action is taken. LCS recoveries for organic analyses with potentially unacceptable low MS recoveries are reviewed. For this project, no VOC or SVOC analyses were done, therefore evaluation for organics was not conducted.

**Table 10**  
**Sample MS Evaluation Summary**

Test Method	CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)	Number of MS Samples	Number of Laboratory Batches
SW-846 6010	7429-90-5	Aluminum	3270	8710	2	2
SW-846 6010	7440-36-0	Antimony	37	42	2	2
SW-846 6010	7440-38-2	Arsenic	87	89	2	2
SW-846 6010	7440-39-3	Barium	97	101	2	2
SW-846 6010	7440-41-7	Beryllium	97	107	2	2
SW-846 6010	7440-43-9	Cadmium	84	90	2	2
SW-846 6010	7440-47-3	Chromium	98	139	2	2
SW-846 6010	7440-48-4	Cobalt	88	92	2	2
SW-846 6010	7440-50-8	Copper	102	105	2	2
SW-846 6010	7439-89-6	Iron	0	5270	2	2
SW-846 6010	7439-92-1	Lead	93	106	2	2
SW-846 6010	7439-93-2	Lithium	104	106	2	2

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Test Method	CAS No.	Analyte	Minimum (%REC)	Maximum (%REC)	Number of MS Samples	Number of Laboratory Batches
SW-846 6010	7439-96-5	Manganese	77	132	2	2
SW-846 6010	7439-97-6	Mercury	4.3	89	3	3
SW-846 6010	7439-98-7	Molybdenum	86	88	2	2
SW-846 6010	7440-02-0	Nickel	94	106	2	2
SW-846 6010	7782-49-2	Selenium	87	87	2	2
SW-846 6010	7440-22-4	Silver	91	93	2	2
SW-846 6010	7440-24-6	Strontium	91	103	2	2
SW-846 6010	7440-31-5	Tin	86	87	2	2
SW-846 6010	11-09-6	Uranium, Total	87	92	2	2
SW-846 6010	7440-62-2	Vanadium	91	134	2	2
SW-846 6010	7440-66-6	Zinc	107	113	2	2

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. All inorganic results with MS recoveries greater than zero were acceptable based on this criterion.

Percent recovery of iron ranged from 0 to 5270. Because iron was not detected above background means plus two standard deviations, project decisions were not impacted by the MS percent recovery of 0 for iron.

### 9.2.2 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 which are summarized in Table 11. Analytes with the highest relative percent differences (RPDs) (greater than 35 percent) are reviewed by comparing the highest sample result to the WRW AL. For analytes with RPDs exceeding 35 percent, if the highest sample results are sufficiently below the ALs, no further action is needed.

With respect to metals, aluminum, iron, manganese, mercury, and zinc had RPDs greater than 35 percent. Manganese and mercury were not detected above their respective background means plus two standard deviations. The maximum result for aluminum was 21.9 percent of its WRW AL. Iron had a maximum result of 2.6 percent of its associated WRW AL. Lastly, the maximum result for zinc was less than one percent of its WRW AL. This review indicates that project decisions were not impacted by MSD RPD values for metals that were greater than 35 percent.

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**Table 11**  
**Sample MSD Evaluation Summary**

Test Method	CAS No.	Analyte	Max RPD (%)
SW-846 6010	7429-90-5	Aluminum	47.80
SW-846 6010	7440-36-0	Antimony	23.16
SW-846 6010	7440-38-2	Arsenic	1.13
SW-846 6010	7440-39-3	Barium	6.12
SW-846 6010	7440-41-7	Beryllium	4.78
SW-846 6010	7440-43-9	Cadmium	1.18
SW-846 6010	7440-47-3	Chromium	21.51
SW-846 6010	7440-48-4	Cobalt	1.13
SW-846 6010	7440-50-8	Copper	21.05
SW-846 6010	7439-89-6	Iron	83.33
SW-846 6010	7439-92-1	Lead	29.19
SW-846 6010	7439-93-2	Lithium	- 3.92
SW-846 6010	7439-96-5	Manganese	47.52
SW-846 6010	7439-97-6	Mercury	146.75
SW-846 6010	7439-98-7	Molybdenum	1.16
SW-846 6010	7440-02-0	Nickel	8.89
SW-846 6010	7782-49-2	Selenium	1.14
SW-846 6010	7440-22-4	Silver	2.13
SW-846 6010	7440-24-6	Strontium	13.47
SW-846 6010	7440-31-5	Tin	1.16
SW-846 6010	11-09-6	Uranium, Total	1.14
SW-846 6010	7440-62-2	Vanadium	12.70
SW-846 6010	7440-66-6	Zinc	45.98

**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 12 indicates that sampling frequencies were adequate.

**Table 12**  
**Field Duplicate Sample Frequency Summary**

Test Method	Sample Code	Number of Samples	% Duplicate Samples
ALPHA SPECTROSCOPY	REAL	8	50.00
	DUP	4	
GAMMA SPECTROSCOPY	REAL	32	12.50
	DUP	4	

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Test Method	Sample Code	Number of Samples	% Duplicate Samples
SW-846 6010	REAL	32	12.50
	DUP	4	

Duplicate sample RPDs indicate how much variation exists in the field duplicate analyses; duplicate sample RPDs are provided in Table 13. 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.

All metal analytes, except for arsenic and mercury, in Table 13 have maximum RPD values greater than 35 percent, however, project decisions were not impacted because of the following:

- Beryllium, chromium, copper, lead, lithium, nickel, vanadium, and zinc all have maximum values that are less than 10 percent of their WRW ALS. The high RPD results for these metals did not impact project decisions.
- Barium, cobalt, iron, and strontium were not detected above their associated background means plus two standard deviations.
- Although the maximum detected amount of aluminum is approximately 22 percent of its associated WRW AL, the maximum value of 50,000 mg/kg is well below the WRW AL of 228,000 mg/kg.

**Table 13**  
**RPD Evaluation Summary**

Laboratory	Test Method	Analyte	Max of RPD (%)
ESTLDEN	SW-846 6010	Aluminum	107.69
ESTLDEN	SW-846 6010	Arsenic	33.01
ESTLDEN	SW-846 6010	Barium	105.56
ESTLDEN	SW-846 6010	Beryllium	117.65
ESTLDEN	SW-846 6010	Chromium	80.85
ESTLDEN	SW-846 6010	Cobalt	150.36
ESTLDEN	SW-846 6010	Copper	89.16
ESTLDEN	SW-846 6010	Iron	113.73
ESTLDEN	SW-846 6010	Lead	110.50
ESTLDEN	SW-846 6010	Lithium	98.51
ESTLDEN	SW-846 6010	Manganese	121.17
ESTLDEN	SW-846 6010	Mercury	23.53
ESTLDEN	SW-846 6010	Nickel	120.47
ESTLDEN	SW-846 6010	Strontium	78.26
ESTLDEN	SW-846 6010	Vanadium	124.79
ESTLDEN	SW-846 6010	Zinc	102.44

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### 9.2.3 Completeness

Based on original program DQOs, a minimum of 25 percent of ER Program analytical results must be formally 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 14 presents the number and percentage of validated records (codes without "1"), verified records (codes with "1"), and rejected records for each analyte group. The summary of verified and validated records indicates the data are acceptable. Although no records were validated for this project, other samples collected during the same period for surrounding IHSS groups were validated with no records being rejected. Overall program V&V completeness is based on program not project statistics and is adequate.

**Table 14  
V&V Summary**

Validation Qualifier Code	Total of CAS Number	Alpha Spec	Gamma Spectroscopy	SW-846/6010
J1	148	0	0	148
UJ1	21	0	0	21
V1	703	40	96	567
Total	872	40	96	736
Verified	872	40	96	736
% Verified	100.00%	100.00%	100.00%	100.00%

KEY: Validations: J = Estimated, JB = Estimated with possible laboratory contamination, R = Rejected, UJ = Estimated detection limit, V = Validated Verifications: J1 = Estimated, JB1 = Estimated with possible laboratory contamination, R1 = Rejected, UJ1 = Estimated detection limit, V1 = Verified

### 9.2.4 Sensitivity

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

### 9.3 Summary of Data Quality

RPDs greater than 35 percent indicate the sampling precision limits of some analytes have been exceeded. No records were rejected. All records were verified. Although no records were validated for this project, other samples collected during the same period for surrounding IHSS groups were validated with no records being rejected. If additional V&V information is received, IHSS Group 100-1 records will be updated in SWD. Data qualified as a result of additional data will be assessed as part of the CRA process. Data collected and used for IHSS Group 100-1 are adequate for decision making based on ER Program Goals.

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## **10.0 PROJECT CONCLUSIONS**

Arsenic was detected at one sampling location (BT39-007) at a concentration of 25 mg/kg, which is only slightly greater than the WRW AL of 22.2 mg/kg, at a depth of 2.5 to 4.5 feet bgs. Migration of this contaminant to surface water through erosion is unlikely because the area is not prone to landslides or erosion. Migration of this contaminant in groundwater will not likely impact surface water because of the low levels of soil contamination found in IHSS Group 100-1. All other COCs were well below the associated WRW ALs.

## **11.0 REFERENCES**

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### **ENCLOSURE**

Complete Data Set Compact Disc – Accelerated Action Data

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